BUILDING CONSTRUCTION TECHNIQUES METHODS AND DETAILS BUILDING SYSTEMS AND PREFABRICATION OF BUILDING ELEMENTS PRINCIPLES OF MODULAR COORDINATION ESTIMATION, SPECIFICATION, VALUATION PROFESSIONAL PRACTICE

PROJECT MANAGEMENT, PERT, CPM.

A **project** presupposes commitment of task(s) to be performed within well-defined objectives, schedules and budget. Management refers to an act of managing, controlling, coordinating, directing etc of a host of activities

Project management is an organized venture for managing projects. It involves scientific application of modern tools and techniques in planning, financing, implementing, monitoring, controlling and coordinating unique activities or tasks to produce desirable outputs in consonance with pre-determined objectives within the constraints of time, cost, quantity and quality. Project management involves the following three phases : Planning, scheduling and controlling

Event is a particular instant of time at which some specific part of a plan is to be achieved **Activities** are clearly recognizable jobs or operations

Resources

Material resource (what) Equipment resource (how) Space resource (where) Effort or manpower resource (who) Time resource (when)

Role of Project Manager Network compression Compression potential Project under-run Project over-run

Cost under-run / Cost over-run

There is cost over-run when the cost incurred is more than the value of work done. Similarly there is cost under-run when the cost incurred is less than the value of work done.

Cost over-run = ((actual cost – value of work completed) / value of work completed) * 100 (Under-run)

Project programming Resource balancing Crashed program Time-cost trade-off curve Use of computers in Project management

Work bread down structure

The work break down structure represents a systematic and logical breakdown of the project into its component parts. It is constructed by dividing the project into its major parts, with each of these being further divided into sub-parts. This is continued till a breakdown is done in terms of manageable units of work for which responsibility can be defined.

Compare between Early start schedule and late start schedule in Project Management

The *earliest start time* for an activity is the earliest time by which it can commence. This is naturally equal to the earliest event time associated with the tail of the activity arrow. The *late start time* for an activity is the latest time by which an activity can be started without delaying the completion of the project. For 'no delay' condition to be fulfilled it should be naturally equal to the latest finish time minus the activity duration.

Suggest the components of financial appraisal of a project

- Investment outlay and cost of project
- Means of financing
- Cost of capital
- Projected profitability
- Break-even point
- Cash flows of the project
- > Investment worthwhile ness judged in terms of various criteria of merit
- Projected financial position and flows
- Level of risk

What is mastic asphalt? Where is it used in built environment? Mastic asphalt is rock asphalt containing 90% of calcium carbonate with atleast 8% of bitumen which is then heated to 176 to 200 and stabilized with 12 1/2% sand Used in damp proofing of flat roofs, walls and floors

What is net present value? Which are the major parameters that decide the net present value of a development project?

The net value or net benefit of a project when all costs have been discounted to the present at the accounting rate of interest

The major parameters that decide the net present value are

- > Cash flow occurring at the end of every year, till the life of the project
- ➢ Life of the project
- Cost of capital use as the discount rate

In architectural design what is represented by 'Blue series' and 'Red series'? Explain the underlying concept and their applications

Le Corbusier, while working with the modular called the Fibonacci series arising from the relationship based on the unit 108, the red series, and that series based on the double unit 216 the blue series. He drew a man of a height of 1.75m, engaged at four points: zero, 108, 175, 216, then the red strip on the left, the blue on the right.

WATER SUPPLY, SEWERAGE AND DRAINAGE SYSTEMS

SANITARY FITTINGS AND FIXTURES

PRINCIPLES OF ELECTRIFICATION OF BUILDINGS

ELEVATORS, THEIR STANDARDS AND USES

AIR-CONDITIONING SYSTEMS

FIRE FIGHTING SYSTEMS.

Where check valves are used? Sketch a check valve labeling its parts

Check valve is also called as Reflux valve or non-return valve. This type of valve is generally provided in a pipeline, which is supplied directly by a pump. When the pump fails or is stopped, the water is prevented from running back to the pump. It is an automatic device used to allow water to flow in one direction only.

Cad APPLICATION OF COMPUTERS IN ARCHITECTURE AND PLANNING UNDERSTANDING ELEMENTS OF HARDWARE AND SOFTWARE COMPUTER GRAPHICS PROGRAMMING LANGUAGES – C, VISUAL BASIC AND AUTOCAD.

Outline the procedures to convert a part of an Auto CAD drawing into a separate drawing File.

Consider a drawing file named whole.dwg a part of whose contents needs to be put into a separate drawing file.

The following steps are involved:

- 1. open a new drawing file and put it aside
- open the file, whole.dwg and perform the following command copyclip. Select objects: using a window or any other selection method pick all the objects that constitute the contents of the separate file. Minimize whole.dwg and open the new drawing file
- 3. command pasteclip. Specify insertion point : pick any point on the screen
- 4. command zoom all
- 5. command file : save as. This opens the save as dialogue box. Save the new file as part.dwg. Now the drawing file part.dwg contains the necessary part of whole.dwg

environmental

ELEMENTS OF ENVIRONMENTAL SCIENCE ECOLOGICAL PRINCIPLES CONCERNING ENVIRONMENT ROLE OF MICRO-CLIMATE IN DESIGN CLIMATIC CONTROL THROUGH DESIGN ELEMENTS THERMAL COMFORT ELEMENTS OF SOLAR ARCHITECTURE PRINCIPLES OF LIGHTING AND ILLUMINATION BASIC PRINCIPLES OF ARCHITECTURAL ACOUSTICS AIR POLLUTION, NOISE POLLUTION AND THEIR CONTROL.

Mention the different ways of decreasing the traffic noise level from a highway

- By depressing highways thereby allowing noise to be absorbed by the slopes or radiated into the open atmosphere above the highway
- Vegetation can help reduce outdoor noise and also psychologically separate the source of sound from the viewer
- Such things as walls or soil mounds in combination with plants will absorb or diffract sound waves that come in contact with them.
- Soft objects such as leaves and soil tend to absorb sound, while hard objects such as smooth tree trucks and walls tend to deflect sound and send sound waves in a different direction
- Tall, dense evergreen plantings are more absorbent than other types of plantings, but they must have foliage to the ground level in order to be effective sound barriers
- 4. What are the primary considerations for planning of settlements in a desert region?

- Both the buildings and the external living spaces need to be protected as much as possible from the intense solar radiation and the hot, dusty winds
- An enclosed, compactly planned and essentially inward-looking building is the most suitable
- By placing as much accommodation as possible as possible under one roof, thermal loading from the sun and hot air will be considerably lessened
- Site conditions permitting, the larger dimensions of a building should preferably face north and south.
- Non-habitable rooms (stores, toilets etc.,) can be effectively used as thermal barriers if planned and placed on the east and west end of the building
- By aligning buildings close to each other, especially if east and west walls are placed close together, mutual shading will decrease the heat gains on external walls
- Close group of buildings, narrow roads and streets, arcades, colonnades and small enclosed courtyards give maximum amount of shade and coolness

Feb 1997 SECTION A (100 marks)

SUBSECTION A1 (75 marks)

1. Write in your answer book the correct or most appropriate answer to the following multiple choice questions by writing the corresponding letter A, B, C and D against the sub-question number

(30 X 1 = 30)

- 1.1 The Newtown Intown concept involves
 - a. increasing the population density in the city center
 - b. provision of large scale recreational facilities in city core
 - c. encouraging strip commercial within the city core
 - d. large scale rehabilitation, modernization and redevelopment of the city core

1.2 An 'aquiclude' is

- a. confined bed of impervious material between aquifers
- b. perched aquifer
- c. artesian aquifer
- d. large water body underground

- 1.3 if 'a' is the optimistic time, 'b' is the pessimistic time and 'm' is the most likely time of an activity, the expected time of the activity is
 - a. (a+5m+b)/6
 - b. <u>(a+4m+b) / 6</u>
 - c. (a+2m+b)/6
 - d. (a+m+b) / 6
- 1.4 The most commonly used base for timber painting is
 - a. red lead
 - b. white lead
 - c. titanium white
 - d. zinc oxide
- 1.5 Absorption of sound in porous material occurs mainly due to
 - a. creep loss
 - b. vacuum in holes
 - c. frictional loss
 - d. none of the above
- 1.6 In sewers, velocity of flow should not be
 - a. more than self cleaning velocity
 - b. less than velocity of water at flushing
 - c. less than dry water flow velocity
 - d. less than self cleansing velocity
- 1.7 as per Indian road congress the width of formation of highway in plain land is
 - a. 6.0 m
 - b. 12.0 m
 - c. 18.0 m
 - d. 21.0 m
- 1.8 in a lecture auditorium the seating pattern from the speaker should fall within maximum angle of
 - a. 0º
 - b. 90°
 - c. 120°
 - d. 140º

1.9 when two pigments of contrasting value are mixed, the most striking change observed is in

a. hue dimension

b. occult rhythm

- c. occult balance
- d. none of the above
- 1.10 in meandering river the location of intake point or city water supply should be
 - a. on concave banks
 - b. on convex banks
 - c. down stream point of waste disposal
 - d. middle of the river
- 1.11 number of common clay bricks required to make one cubic meter of brick masonry is
 - a. 350
 - b. 420
 - c. <u>500</u>
 - d. 550
- 1.12 sinking fund refers to
 - a. reserve fund
 - b. fund loss due to damage
 - c. bad debts
 - d. fund for underground construction
- 1.13 BASIC is a
 - a. Compiler
 - b. Hardware item
 - c. Interpreter
 - d. Plotter type
- 1.14 Acidity of soil is indicated by
 - a. BOD
 - b. <u>Ph</u>
 - c. Gl
 - d. CIO
- 1.15 The unit measurement for space in urban society is
 - a. Family
 - b. Group of family
 - c. Community
 - d. Individual
- 1.16 DIM in autoCAD refers to
 - a. Dimension of array
 - b. Dimension function

- c. Brightness of visual screen
- d. None of the above
- 1.17 Sense of movement in a visual composition can be achieved by
 - a. Distributing the visual balance
 - b. Placing elements in diagonal arrangement
 - c. Placing elements symmetrically
 - d. Overlapping elements
- 1.18 Minimum strength of cement mortar used in load bearing brick masonry is
 - a. 50 N/cm²
 - b. 60 N/cm²
 - c. 80 N/cm²
 - d. 100 N/cm²
- 1.19 if 'p' denotes the total population the age-dependency ratio is expressed as
 - a. P
 - b. P
 - c. P
 - d. P
- 1.20 Concept of self supporting "industrial Town was proposed by
 - a. Lewis Mumford
 - b. Henry Wright
 - c. Robert Owen
 - d. Ebenezer Howard
- 1.21 Of the following types of forests, which one is least likely to be destroyed by fire
 - a. Deciduous forest
 - b. Coniferous forest
 - c. Rain forest
 - d. Broad-leaf evergreen forest
- 1.22 Workability of concrete mix with low water-cement ratio is determined by
 - a. Slump test
 - b. Tensile strength test
 - c. Flexural strength test
 - d. Compaction factor test
- 1.23 In hot dry climate the form and planning of settlement should be
 - a. High rise high density

- b. Low rise high density
- c. Low rise low density
- d. High rise low density
- 1.24 The extent of wind shadow on the leeward side is more dependent on
 - a. Height of the building
 - b. Depth of building
 - c. Width of building
 - d. All of the above
- 1.25 Letchworth was designed based on the concept of
 - a. Newtown
 - b. Garden city
 - c. Factory town
 - d. Linear city
- 1.26 Jharoka is an architectural element used in buildings as
 - a. Gateway
 - b. Balcony
 - c. Column decoration
 - d. Ceiling decoration
- 1.27 The concept 'architecture as expression of inner structure' is attributed to
 - a. Alvar alto
 - b. Mies vander rohe
 - c. Walter gropius
 - d. Le corbusier
- 1.28 Psychometric scaling deals with
 - a. <u>Subjective weighting</u>
 - b. Frequency of sound
 - c. Thermal comfort
 - d. Colour intensity
- 1.29 The concept of 'la ciudad linear' is associated with
 - a. Le corbusier
 - b. Tony garnier
 - c. S y mata
 - d. robert owen
- 1.30 the word megalopolis was coined by

a. lewis mumford

- b. Patrick geddes
- c. Norma cousins
- d. Lean gottman

Feb 1998 SECTION A (100 marks)

SUBSECTION A1 (75 marks)

Write in your answer book the correct or most appropriate answer to the following multiple choice questions by writing the corresponding letter A,B,C or D against the sub-question number

1.1 'Pompidou Centre' in paris is an example of

- a. symbolic analogy
- b. Mechanical analogy
- c. Bio-morphic analogy
- d. Mathematical analogy

1.2 Cement (in cu.m) required for preparing 100 cum. of cement concrete in the proportion of 1:2:4 is

- a. 0.80
- b. 1.00
- c. 1.20
- d. 1.40

1.3 The Pritzker Architecture prize, 1996, has been awarded to

- a. Charles Correa
- b. Jose Rafaael Moneo
- c. Robert Venturi

- d. Ricaardo Legorretta
- 1.4 Maximum tensile stress is possible in
 - a. Wood
 - b. Stabilized mud block
 - c. Stone block
 - d. Steel
- 1.5 'kailash Temple' of Ellora is an example f rock-cut architecture of

a. Brahmanical style

- b. Dravidian style
- c. Pallava style
- d. Mamalla style
- 1.6 'Zeolite' is
 - a. hydrated alumino-silicate
 - b. sodium carbonate
 - c. hydrated calciuym hydroxide
 - d. calcium bi-carbonate
- 1.7 The gradient of a horizontal branch in building drainage system should not be steeper than
 - a. 1 in 60
 - b. 1 in 30
 - c. 1 in 20
 - d. 1 in 10
- 1.8 'Timgad' is an example of
 - a. Greek town
 - b. Roman town
 - c. Sumerian town
 - d. Egyptian town
- 1.9 'Architect's Credo' is
 - a. Liberty, equality and Fraternity
 - b. Firm, Commodity and Delight
 - c. I can, I built, I over changed
 - d. Man, hot dogs and Apple pie
- 1.10 Dimmer is used for
 - a. Energy saving
 - b. Shortening bulb life

- c. Flexible lighting
- d. Change of emphasis of lights
- 1.11 The phenomena of degrading water quality of natural water bodies in decomposition is
 - called
- a. Putrificaton
- b. Eutrophication
- c. Fermentation
- d. Hydration

1.12 In computer program a valid real constant is

- a. 1
- b. –1/2
- c. 1.5
- d. 58,634.2
- 1.13 The water Temple, Awaji's Island' is designed by
 - a. Fumihiko Maki
 - b. KenzoTange
 - c. Arata Isozaki
 - d. Tadao Ando
- 1.14 An 'activity' in project Management means
 - a. Start or completion of task in time and resource
 - b. Total project time for completion of work
 - c. Least total time required to complete the work
 - d. Actual performance of task consumes time and resources
- 1.15 The pH scale runs from 0-14, the nearest value of drinking water is
 - a. 0
 - b. 4.5
 - c. 7.0
 - d. 12.6
- 1.16 The emission of auto exhaust consists of
 - а. со
 - b. so2
 - c. nox
 - d. all the three

- 1.17 According to architecture of Manasara a building is called 'female' when its plan is
 - a. octagonal
 - b. rectangular
 - c. circular
 - d. square
- 1.18 The unit of measurement for intensity of sound level is
 - a. bel
 - b. decibel
 - c. hertz
 - d. sones

1.19 To prevent excessive contrast between wall and window which creates glare, the ratio of wall to window area should not generally exceed

- a. 1:1
- b. 2:1
- c. 3:1
- d. 4:1
- 1.20 Permissible stress in bending compression (N/mm²) for M20 grade concrete is
 - a. 3.0
 - b. 5.0
 - c. 7.0
 - d. 8.5
- 1.21 Non-degradable pollutant is
 - a. sewage
 - b. algae
 - c. detergents
 - d. DDT
- 1.22 Maximum air-flow at body level in a room can achieved through
 - a. High inlet and high outlet
 - b. High inlet and low outlet
 - c. Low inlet and high outlet
 - d. Low inlet and low outlet
- 1.23 The 'bread basket region refers to
 - a. Tropical desert
 - b. Coniferous forest
 - c. Temperate grass-land

- d. Tropical grass-land
- 1.24 'Tap root' concept was initiated by
 - a. Le Corbusier
 - b. F. L. Wright
 - c. Tony Garnier
 - d. Robert Millart
- 1.25 Extreme simplicity' was propagated by
 - a. J.J.P. Oud
 - b. C.A.Doxiadis
 - c. Mies Van der Rohe
 - d. Walter Gropius
- 1.26 Botanical name for 'Gulmohar tree' is
 - a. Hamelia patens
 - b. Cordia Sebestina
 - c. Delonix Regia
 - d. Gmelina philippensis
- 1.27 Type of village should be built on a bank of river or a sea as per architecture of manasara is

a. Nadyabarta

- b. Karmukha
- c. Swastika
- d. Prastara
- 1.28 CPCB is an organization which deals with
 - a. Pest control
 - b. Poverty control
 - c. Population control
 - d. Pollution control
- 1.29 Heliodome is used to measure
 - a. Atmospheric pressure
 - b. Sound level
 - c. Sun path
 - d. Intensity of light
- 1.30 Multiplayer dome was found during
 - a. Greek period
 - b. Renaissance period

- c. Indus valley civilizationd. Egyptian civilisation

Match the following

а.	Principles and practices of town and country planning	A. A Toffler
b.	Site planning	B. Andrea palladio
C.	The city in History	C. Charles correa
d.	Four books of aarchitecture	D. C.p.kukreja
e.	Future shock	E. Lewis keeble
f.	Complexity and contradiction in architecture	F. F.I.wright
g.	Human aspects of urban form	G. Kevin lynch
h.	The new landscape	H. Amos rappoport
i.	Writings and buildings	I. Robert venturi
j.	Tropical architecture	J. Lewis mumford

а.	Ringlemann chart	A. Suspended particles
b.	Waldram diagram	B. Hardware
C.	Electro static precipitator	C. Smoke density
d.	Stereoscope	D. Sky factor
e.	Micro processor	E. Aerial photo

а.	Linear city	A. F	P.I.nervi
b.	Dynapolis	B. <i>I</i>	Anant raje
C.	National institute of immunology, delhi	C. [D.a. nair
d.	Exhibition hall, turin	D. S	Soria Y. Mata
e.	Loylola chapel, trivandrum	E. l	Le corbusier
f.	Kinemax, france	F. (Oscar Periera
g.	Kalakshetra theatre, chennai	G. F	Raj rewal
h.	Metabolism	H. I	.m Pei
i.	New parliament complex, Sri Lanka	I. S	Shivnath prasad
j.	National Gallery of Arts, Washington D.C.	J. L	Lawrie baker
		К. с	denis laming
		L. (gunar Mydral
		M. (Geoffrey Bawa
		Ν. α	charles Correa
		0. k	kenzo Tange
		Р. (C.A. Doxiadis

- İ.
- Distinguish between: i. Transplantation and transpiration i. Hardening and tempering of steel İİ.
- Curtain wall and cavity wall iii.
- Gully and gutter iv.

- v. Heartwood and laminated wood
- vi. Food producers and Food Consumers
- vii. Repetition and Rhythm
- viii. Easement and Prescriptive Rights
- ix. Earthenware and Stoneware
- x. S trap and P trap

SUB SETION – A2 (25 marks)

Answer all questions. Each question carries five marks

Outline the procedures to convert a part of an Auto CAD drawing into a separate drawing File.

Consider a drawing file named whole.dwg a part of whose contents needs to be put into a separate drawing file.

The following steps are involved:

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- open the file, whole.dwg and perform the following command copyclip. Select objects: using a window or any other selection method pick all the objects that constitute the contents of the separate file. Minimize whole.dwg and open the new drawing file
- 8. command pasteclip. Specify insertion point : pick any point on the screen
- 9. command zoom all
- 10. command file : save as. This opens the save as dialogue box. Save the new file as part.dwg. Now the drawing file part.dwg contains the necessary part of whole.dwg

Describe the salient features of English style Garden

Outline the mechanism to scale down a large public square flanked by buildings all round

By installing a sculpture/ outdoor murals in the public square

By planting trees By suggesting the direction of movement in the form of channel of space – covered corridor or hedges or floorscape or pavement design By installing 'Graffiti' on vertial plane

Entrance gateways

By placing awnings above windows or doors

Outline with example the evolution of settlement planning thoughts during Egyptian period

- Settlements were located on river banks which were subjected to flood and hence impact of straight lines and parallel lines were derived by receding lines of flood water which were parallel and also almost straight as the river Nile
- Transportation within the settlement was probably on foot, but inter-settlement movement was by river
- Changing flood level of river needed some protection wall on the river from side of a settlement
- Central spine of transportation was on surface and not water as the river was wide and settlements grew only on one side of the river
- The technology of stone cutting and curving and the tremendous pomps and splendors of the pharaohs led to advanced construction technologies

KAHUN 3000 B.C.

- Slave town, slaves engaged in Illahun pyramid
- Planned in grid pattern
- Narrow lanes as passageways and also for drainage
- > Wall surrounded the town to protect against flood and escape of slaves
- Sun-dried brick construction
- Rooms crowded about common courtyards

A developer is planning to develop 50 hectare of land for residential complex. 65% of the total Ind will be available for residential plots. The land acquisition cost is Rs.60.00 per sqm. Mentioning all the outgoings and assuming appropriate cost for them with 20% profit for the developer, workout the land cost component for the project per unit area of built space if FAR is 1.5

SECTION – B (50 marks)

PART – 1

Answer any TEN questions. All questions carry equal marks

Explain with sketches the evolution of Gothic vaulting during Roman and Romanesque period

Explain the term 'vernacular Architecture". Mention the contribution of Laurie Baker in the development of vernacular architecture

Mention the advantages of poly carbonate sheets or Fiberglass reinforced plastic

- ➤ Light in weight
- > Easy to repair
- > Durability

- Corrosion resistance
- ➢ Freedom of design i.e. flexibility
- Low investment in tooling
- ➢ Easy maintenance

Draw the sketches (at least five) of the different ways to cover long span uninterrupted space

Tubular steel truss Dome Tensile structures

Critically analyse the architectural features of Taj mahal building complex at Agra.

Site Plan rectangle aligned north-south measuring 1900' x 1000' Central area divided off into square garden of 1000' side South : system of roads & service dwellings, courtyards and stables

North : raised terrace containing white marble tomb and two detached red sandstone buildings

West : Mosque

East : Mihmam – Khana (Guest house)

Majlis - khana (assembly hall)

The entire garden portion including the tomb is enclosed within a high boundary wall, having broad octagonal pavilions at each corner & a monumental entrance gateway in the center of the southern side

Mausoleum Elevated on a plinth 22' high

186 square with chamfered angles to form an eight sided structure – this shape is carried up to form a building 108' in height, having a marble cupola over each corner.

In the center towering to a height of 187' is the great bulbous dome. The elevation, equal on four sides is typically Islamic in design. In the center it has magnificient arcyhed recess framed by a rectangular wall that rises above the parapet of the roof. Smaller arched recesses in two storeys flank the main arch and are echoed in the narrower beveled wall surfaces. These arched recesses contain the doors and windows. Perforated marble screens, so deliberately carved that they resemble lace work, fill the windows. Floral designs, inlaid with semi precious stones decorate the spandrels of the arches. To extend and distribute the architectural effect a minaret in 3 stages and crowned by a kiosk rises from each corner of the plinth to a height of 137'

Proportion entire width is equal to the height

Height of the façade in the center is the same height as the dome

Although all these factors are considered the facile grouping, rhythmical disposal, and skillful interrelation of each part in the total unity that cause the appearance of this building to react on the aesthetic perceptions in a most inspiring manner

Dome crowning glory of the elevation Body of the feature is seen to be a globe, its lower part truncated by the drum, while its upper curves, produced tangentially, rise up to form the foliated base of the finial

Interior interior arrangement of the compartments – same as that of Humayun's tomb. I.e. octagonal central hall with subsidiary chambers in the angles and all are connected by radiating passages. Main hall is also in two stories of arcades, over which is a semi circular vault forming the inner shell of the double dome Most of the mural enrichment consists of inlaid patterns

Material undoubtedly much of its charm is produced by the quality & texture of the material used the marble is of such a nature that it takes on incredibly subtle variations f tint and tone, according to the changes in light. for every hour of the day and for every atmospheric condition the Taj has its own colour values from

- Soft dreaminess at dawn
- Dazzling whiteness at midday
- Cold splendour in moon light

Garden from the central pool (pond) the water channels flow in the four directions dividing the garden at right angles into four from charbagh or four portioned garden plan. The inclination and level of the garden is carefully designed to keep the water constantly flowing from the river behind the Raj. The gardens were so planned to prepare the spectator for the exquisite appearance and lovely dignity of the central structure, each of its formal elements being designed with the express object of either harmonizing with its architecture or bringing it into pleasing perspective.

State the special considerations for the fire fighting measures for an auditorium

Bring out the advantages of PVC pipes over conventional C.I. pipes in building sewer system

Enumerate the design considerations to ensure ventilation in engineering industrial structures

Discuss with illustrations the application of 'Organic architecture' by F.L. Wright

Show the exploded details of

- Dove-tailed joint in wood
- Double Tenon and Mortise joint in wood

Outline the utility of mixing sand in mortar

Sand forms an important ingredient of mortar

Sand is used in mortar for the following purposes

- Bulk: it does not increase the strength of mortar. But it acts as adulterant. Hence, bulk or volume of mortar is increased which results in reduction in cost
- Setting: if building material is fat lime, carbon dioxide is absorbed through the voids of sand and setting of fat lime occurs effectively
- Shrinkage: it prevents excessive shrinkage of the mortar in the course of drying and hence, cracking of mortar during setting is avoided
- Strength: it helps in the adjustment of strength of mortar or concrete by variation of its proportion with cement or lime. It also increases the resistance of mortar against crushing
- Surface area: it subdivides the past of the binding material into a thin film and thus more surface area is offered for its spreading and adhering

Explain the visual principles of landscape design with building mass or block

Draw the essential features of st. peter plaza, Rome, explaining the design feature

The rateable value of a building is Rs.20,000/- p.a. when interest on capital is 18% and on sinking fund is 6%. The owner of the building gets an offer from a bank for a net rent of Rs.25,000 p.a. for 21 years lease period, provided he modifies the internal layout at a cost of rs.30,000/-. As a valuer what would be your advice to the owner regarding the bank offer.

Determine the size and the end span reinforcement (due to moment) for a beam to support a live load of 12 KN/m on a single span of 8m, using M15 concrete grade. Sigma st = 230 N/mm^2 (R = 0.658 N/mm^2 and j = 0.9)

Highlight the critical design features of Asiad Village, New Delhi

Compare between Early start schedule and late start schedule in Project Management

The *earliest start time* for an activity is the earliest time by which it can commence. This is naturally equal to the earliest event time associated with the tail of the activity arrow. The *late start time* for an activity is the latest time by which an activity can be started without delaying the completion of the project. For 'no delay' condition to be fulfilled it should be naturally equal to the latest finish time minus the activity duration.

Mention the architectural characters developed in the construction of Khajuraho group temples, which distinguish them from any other temple design and style

Starting the concept of 'Taxonomy of Space', explain at least four methods of creating spaces within a large enveloping space.

Suggest the elements in normal public buildings to be stressed upon for the use of physically handicapped persons.

SECTION B (50 marks)

PART – II Answer any TEN questions. All questions carry equal marks

Enumerate the decision factors for outdoor recreation

- > Age group
- Distance
- > Family income
- Mode of travel
- > Availability of time

Mention five government-sponsored slum up gradation schemes in urban areas

Draw a sketch of diamond interchange of a freeway with a highway and label all the parts

Suggest the components of financial appraisal of a project

- Investment outlay and cost of project
- Means of financing
- ➢ Cost of capital
- Projected profitability
- Break-even point
- Cash flows of the project
- > Investment worthwhile ness judged in terms of various criteria of merit
- Projected financial position and flows
- Level of risk

Evaluating "master plan approach" suggest the future of spatial plan

Highlight the principles with sketches "Hoyt's sector theory"

- Growth along a particular transport route takes the form of land use already prevailing and that each sector of relatively homogenous use extends outwards from the center
- Compatible land uses would lie adjacent to each other (for example ware housing and light manufacturing, and low-income housing) and incompatible uses will be repelled(for instance high income housing and ware housing and light industry)
- Residential uses will tend to be segregated in terms of income and social position and will expand in different directions in different directions in different parts of the city
- When the inner areas are abandoned by high income households they are infilled (usually at a higher density) by lower income households

The weights of 40 students in a college are recorded to the nearest kilogram. Construct a histogram and frequency polygon for the weight distribution at 5 kg class interval

51	52	54	56	57	58	58	59
59	60	61	62	62	63	63	64
64	64	65	65	66	66	67	67
68	68	69	69	70	71	72	72
73	74	76	77	78	79	81	84

Mention the different ways of decreasing the traffic noise level from a highway

- By depressing highways thereby allowing noise to be absorbed by the slopes or radiated into the open atmosphere above the highway
- Vegetation can help reduce outdoor noise and also psychologically separate the source of sound from the viewer
- Such things as walls or soil mounds in combination with plants will absorb or diffract sound waves that come in contact with them.
- Soft objects such as leaves and soil tend to absorb sound, while hard objects such as smooth tree trucks and walls tend to deflect sound and send sound waves in a different direction
- Tall, dense evergreen plantings are more absorbent than other types of plantings, but they must have foliage to the ground level in order to be effective sound barriers

Identify various methods for conducting Environmental Impact Assessment

Outline the details required to be incorporated in the preparation of project estimate for water supply scheme of a town

➢ Financial aspect

- > Population
- > Quality of water
- Rate of consumption
- Sanitary survey of area
- Sources of water supply
- Topography of area
- Trend of town development

Suggest the action programmes for top soil conservation or protection

- Protection of soil from impact of raindrops
- > Increasing the permeability i.e. encouraging ore water to enter the sol
- > To prevent water from concentrating and moving down the slope in a narrow path
- > To slow down the water movement down the slope
- Reducing the wind velocity near the ground by growing vegetation cover and retaining the land surface

Explain the principles for serial vision and truncation in urban design

State the importance and purpose of channelisation of modern highways

- > To ensure smooth flow of traffic
- Increase in operating speed of vehicles
- Greater capacity
- Safe overtaking
- > To reduce accidents

Outline the "vastupurusha mandala" discuss its applicability in modern urban structure

Purusha and Mandala are associated with vaastu (site). Vastu encompasses the house with the site and its environment. According to the Vedic thought, Purusha is not only the cause and life behind all prakriti, but also behind all creations of Man. Purusha is consciousness, the life source. It is also called atman. The Vastupurusha Mandala is a grid of square, regarded as a perfect figure, is conceived to be a fundamental form in architecture and all other shapes are derived from it. The Vastupurusha Mandala offered the formula to determine the functions of the building in relation to its orientation. The Vasturatnakara assigns specific functions to each direction. The south-east for example, is dedicated to fire and north-east to the element Water. Invariably, the correspondence with the elements would determine the position of the rooms in the house. The space assigned to the region of fire, for instance, would be used for building a kitchen or reserved as a

source for heat and warmth. The Mandala also served as a guide to locate the buildings on site and determining the position of the shrines in a temple complex.

Comment on the performances of urban land ceiling and regulation act and suggest requisite reform

State the elements of public interest in formulating development control

- ➤ Health
- ➤ Economy
- > Safety
- > Convenience
- > amenity

Suggest the characteristics of "growth center" in regional planning

- > Every town or village is in more or less degree a regional capital
- Each town works as a service center for the neighbouring area; it is the seat of regional integration for the area around it
- Present day activities are to be concentrated in some central area
- Consumer markets govern the location of industries, which in turn depend on the population of the town and its environs
- Population size alone cannot decide the hierarchy of human settlements
- > The function of settlement is more important than the size of population
- The absence of more towns may make a town serve a wider area and closer proximity of more towns in an area may force some big towns to remain only trading towns and be in a lower order of hierarchy

The total population of an area for 1981 and 1991 was given as 30 lakhs and 35 lakhs respectively. Extrapolate the expected population for 2001 based on two different methods Arithmetic rate Geometric rate

Explain the merits and demerits of a large dam in regional planning

Merits :

- Storage of water for irrigation
- ➢ Generation of electrical power
- ➤ Water supply
- > Flood control
- Controlling of silt formation in rivers and canals

- Fish culture and breeding
- Recreation
- ➢ Wild-life preservation
- > Soil conservation

Demerits :

An aircraft flying at an altitude of 5000m above mean sea level takes aerial photographs of a terrain having an average elevation of 1000m above mean sea level

- 1. Find the scale of photograph if focal length of camera is 20 cm
- 2. Find the area covered in ground by each photo format of 23 cm X 23 cm

SECTION A (100 marks)

SUBSECTION A1 (75 marks)

write in your answerbook the correct or most appropriate answer to the following multiple choice questions by writing the corresponding letter A,B,C or D against the sub-question number

- 1.31 'Peristyle' in architecture means
 - a. a row of free standing columns surrounding an area
 - b. perimeter wall of an enclosed shrine
 - c. perishable materials in buildings
 - d. the triangular part above the entablature in the classic order
- 1.32 washington D.C. is an example of

- a. linear urban form
- b. star shaped urban form
- c. poly centred net urban form
- d. the sheet urban form
- 1.33 SON lamps operate on the principle of discharge in
 - a. Sodium vapour
 - b. Krypton vapour
 - c. Mercury vapour
 - d. Zonc and cadmium vapour
- 1.34 A method of control survey, in which a network of triangles in used, is
 - a. Triangulation
 - b. Three-point resection
 - c. Trilateration
 - d. None of these
- 1.35 Hyperbolic paraboloid can be generated by
 - a. A curve moving over two straignt lines at obtuse angles
 - b. A straight line moving over a curve at acute angle
 - c. A curve moving over two other parallel curves
 - d. A straight line moving over two other straight lines at an angle to one another
- 1.36 Savannas are
 - a. Grass lands with drought-resistant trees
 - b. Parts of arctic regions with moving glaciers
 - c. Estuaries, where delta is formed
 - d. Parts of the desert with perennial water pockets
- 1.37 Variability of project duration in PERT analysis is measured in terms of
 - a. Pessimistic time difference
 - b. Optimistic time difference
 - c. Time difference of activities
 - d. Square of standard deviation of activity duration
- 1.38 The term 'Necropolis' refers to
 - a. Small size metropolis
 - b. The new metropolis
 - c. Dead city
 - d. The city in space

- 1.39 Phenomenon of contorted growth of trees due to unequal irradiation of light on two sides is known as
 - a. Photosynthesis
 - b. Phototropism
 - c. Photoperiodism
 - d. photorespiration
- 1.40 the total quantity of runoff for an area of 18 hectares n a lateritic region (runoff oefficient = 0.5 and rainfall = 10 mm/hour), is
 - a. $55 \text{ m}^3 / \text{hr}$
 - b. 108 m³ / hr
 - c. 90 m³ / hr
 - d. 180 m^3 / hr
- 1.41 the average lux required on a pavement, having width 4m., is 8. the mounting height of the lamp (lumen 2000) is 4m. the spacing of the lamps (for the coefficient of the utilization is 0.5 and maintenance factor is 0.8) is
 - a. 25 m
 - b. 75 m
 - c. 10 m
 - d. 15 m
- 1.42 in BOT based project, the most important evaluation criterion is
 - a. financial internal rate of return
 - b. internal rate of return
 - c. benefit-cost ratio
 - d. present value
- 1.43 addition of Decibel levels 92 dBA and 87 dBA amounts to
 - a. 87 dBA
 - b. 150 dBA
 - c. 180 dBA
 - d. 93 dBA
- 1.44 the velocity head f water supply line is measured in terms of
 - a. m/sec
 - b. m/sec²
 - c. m
 - d. m²/sec
- 1.45 'After image' in visual perception is

- a. same image same colour
- b. same image complementary colourc. inverted image complementary colour
- d. mirror image same colour

Match the following

(2.1)	distomat	K. odour
(2.2)	Trowel	L. Truss
(2.3)	Lamelle	M. Plaster
(2.4)	Aziotic	N. Mud architecture
(2.5)	Purlin	O. Survey
(2.6)	Adobe	P. Order
(2.7)	Jalousie	Q. Luminaire
(2.8)	Latourette	R. Plumbing
(2.9)	Column	S. Window
(2.10)	doric	T. temple
		U. Le Corbusier
		V. buckling
		W. computer
		X. air conditioning

(2.11)	express Tower, Bombay	(A) Paolo soleri

(2.12) chano	semi-conductor complex, digarh	(B) Charles correa
(2.13)	IIT campus Kanpur	(C) Edward D. Stone
(2.14)	Aranya Housing Project, Inoree	(D) Jorn Utzon
(2.15)	Amsterdam south plan	(E) John Nash
(2.16)	Park crescent, London	(F) B.V. Doshi
(2.17)	Sydney opera house	(G) H.P.Berlage
(2.18)	Cidade de Goa	(H) A.P.Kanvinde
(2.19)	U.S.Embassy , New Delhi	(I) Joseph all en stein
(2.20)	Arcosanti, USSsA	(J) Romi khosla and associates
		(K) anant raje
		(L) Richard neutra

(2.21)	Defensible space	(A) Eqgene p odum
(2.22)	The economics of urban areas	(B) Robert wenkam
(2.23)	Fundamentals of ecology	(C) Arthur B gallion
(2.24)	Design for the real world	(D) Edgar r neff
(2.25)	Urban pattern	(E) Brian goodall
		(F) Oscar newman
		(G) victor papanek
		(H) Richard meyer

Distinguish between:

- xi. Viewshed and watershed
- xii. Dormer window and Bay Wondow
- xiii. Economic life and Physical life of building
- xiv. Aqueduct and Aacquifer
- xv. Ventialtion and air-conditioning
- xvi. Gradient and camber
- xvii. Revolving fund and Sinking Fund
- xviii. Raster images and vector images
- xix. Value and intensity of colour
- xx. Arbitrator and umpire

SECTION – B (75 marks) PART I Answer all questions. Each question carries five marks

Draw the following brick paving patterns Running bond (bricks laid on edge) Herring bone (bricks laid flat) Basket weave (bricks laid on edge) Stacked bond (bricks laid on edge) Basket weave variation (bricks laid flat)

What is a psychrometric chart. Draw a typical psychrometric chart with appropriate labeling and explain its application

Discuss the salient features of French style garden through illustration The French gardens were not only inspired but also built by the Italian artist Illustrate with sketches the function of the following AutoCAD commands REVSURF RULESURF EDGESURF TABSURF THICKNESS

Draw a schematic plan and a section of an open air theatre designed for good acoustics, showing all the design elements used for achieving the objective

A loan of Rs. 8,00,000 has been granted by a financial institution to an individual for the construction of his house. The loan has to be repaid by way of annuity at the rate of 13.5% interest per annum un 15 equal installments from the year in which the loan is taken by the house owner. Calculate the yearly installment for repaying the loan

The general formula for the future value of a single flow is

 $S = P(1+i)^n$ where

S = the future value after n years P = principle amount i = rate of interest n = number of years

future value of an annuity is given by the following formula $sn = R \{ ([1+i]^n - 1) / i \}$ where

sn = future value of an annuity which has duration of n years R = constant periodic flow [annual installment]

To calculate the yearly installment, the future value of annuity has to be equated to the general formula for the future value

 $R \{ ([1+i]^n - 1) / i \} = P (1+i)^n$

From the given problem R { ($[1+13.5/100]^{15} - 1$) / 13.5 / 100 } = 8,00,000 (1+13.5 / 100)^{15} = 1,09,605.16

The yearly installment is Rs. 1,09,605.16

Indicate five major advantages for which you will recommend steel structure for a multi-storied building

- Elegant, slender members
- High strength to weight ratio
- Load on foundation is less

Sketch the section of an overhead water reservoir, showing the float valve, overflow pipe, drain outlet, supply inlet and outlet and other valves

What is mastic asphalt? Where is it used in built environment? Mastic asphalt is rock asphalt containing 90% of calcium carbonate with atleast 8% of bitumen which is then heated to 176 to 200 and stabilized with 121/2% sand Used in damp proofing of flat roofs, walls and floors An activity in a CPM network has a duration of 4 days. The fgree float for the activity from the occurrence of the preceding event

With the help of the diagrammatic plan and a side view, show the various important elements and space components of a typical orissan temple

Explain the phenomenon 'stack effect' in a building. Write the equation for estimating stack effect

With the help of three sketches explain the v ariation of the horizontal thrust at the springing point of an arch with respect to its rise for a fixed span and load

What is contrast in visual design? Explain the various applications of contrast in architectural reservation.

What is the utility of central court in a housing cluster under hot-humid climate? Explain with sketches

Indicate the various possibilities of use of the following industrial and agricultural wastes in buildings Blast furnace slag Waste glass Slate and laterite stone wastes Coconut waste and husk Rice husk

Compare between 'chaityas' and 'viharas' in rock-cut architecture, in terms of their layouts, elements and facade treatment

What were the major driving forces in development of modern architecture in post industrial revolution?

Explain through plan and section the illumination scheme of the design studio in an architect's office having six drawing desk units and three computer workstations.

SECTION – B (75 marks) PART II

- 5. Draw a population pyramid for an urban area with significant in-migration of working population
 - Population pyramid is a two dimensional pictorial representation of population (both men and women) with the break up of different age groups, which is prepared from the census data
 - The age structure of a population at a time is the result of past trends in nasality (birth rate), mortality (death rate) and migration
 - The age structure of a given population has its influence on the pattern of demand for various goods and services
 - By comparing two or more pyramids, changes in particular age group can create pressure on school facilities, employment opportunities and needs for housing units
- 6. Indicate five major factors, which affect the capacity of a road in urban areas
 - ➤ Lane width
 - Large commercial vehicles
 - Width of shoulders of the road
 - Alignment of the road
 - Presence of intersection at grade
 - Vehicular stream speed
 - One or two way traffic movement
 - No. of traffic lanes
 - Vehicular and driver characteristics
 - ➢ Composition of traffic
 - ➤ Traffic volume
- 7. Workout the net and the gross population densities for a neighbourhood, given the following:
 - \blacktriangleright Ground coverage = 30%
 - ≻ F.A.R.. = 1.5
 - Plinth area per residential block = 372 sq.m.
 - Number of dwelling units per floor in each block = 2
 - Average family size = 4.5
 - \blacktriangleright Area under residential plots = 65%
 - Area under access roads = 2
 - Area under others including major roads = 36%
- 8. Indicate with sketches, the different types water supply distribution network in an urban area

- 9. Briefly enumerate the advantages as well as the application of remote sensing in planning?
- 10. In a 200m x 150m corner plot with vehicular traffic on two abutting roads, prepare a schematic housing layout plan with six four-storied blocks of 48 HIG units, with the objectives of minimum pedestrian-vehicular conflict and maximum defensible spaces
- 11. In the light of 74th Amendment of the Indian constitution, discuss the new role of the state town and country planning departments
- 12. Write, step by step, the AutoCAD commands to perform the following operations in mapping
 - a. To draw a site plan of irregular configuration, closed traversed dimensions of edges and angles between the pairs of edges
 - b. To estimate the area and perimeter of the site
 - c. To create hatches for the landmass and waterbodies
- 13. What are the major considerations for designing an oxidation pond for a small town?
- 14. What is net present value? Which are the major parameters that decide the net present value of a development project?

The net value or net benefit of a project when all costs have been discounted to the present at the accounting rate of interest

The major parameters that decide the net present value are

- Cash flow occurring at the end of every year, till the life of the project
- ➢ Life of the project
- Cost of capital use as the discount rate
- 15. Mention the significant factors for designing a neighbourhood level park
- 16. Explain the visual design fatures of the 'campidoglio' in rome
- 17. A primary road within a city has to bend along a horizontal curve having a radius of 150m. what should be the design speed of the road at that section if the maximum superelevation of 0.07 is not to exceeded and the safe limit of transverse coefficient of friction is 0.15?
- 18. Mention the salient features of kenzo tange's plan for new Tokyo
- 19. In urban and rural systems highlight the social conditions that influence the social class structure

- 20. What are the primary considerations for planning of settlements in a desert region?
 - Both the buildings and the external living spaces need to be protected as much as possible from the intense solar radiation and the hot, dusty winds
 - An enclosed, compactly planned and essentially inward-looking building is the most suitable
 - By placing as much accommodation as possible as possible under one roof, thermal loading from the sun and hot air will be considerably lessened
 - Site conditions permitting, the larger dimensions of a building should preferably face north and south.
 - Non-habitable rooms (stores, toilets etc.,) can be effectively used as thermal barriers if planned and placed on the east and west end of the building
 - By aligning buildings close to each other, especially if east and west walls are placed close together, mutual shading will decrease the heat gains on external walls
 - Close group of buildings, narrow roads and streets, arcades, colonnades and small enclosed courtyards give maximum amount of shade and coolness
- 21. What are the factors to be considered in landscape planning for cyclone-prone coastal zones?
- 22. Mention the points to be considered while designing a signage system for the India gate precinct in New Delhi.
- 23. The spot elevations of four points A,B,C and D in an area, are 900m, 1650m, 1200m and 1800m respectively. Determine the maximum scale and the average scale of the survey photo, when the flying height is 4500m. The focal length of the camera is 140mm.
- 24. Indicate five major factors that you would consider for assessing the housing demand in a town

Feb 2000 SECTION A (100 marks)

SUBSECTION A1 (75 marks)
write in your answerbook the correct or most appropriate answer to the following multiple choice questions by writing the corresponding letter A,B,C or D against the sub-question number

- 1.46 J.N.U., New Delhi campus has been designed by
 - a. A.P. Kanvinde
 - b. Louis I.Khan
 - c. C.P.Kukreja
 - d. J.A.Stein
- 1.47 Occupancy Rate refers to
 - a. Number of buildings per unit area
 - b. Number of persons per habitable room
 - c. Number of habitable rooms per acre
 - d. Number of persons working in an office
- 1.48 The new Guggenheim Museum in Bilboo, spain was designed by
 - a. Frank Gehry
 - b. F.L.Wright
 - c. Roger Anger
 - d. Norman Foster
- 1.49 Vidyadhar Nagar was planned by
 - a. HKMewada
 - b. Vidydhar Bhattacharya
 - c. BVDoshi
 - d. Charles Correa
- 1.50 For Indian metropolitan cities the quantity of solid waste accumulation per head per day is approximately
 - a. 0.5kg
 - b. 1.5 kg
 - c. 2.5 kg
 - d. 3.5 kg
- 1.51 the maximum gradient of a ramp leading to a car park is
 - a. 1 in 5
 - b. 1 in 10
 - c. 1 in 15
 - d. 1 in 20
- 1.52 'Less is a Bore' is propogated by

- a. Eero saarinen
- b. Philip Johnson
- c. Robert venturi
- d. Joseph Paxton
- 1.53 Turbidity of water is due to
 - a. Algae
 - b. Fungi
 - c. Organic salt
 - d. Suspended matters
- 1.54 The only architect-president of a nation was
 - a. Richard Nixon
 - b. F.Marcos
 - c. Thomas Jefferson
 - d. L.B.Johnson
- 1.55 The Pruitt housing project in St. Louis failed because of
 - a. Natural calamity
 - b. Structural failure
 - c. Un-afordability
 - d. Functional inaccessibility
- 1.56 To ensure comfort condition inside the room, the temperature and relative humidity values should preferably be
 - a. 20 C and 65% respectively
 - b. 15 C and 45% respectively
 - c. 25 C and 50% respectively
 - d. 30 C and 65% respectively
- 1.57 intensity of colour r efers to
 - a. brightness
 - b. darkness
 - c. pigment density
 - d. quantity
- 1.58 as per the National Building Code the minimum area of a habitable room is
 - a. 8.5 sqm
 - b. 9.5 sqm
 - c. 10.5 sqm
 - d. 11.5 sqm

- 1.59 the most commonly used disinfectant for purification of municipal water is
 - a. boric powder
 - b. alum
 - c. bleaching powder
 - d. camphor
- 1.60 in completion of a project, critical path is the one which requires
 - a. maximum time
 - b. minimum time
 - c. optimum time
 - d. critical time
- 1.16 with every doubling of distance from source the noise level will reduce by
 - a. 6 dbA
 - b. 8 dbA
 - c. 10 dbA
 - d. 12 dbA
- 1.17 indicator of poverty line denotes
 - a. persons having no shelter
 - b. level of family income
 - c. percapita calorie consumption of food
 - d. none of the above
- 1.18 the situation which provides the most intimate scale to an observer is, while walking along
 - a. 9m wide road in front of one storey building
 - b. 12m wide road in front of two storey building
 - c. 15m wide road in front of three storey building
 - d. 21m wide road in front of four storey building
- 1.19 the concept of Greek town planning emphasized on
 - a. large size
 - b. more open space
 - c. human scale
 - d. compact development
- 1.20 'Habit' of plants refers to
 - a. growth rate
 - b. branching pattern
 - c. foliage
 - d. life span

Match the following

(2.11)	symbiosis	Y. planting
(2.12)	St. mark Square	Z. Rome
(2.13)	Autolisp	AA. Ecology
(2.14)	Symbolic Garden	BB. Egypt
(2.15)	Ferrule	CC.Wash basin
(2.16)	Layering	DD. Water Main
(2.17)	Ziggurat	EE. Sensor
(2.18)	Bib-cock	FF. Venice
(2.19)	Kalasha	GG. Habitat
(2.20)	Scan line	HH.Computer
		II. Japan
		JJ. Mesopotamia
		KK. Lingaraj temple

(2.21)	Geodesic dome	(M) F.L.Wright
(2.22)	Conservative Surgery	(N) Moshe Safdie
(2.23) Kong	Chek Lap Kok Airport, Hong	(O) Cesar Pelli
(2.24)	Calcutta	(P) Buckminister Fuller

(2.25) Comp	Khalso Heritage Memorial blex, Anandpur Saheb	(Q) M.N. Joglekar
(2.26)	Slum Networking, Indore	(R) K.T.Ravindran
(2.27)	Vertical city	(S) Patrick Geddes
(2.28)	Jawahar Kala Kendra, Jaipur	(T) Norman Foster
(2.29)	Petronas Towers, Kuala	(U) Le Ccorbusier
Lump	ur	
(2.30)	Gandhinagar, Gujarat	(V) Job charnock
(2.26)	Design with Nature	(W) H.K.Mewada
(2.27)	Small is Beautiful	(X) B.V.Doshi
(2.28)	The World Cities	(Y) Himanshu H. Parikh
(2.29)	Culture Of Cities	(Z) Charles Correa
(2.30)	The Fountainhead	(AA) Ebenezer Howard

(I) Andrew Thomas
(J) John O.Simonds
(K) Ian McHaarg
(L) Lewis Mumford
(M) Henry Ff.Arnold
(N) Clarence Stein

(O) peter Hall
(P) Ayn Rand
(Q) E.F.Schumacher

Distinguish between:

- xxi. Value and cost
- xxii. Urbanism and urbanization
- xxiii. Absolute Humidity and Relative Humidity
- xxiv. Site Plan and key plan
- xxv. Fine Sand and Coarse sand
- xxvi. Forum and Agora
- xxvii. Harmony and Contrast
- xxviii. Artesian Well and Infiltration well
- xxix. Restoration and Reconstruction
- xxx. Conforming uses and compatible uses
- xxxi. Plot coverage control and FAR control
- xxxii. Aerobic and anaerobic
- xxxiii. Cadastral Map and Topographic Map
- xxxiv. Percentage Rage Contract and Lump sum Contract
- xxxv. Hard Wood and Soft Wood

SECTION – B (75 marks) PART I Answer all questions. Each question carries five marks

Describe with sketches various elements of Bishnupur Temple Architecture in West Bengal

Explain with illustration, the baroque city-planning concept of monarchy and monumentalism

The importance was laid upon both mass and space The main features of Barogue planning were as follows:

- > Avenues
- > Fountains
- > Axis
- > Geometry

Example : the shone brunn palace at Germany where sides of the trees were also chopped off along the road to achieve the "axis" of the design.

Comment on the concept of 'Smart Building' in contemporary architectural development

Highlight with example the utility of 'Floorscaping' in a public plaza

Draw a steel truss roof showing north-light and label the components

Outline the causes of failure due to combining old and new materials for building preservation

What is the significance of water cement ratio in building construction? Indicate the critical observations required in this context

- > Crushing strength of concrete is affected by water-cement ratio
- > Wearing and tearing strength also depends on this ratio
- > Workability of concrete
- > Hence simple tests can be carried out to maintain and determine the water-cement ratio

Illustrate any one of the best examples of residential sector planning in post independent new towns of India

Residential sector in chandigarh

- The basic planning unit of the city is a sector, 800 by 1200 metres with a population varying between 3,000 and 20,000, depending upon the size of the plots and the topography of the area
- The dimensions of the sector are derived from a "modular" conception. Corbusier established a distance of 400 metres as a sort of outer limit of modular perception a distance beyond which measures could not be readily grasped.
- Each sector is based on the concept of a neighbourhood unit which ensures necessities like shops, educational institutions, health centers, places of recreation and worship within a walkable distance
- Introvert in character, a sector is bounded by fast-traffic roads running on its four sides and permitting only four vehicular entries into its interior

Explain briefly the function of the following commands in AutoCAD FILTER 3DFACE PEDIT SETVAR LTSCALE

Highlight briefly, a) planting criteria and b) Environmental requirements for Indoor plantations

State the parameters governing the lighting design of a room

Highlight the design philosophy through project examples of architect Norman Foster and his contribution to contemporary architecture

List all the information required in a Notece Inviting Tender

Sketch various techniques of water-proofing on R.C.C. roofs.

Explain the concept of 'After Image' as a visual phenomenon

Highlight the structural significance of Flying Buttress with reference to historic architectural evolution

Indicate the criteria for selection of an Elevator system in a building

Draw a neat sketch of a domestic kitchen, 3.0m x 4.0m, showing arrangement of different functional areas as well as the necessary service layout

Discuss the significance of air changes in a given room and mention the factors governing the airchange requirements

List the various forms of plants used generally in planting design

SECTION – B (75 marks) PART II

Explain with the help of sketches the hippodomian-planning concept Advocated the GRID IRON pattern of road layout.. This system was introduced to rebuild the Greek cities, which were destructed by the Persian invasion. For laying out the perpendicular roads, individual buildings were made the common denominator and the functions of the buildings were given importance.

Mention the key elements used for interpretation of Aerial photographs.

Aerial photographs cannot give details of inside the buildings; the true nature of activities carried out within cannot be ascertained.

- Such information has to be obtained only through perception and inter-relation with the shape, size and environmental factors of the building structures.
- This difficulty is particularly encountered in mixed land use area and hence, in such instances remotely sensed information has to be intensively cross checked with ground information
- Certain types of information such as about the health status, and age and sex structure of population and similar other details have to be obtained through a detailed socio-economic survey in the filed.

Outline the concept of 'Vermiculture' in Solid Waste Management

What do you understand by "sight distance" in a traffic flow? Write the expression for "braking distance" of a vehicle on a roadway

Sight distance from a point is the actual distance along the road surface, which a driver from a specified height above the carriageway has visibility of stationary or moving objects. In other words, sight distance is the length of road visible ahead to the driver at any instance

Braking distance of a vehicle is the distance travelled by the vehicle after the application of the brakes, to a dead stop position

- $I = v^2 / 2gf$ where
- I = braking distance in metres
- v=speed of vehicle in metres / sec
- f = design coefficient of friction = 0.4 to 0.35 dpending on speed, from 30 to 80 kmph
- g = acceleration due to gravity = 9.8 metres / sec²

Explain the concept of "Eminent Domain" and "Police power" in relation to town planning?

- Eminent domain by which the government can acquire any private property for the sake of public welfare, public health and public safety
- Police power by which the developmental authorities can control the nuisances and the undue developments. Most of the developmental controls like building bye-laws and planning laws emanate from this police power.

An urban area is expected to accommodate during the next decade an additional population of 65,000 to the existing population of 2,25,000. Estimate the existing housing need and also the need at the end of the next decade based on the following information Present household size 4.75 persons Future household size 4.50 persons Housing stock to be replaced @ the end of the decade 4,500 units A residential neighbourhood with a popuion of 15,000 has to be serviced by a water supply pipe 700m in length. Assuming average rate of supply of water at 175 litre per capita per day, maximum permissible velocity of flow of 1.5 m/sec and head loss across the pipe length not to exceed 8m, design the diameter of the pipe using Hazen's-William's Nomogram for C.I. pipes

Explain the "backwash effect " in development process

State the administrative procedures under the land acquisition act 1894 and the recent amendments to expedite the process of land acquisition

Whenever any government department or a public authority want to acquire any land, they must send their requisition proposal to the appropriate office of the government (normally designated as land acquisition collector – who is in every district and big cities) who will on behalf of the department or public authority, which needs the land, go through the various stages of the land acquisition procedure until he takes possession of the land and hands it over to the concerned department or the public authority.

Briefly outline the recommendation of the national housing policy

- To encourage investment in housing and thereby achieve a sustained growth of the nation's overall housing stock
- To provide housing as part of the strategy for augmenting employment and upgrading skills
- To motivate and assist the houseless households, to secure for itself, affordable shelter in the shortest possible time span
- To reorient and strengthen public housing agencies, so that they could concentrate on provision of developed land with water supply, sanitation, roads, lighting, and other infrastructure facilities and leaving construction of houses to the people
- To divert the attention of the housing agencies towards improving the housing conditions of the absolutely houseless and other disadvantageous groups in dire need of assistance
- To endeavour to bring about an equitable distribution of land for housing through legal and fiscal measures and secure access to the poor households, to land
- > To attract more public investments in the housing sector by monetary and legal measures
- To utilize science and technology to the needs of the shelter sector, both for optimizing the use of scarce, conventional building resources and for achieving cost reduction to levels affordable to various income groups
- > To promote repair, renovation and up gradation of existing housing stock
- > To curb speculation and profiteering in land and to arrest spiraling rents and lane values
- To enhance housing stock by, promotion of research and development in available building materials, by imparting training for upgrading construction skills; by adopting appropriate and improved technology, by encourageang co-operative and group

ghousing, by reviewing and modifying related laws and regulations which at present function as disincentives for housing development etc.

Explain the hierarchy of recreational open spaces in urban areas in terms of physical size and facility standards

Category	Population	Area in	Facility standards	
	per unit	hectares		
Totlot	500	0.05	Paved area, playground apparatus area for small children	
Children's park	2000	0.2		
Neighbourhood	1000	0.2		
playground				
Neighbourhood park	5000	0.8	Playground apparatus areas,	
			landscaped areas, multiple-use paved	
			areas	
District park	25,000	5.0	Facilities of neighbourhood park, tennis	
			courts, football and lighting for evening	
			use, community center / recreation	
			buildings and swimming pool	
Regional park	1,00,000	40.0	Water resource, camping, nature study	
			picnicking	

What do you understand by the terms of parking accumulation, parking index and parking turnover?

Parking accumulation

The total number of vehicles parked in an area at a specified time.

Parking Index Percentage of the theoretically available number of parking bays actually occupied by parked vehicles. Parking turnover Rate of the usage of available parking space.

Enumerate the factors which affect runoff from a catchment basin

Describe the salient features of 73rd constitutional amendment act of India, and its role in empowering grass root level organizations

- There shall be constituted in every state panchayats at avillage, intermediate and district level
- To have proper representation of population in all areas, the ratio between the population of a territorial area of a panchayat and the number of seats, which are filled by election, shall be same throughout the state
- > Normally duration of panchayat is five years
- The legislature of a state may endow the panchayat with such powers to enable them to function as institutions of self government, subject to conditions, with respect to prepaation and implementation of plans for economic development and social justice
- > Panchayats may be given powers to impose taxes, duties, tolls and fees subject to limits
- > A finance commission may be constituted to review financial position of the panchayat

Explain the differences between formal and functional regions

A *Formal region* is geographical area which is uniform or homogeneous in terms of selected criteria. A formal region can be further defined as natural or economic formal region depending upon the criteria used. A *Natural formal region* is a formal region based on the criteria of topography, climate or vegetation. Criteria used are predominantly physical, linked with the concept of geographical determinism. *Economic formal regions* are generally based on types of industry or agriculture (such as coal mining region, tea plantation region) although there are obvious physical undertones

Functional region is a geographical area, which displays certain functional coherence, interdependence, of parts, when defined on the basis of certain criteria. It is sometimes referred to as a nodal or polarized region and is composed of heterogeneous units, such as cities, towns and villages, which are functionally inter-related.

Distinguish between 'Street Furniture' and 'Street Hardware', giving examples

Establish the relationship between 'Human Vision', 'Distance' and 'Scale' in urban design

Explain the relevance of the term "Ammortisation" to urban finance Ammortisation is a means of paying out a predetermined sum (the principal) plus interest over a fixed period of time, so that the principal is completely eliminated by the end of the term.

Highlight the major functions of waterbodies in urban areas

What is the significance of ATTRIBUTES entity in AutoCAD. Mention the steps of various commands associated with ATTRIBUTES entity.

Feb 2001

SECTION A

(75 marks)

This section contains TWO questions: AR - 1 (25 marks) and AR - 2 (50 marks) AR.1 This question consists of TWENTYFIVE sub-questions (1.1 – 1.25) of ONE mark each. For each of these sub-questions, four possible answers (A, B, C and D) are given, out of which only ONE is correct.

1.1 According to Aristotle, the ideal range of population for a city or polis is

- a. 2000 30,000
- b. 1000 10,000
- c. 10,000 20,000
- d. 10,000 1,00,000

1.2 'Crash time of a project indicates the

- a. optimum time in which a project is completed
- b. <u>Shortest time in which a project can be completed</u>
- c. maximum delay that the project can undergo
- d. point of time at which the project will fail
- 1.3 'Architrave' is the
 - a. slab of stone on top of classical orders
 - b. lowest part of entablature
 - c. wall supporting the weight of an arch or vault
 - d. topmost part of a classical Greek column
- 1.4 the first Garden City, Letchworth, was designed by
 - a. Ebenezer Howard
 - b. Antonio sant Elia
 - c. Raymond Unwin
 - d. Clarence Perry
- 1.5 The minimum water supply requirement per head per day for residential purposes including drainage and sanitation is
 - a. 70 litres
 - b. 135 litres
 - c. 180 litres
 - d. 210 litres

- 1.6 the term 'Conservative Surgery' was coined by
 - a. Patrick Geddes
 - b. Le Corbusier
 - c. Edwin Lutyens
 - d. Frank Lloyd Wright
- 1.7 Level of service (LOS) for a signalized intersection is defined in terms of
 - a. Traffic flow characteristics
 - b. Mix of modes
 - c. Delay
 - d. Profile of intersection
- 1.8 The designer of the garden of Versailles, France, was
 - a. Andre Le Notre
 - b. Ebenezer Howard
 - c. Andrea Palladio
 - d. Patrick Geddes
- 1.9 The noise level for lecture rooms should be kept at
 - a. 30 dB
 - b. 40 dB
 - c. 50 dB
 - d. 60 dB
- 1.10 the architectural movement, which was also popularly referred to as 'Jazz Moderna' is
 - a. Arts and Craffts movement
 - b. Art Nouveau movement
 - c. Art deco movement
 - d. Ecole de beaux arts movement
- 1.11 Temples of many shikaras are
 - a. Indo-aryan temples
 - b. Dravidian temples
 - c. Besara temples
 - d. Khajuraho temples
- 1.12 Hardness of water is measured in parts per million by weight in terms of
 - a. Calcium carbonate
 - b. Ferrous oxide
 - c. Carbon dioxide

- d. Magnesium sulphate
- 1.13 The concept of 'Ekistics' was propagated by
 - a. Amos Rapoport
 - b. <u>Constantine Doxiadis</u>
 - c. Buckminister Fuller
 - d. Adam Hardy
- 1.14 Water seal in water closet is used to
 - a. Prevent foul gases from entering the house through external sewer pipe
 - b. Prevent water from leaking through the pipe
 - c. Keep the water closet moist throughout
 - d. None of the above
- 1.15 Which of the following is generally the largest internal source of revenue for Indian municipalities?
 - a. Property tax
 - b. Stamp duty on property transfer
 - c. Conservancy tariff
 - d. Water tariff
- 1.16 For proper ventilation, the ratio of opening area in a room to the total floor area of the room, should be
 - a. 1:6
 - b. 1:10
 - c. 1:12
 - d. 1:20
- 1.17 resemblance with Graeco-Roman basilica is evident in a Buddhist
 - a. temple
 - b. vihara
 - c. chaitya
 - d. stupa
- 1.18 Among the following architect-planners of foreign origin, the only one who is NOT associated with an Indian city is
 - a. otto koenigsberger
 - b. <u>fry Otto</u>
 - c. le corbusier
 - d. Edwin lutyens

- 1.19 The most appropriate plan type for comprehensive physical planning of a metropolitan region is
 - a. District plan
 - b. Action area plan
 - c. Town planning scheme
 - d. <u>Structure plan</u>
- 1.20 In network analysis, the amount of time by which the start of an activity may be delayed without hampering the start of a succeeding activity, is called
 - a. Total float
 - b. Free float
 - c. Time lag
 - d. Start lag
- 1.21 The most common method of protecting or preserving timber is
 - a. Smoke drying
 - b. Salt seasoning
 - c. Dry seasoning
 - d. Creosoting
- 1.22 Codex Atlanticus, a book propagating a new concept in urban planning, was authored by
 - a. Leonardo da vinci
 - b. Biaggio rossetti
 - c. Michelangelo
 - d. Leon battista alberti
- 1.23 The book 'Design with Nature' was written by
 - a. Lawrence Halprin
 - b. Frederick Law Olmsted
 - c. Ian McHarg
 - d. Andre Le Notre
- 1.24 The extreme limit to which a body can be repeatedly strained without fracture or permanent change of shape, is known as
 - a. Compressibility
 - b. Resiliency
 - c. Density
 - d. Elasticity
- 1.25 The locus of a fixed point outside a circle rotating on a fixed straight line is called a. Superior Trochoid

- b. Hypocycloid
- c. Epicycloid
- d. Involute

AR.2 This question consists of TWENTYFIVE sub-questions (2.1 - 2.25) of TWO marks each. For each of these sub-questions, four possible answers (A,B,C and D) are given, out of which only ONE is correct.

2.1 Which of the following is the closest approximation to a land of area measuring 1.5 acres?

- a. 1500 sq.m.
- b. 3035 sq.m.
- c. 6060 sq.m.
- d. <u>6070 sq.m.</u>
- 2.2 Two critical activities A and B need 5 and 8 days respectively, to complete. Another non-critical activity C needs 5 days to complete with a free float of 2 days. If C is completed in 4 days now, how much compression in project time is achieved?
 - a. <u>O days</u>
 - b. 1 day
 - c. 2 days
 - d. 3 days
- 2.3 in a seminar room of area 200 sq.m., 4m. height and total absorbing power of 120 m² sabines, what is the reverberation time?
 - a. 0.24 secs.
 - b. 1.06 secs.
 - c. 1.52 secs.
 - d. 4.16 secs.
- 2.4 A town has a basic employment of 25,000 workers. If the basic : non-basic ratio is 1:2.5 and the workers dependency ratio is 1:4, what is the population size of the town?
 - a. 2,50,000
 - b. <u>4,37,500</u>
 - c. <u>3,50,000</u>
 - d. 3,12,500
- 2.5 for large and closed buildings, the fire hydrants should be located at distances of
 - a. 90 120 metres
 - b. <u>50 80 metres</u>
 - c. 120 150 metres

- d. 150 300 metres
- 2.6 What is the rate of ventilation due to wind action if the free area of the window is 1 sq.m., and the wind speed is 1 m/hr. Assume the wind to be perpendicular to the window.
 - a. 1.0 cu.m. / hour
 - b. 0.6 cu.m. / hour
 - c. 0.3 cu.m. / hour
 - d. 0.1 cu.m. / hour
- 2.7 the diagram below shows the relative distribution of different types of housing within a total residential area of 150 hectares. If the net density of the plotted housing area is 350 ppha., how many people will be accommodated there?
 - a. 20,000 25,000
 - b. 25,000 30,000
 - c. <u>30,000 35,000</u>
 - d. 35,000 40,000
- 2.8 as per 1991 census, the urban component of inida's total population was between
 - a. 10% and 20%
 - b. 20% and 30%
 - c. <u>30% and 40%</u>
 - d. 40% and 50%
- 2.9 zinc coating is given over the steel reinforcement to
 - a. increase tensile strength
 - b. reduce bending capacity
 - c. reduce corrosion
 - d. increase bond strength
- 2.10 Which of the following sequences of names constitute the botanical name for identification and use of landscape plants?
 - a. Species and order
 - b. Order and genera
 - c. Family and species
 - d. Genera and species
- 2.11 For a four-way road intersection the following alternative traffic management schemes are proposed
 - Signalized intersection
 - Manually controlled intersection
 - Rotary intersection

Considering the above alternatives, which of the following statements is INCORRECT?

- a. All are equally space consuming
- b. 'i' is more power consuming than 'ii' and 'iii'
- c. 'ii' is more manpower consuming than 'i' and 'iii'
- d. 'iii' is less power and manpower consuming than 'i' and 'ii'

2.12 a residential plot of 20 metre frontage and 25 metre depth is governed by the development regulations of maximum F.A.R. of 200 and maximum plot coverage of 50%. Upto what maximum height can the plot be built?

- a. 2 floors
- b. 3 floors
- c. <u>4 floors</u>
- d. 10 floors
- 2.13 Minimum visibility distance at a major road intersection, for a design speed of 80 Kmph is
 - a. 200 metres
 - b. 180 metres
 - c. 80 metres
 - d. 100 metres
- 2.14 for accumulation of Re. 1/- for 'n' years at a given rate of compound interest 'i', the annual sinking fund is equal to
 - a. 1/1
 - b. (1 + i)ⁿ
 - C. $\{(1 + i)^n 1\} / i$
 - d. $i / \{(1 + i)^n 1\}$
- 2.15 which of the following parametric conditions will provide the most suitable land for intensive development of settlement ?
 - a. slope ~ 4%; soil ~ silty loam aggregate; depth of water table ~ 6 metres; vegetation ~ moderate.
 - b. slope ~ 20%; soil ~ aggregate sand; depth of water table ~ 30 metres; vegetation ~ barren.
 - c. slope ~ 2%; soil ~ clay; depth of water table ~ 1 metres; vegetation ~ moderate.
 - d. slope ~ 10%; soil ~ sandy loam; depth of water table ~ 15 metres; vegetation ~ dense.
- 2.16 A rectangular room (internal dimensions 5m X 3m) is made of 250mm walls. Calculate the volume of concrete needed for 25mm Damp Proof Course.
 - a. 0.425 cu.m.
 - b. 0.45 cu.m.

- c. 0.4 cu.m.
- d. 4.0 cu.m.

2.17 with the following given data, the velocity of undisturbed water flow in a rectangular open drainage channel is equal to

- (Given data : coefficient of roughness = 0.11; liquid width = 1 metre;
 - i. depth of liquid = 60 cm; and slope = 1 in 200)
 - b. 43 metres per sec
 - c. 38 metres per sec
 - d. 31 metres per sec
 - e. 27 metres per sec
- 2.18 the term 'gentrification' refers to
 - a. migration of fresh population into a crowded urban area
 - b. settling of population in a new urban area
 - c. settling of military forces in an urban area
 - d. evacuation of population from a rural area.
- 2.19 A tree of 13 metres height is required to shade the entire southern wall of a buildig of 4 metres height. At a solar altitude of 45, what should be the maximum distance of the tree from the building wall?
 - a. 4 metres
 - b. 9 metres
 - c. 13 metres
 - d. 17metres
- 2.20 the dampers placed in the air conditioning ducts are provided to control the
 - a. velocity and volume of air
 - b. Exhaust air and velocity
 - c. Foul air and exhaust air
 - d. Volume of air and foul air
- 2.21 A site map drawn to scale 1:10,000 shows six contour lines at 5 metres contour interval. The highest cntour elevtaionis 250 metres. The average distance between the highest and the lowest contour lines on the map is 2.1 cms. What is the average slope between the highest and lowest contour elevations
 - a. 1 in 25
 - b. 1 in 21
 - c. 1 in 30
 - d. 1 in 7

- 2.22 one cm. Square area on a map represents 9 hectares. What is the scale of the map?
 - a. 1:300
 - b. 1cm = 30 metres
 - c. <u>1: 30000</u>
 - d. none of the above
- 2.23 if the original cost o;f abuilding is Rs.1,00,000/-, scrap value is Rs.1,000/- and life of the property is 99 years, the Annual Depreciation calculated by Straight line method is
 - a. 100
 - b. 1000
 - c. 90
 - d. 999
- 2.24 loam category in soil texture is represented by
 - a. sand : 20; silt : 50; clay : 30
 - b. sand : 30; silt : 40; clay : 30
 - c. sand : 60; silt : 20; clay : 20
 - d. sand : 40; silt : 40; clay : 20
- 2.25 which of the following operations should be the first one for setting up plane-table survey?
 - a. Orientation
 - b. Leveling
 - c. Centring
 - d. resection

SECTION B (75 marks) attempt EITHER PART – I OR PART – II PART – I This part contains TWENTY questions out of which FIFTEEN are to be answered (All questions carry equal marks)

AR 3. How was Roman Architecture influenced by the availability of natural building materials during classical period?

AR 4. Through a schematic section, explain the function of 'wind scoop' in hot-dry climate

AR 5. Name and sketch the five major elements governing 'imageability' of a place, as propagated by Kevin Lynch.

AR 6. Enumerate the function of each of the following commands in AutoCAD.

- ➢ BLOCK
- > DDEDIT
- > DIMSCALE
- > OFFSET
- ➤ UCS

AR 7. Highlight the significance of 'Building Automation Systems' and identify its application areas in a building.

AR 8. Name and draw at least five types of foundations used for heavy R.C.C. structures.

AR 9. Discuss the concept of "post occupancy evaluation" in architecture

Post occupancy evaluation is the systematic evaluation of buildings in use, from the perspective of the people who use them. It assesses how well buildings match users needs, and identifies ways to improve building design, performance and fitness for purpose.

Post occupancy evaluation differs significantly form conventional surveys and market research. It uses the direct, unmediated experiences of building users as the basis for evaluating how a building works for its intended use.

AR 10. 'Green trees in front of a building do not create fatigue to our eyes' – why?

- AR 11. How are the recesses on external surfaces of Hindu temples functional?
- AR 12. Explain the influence of wooden construction style in Buddhist Architecture
- AR 13. Draw a layout of a toilet of size 1.8 metres X 3.0 metres, showing wash basin with counter, bathtub, European W.C., water heater for hot water supply and all other fixtures. Draw the isometric view of all the pipe lines (water supply, sanitary and drainage showing the positions of fixtures, valves, etc. Drawings need not be to scale)

AR 14. Mention the salient features of the architectural works of Alvar Aalto. Give any one example of his famous works

AR 15. Explain the factors to be considered in the precention of heat gain of the structure during summer months

- AR 16. Explain the difference between 'Sound Foci' and 'Dead Spots' in auditorium
- AR 17. Illustrate with sketches any five different defects of timber
- AR 18. How does purity of air play a significant role in the comfort of people affected by a ventilation system?

AR 19. What are the reasons for efflorescence on porous building materials?

- Presence of salt in the material
- Absorption of ground water containing salt. When dampness occur salt is brought to the surface and when dried, it leave the salt on the surface carrying patches
- Use of Portland cement mortar and certain other lime mortar
- ➤ In stone work, water is absorbed by the stone and on drying salt is left on the surface and results in decay
- AR 20. Explain with illustration, the philosophy behind the design of Jawahar Kala Kendra, Jaipur
- AR 21. Outline the salient features of the historical landscape gardening style of Japan.
 - Close connection between house and garden a complete harmony between the house and garden is maintained
 - > A garden is not just a faithful copy of nature, but reflects an idealized concept of nature
 - The influence of Buddhism and zensect and tea ceremony
 - To achieve an impression of silence all brilliant colours are denounced and preference is given to the various kinds of predominantly green plants so that auniform colour is attained
 - > The Japanese garden is Monochrome in nature. The main garden elements are
 - 1. garden stones
 - 2. stepping stones
 - 3. stone water basin
 - 4. stone lantern
 - 5. water
 - 6. bridges
 - 7. tea houses
 - 8. fences
 - 9. vegetation
- AR 22. With an illustrative example, highlight the characteristics, utilities and effectiveness of Ferro-cement concrete in building construction.

PART II

This part contains TWENTY questions out of which FIFTEEN are to be answered. (All Questions carry equal marks.)

AR 3. Outline the salient features of the "Central place theory" of Christaller. Use a diagram to explain your answer

- Basic elements are
- ➤ A central good
- ➤ A central place
- ➤ A complimentary region

A region can be served by goods of various types if central places producing different ranges of goods are evenly distributed

Central places will be regularly spaced clusters located with in hexagonal trading areas and will together for triangular lattices

Lower order centers will be located at the gravity centers of the triangles formed by next higher order centers

Distances separating the centers will be greater in case of higher order centers and proportionally less for lower order centers

All the central places constitute a hierarchy of the smallest villages to the largest town of national importance

Assumptions

Christaller assumed a homogenous plane with even distribution of natural resources, consumer preferences and production techniques for each and every product.

Transport cost, demand functions and economics of scale would vary from product to product and this spatial range of goods and services produced will also vary

AR 4. Briefly state the environmental impacts of highways.

AR 5. What was the major planning issue that the plan of radburn helped to resolve? Show through a neat schematic diagram how the radburn plan achieved this objective.

This plan introduced the "super block", each block ranging from 30 to 50 acres in size, where through traffic is eliminated. With in them single-family dwellings were grouped about cul-de-sac roads. Kitchen and garages faced the road, while living rooms turned towards the garden. Pathways provided uninterrupted pedestrian access to a continuous park strip, leading to large, common open spaces within the center of the super-block. Underpasses separated pedestrian walks from traffic roadways.

- AR 6. State the common methods of refuse disposal
- AR 7. In project Management, differentiate between PERT and CPM. How is the expected time of an activity computed in PERT
- AR 8. Distinguish between "linear" and "radio-centric" patterns of physical form of cities in terms of (i) transportation (ii) utility networks. Illustrate your answer with schematic diagrams.

	Linear		Radio – centric	
	Advantages	disadvantages	Advantages	disadvantages
Transportatio n network	Easy flow of traffic is maintained	Monotony of drivers as all crossings look similar	City gets prominent center It gives a direction growth of the city Easy connection between radials	Through traffic is increased Too many concentric rings increases intersections
Utility network	Laying of pipes is easy Length of pipe is reduced Easy to plan the layout of the system		The distribution area is divided into different blocks by virtue of its form	

AR 9. Highlight briefly the features and applications of GIS in decision making in planning

Natural resources

wildlife habitat

wild and scenic rivers recreation resources floodplains wetlands agricultural lands aquifers forests minerals and exploration oil and gas

Land parcel-based

zoning - urban and regional subdivision planning and review

environmental impact assessment water quality management maintenance of land ownership land valuation and taxation town planning schemes

Infrastructure

transport route planning street address matching location analysis, site selection disaster planning and evacuation

Socio-economic

population distribution and forecasting demographic marketing and analysis monitoring of patient health epidemiology police crime statistics and monitoring census information public services and access

AR 10. Differentiate between "gross" and "net" residential densities for a planned sector For a sector of 2Km X 1Km size and gross density of 350 ppha, what will be the net density if non-residential land use constitutes 30% of land area?

Gross residential density : No. of persons per acre over the whole of a defined area including public buildings, large open space and half the width of surrounding roads Net residential density : No. of persons per acre of residential area including small garden patches, internal roads, half the width of surrounding roads up to 6m.

Area = 2Km X 1Km = 2 Sq. Km. = 2000 hectares Gross Density = 350 ppha Total population = 350 X 200 = 70,000

Net residential area = 70% of 200 hectares = 140 hectares

70,000 persons live in 140 hectares

Net Density = 70,000 / 140 = 500 ppha

AR 11. Outline the differences between hot-humid and hot-dry climates, in terms of appropriate building and urban forms. Illustrate their differences in mass-void relationship of urban forms.

AR 12. Describe briefly the 'Activated sludge process', highlighting its operation

AR 13. What is the difference between 'direct subsidisation' and 'cross subsidisation' in the provision of urban land, housing or infrastructure in India? Which among these is relatively advantageous and why?

AR 14. Distinguish between "Time mean speed" and "Space mean speed" Estimate the average travel speed of an urban road based on the following information

ingin of the segment of the dibar read – oking		
Vehicle no.	Travel time (min.)	
1	4.5	
2	3.45	
3	3.0	
4	6.0	

(Length of the segment of the urban road = 3km)

Time-mean speed is the average of the speed measurements at one point in space over a period of time

Space-mean speed is the average of the speed measurements at an instant of time over a space

w.k.t speed = distance / time expressed in terms of kmph (kilometers per hour) average travel speed = distance / average travel time

average travel time = (4.5+3.45+3+6)/4

= 4.2375 min

= 4.2375 / 60 hr. [since 1minute = 1 / 60 hour]

= 0.070625 hr.

average travel speed = 3 / 0.070625 kmph = 42.4778 kmph

AR 15. Discuss the essence of "concordance" and "discordance" analysis technique, thro' a suitable example

AR 16.Name the specific laws governing each of the following activitiesPermission of building constructionbuilding permitNotification of master plan area of a citynotification in government gazettePermissible use of a plot of land in a cityland useImpact assessment of a highway departmentenvironmental impactEviction of a tenant by a landlordrent and accommodation control

AR 17. The 1991 housing census for a town of 2.5 lakhs with average household size of 5 persons shows a total number of 40,000 dwelling units. If the annual exponential population growth rate is 2.0%, what should be the average annual rate of dwelling unit supply to meet housing shortage in 2001? Assume a constant average household size and annual obsolescence rate of 5%

No. of Dwelling units in 1991 = population / household size = 2,50,000 / 5 = 50,000, but as per census only 40,000 Dwelling units are there

Existing Demand = 50,000 - 40,000 = 10,000 Dwelling units _____ 1

Replacement need Obsolescence rate is 5% i.e. 5% of houses have to be replaced every year $P(1-i)^n = 40,000(1-5/100)^{10} = 23,950$ Dwelling units will be there after 10 years No. of houses to be replaced = 40,000 - 23,950 = 16,050_____2

Demand at future date Using population projection method Pt = Po X e^{rt} = 2,50,000 X 1.2214 [$e^{2/100 \times 10}$ = 1.2214, since exponential population growth rate is 2.0%] = 3,05,350 No. of dwelling units after 10 years = 3,05,350 / 5 (household size) = 61,070

Future Demand Demand at future date – Existing no. of dwelling units 61,070 – 40,000 21,070

3

Housing shortage = 1 + 2 + 3 = 10,000 + 16,050 + 21,070 = 47,120 Dwelling units Average annual rate of Dwelling units supply = 47,12 Dwelling units / year

- AR 18. In SWOT analysis, what do the individual letters stand for? Give one example for each of these elements in the context of either a city / place or an organization
- AR 19. Outline the various urban planning and design strategies towards conservation of ground water resources
- AR 20. Explain the characteristics of 'maritime desert climate'. Name a place located in this climate.

AR 21. What are the basic components of an ideal remote sensing system?

The basic components of an ideal remote-sensing system include

A uniform energy source. This source will provide energy over all wavelengths, at a constant, known, high level of output, irrespective of time and place.

A non-interfering atmosphere. This will be an atmosphere that will not modify the energy from the source in any manner, whether that energy is on its way to earth's surface or coming from it. Again, ideally this will hold irrespective of wavelength, time, place, and sensing altitude involved.

A series of unique energy/matter interaction at the earth's surface. These interactions will generate reflected and/or emitted signals that are not only selective in respect to wavelengths, but also are known, invariant, and unique to each and every earth surface feature type and subtype of interest.

A super sensor. This will be a sensor, highly sensitive to all wavelengths, yielding spatially detailed data on the absolute brightness (or radiance) from a scene (a function of wavelength), throughout the spectrum. This super sensor will be simple and reliable, require, virtually no power or space, and be accurate and economical to operate.

A real-time data handling system. In this system, the instant the radiance versus wavelength response over a terrain element is generated, it will be processed into an interpretable format and recognized as being unique to the particular terrain element from which it comes. This processing will be performed nearly instantaneously (real time), providing timely information. Because of the consistent nature of the energy/matter interactions, there will be no need for reference data in the analytical procedure. The derived data will provide insight into the physical-chemical-biological state of each feature of interest.

Multiple data users. These people will have comprehensive knowledge of both their respective disciplines and of remote-sensing data acquisition and analysis techniques. The same set of data will become various forms of information for different users, because of their vast knowledge about the particular earth resources being used.

Unfortunately, an ideal remote-sensing system, as described above, does not exist. Real remotesensing systems fall short of the ideal at virtually every point in the sequence outlined.

AR 22. Name the amendment act and the schedule of the constitution of India that provide for the responsibilities and functions of urban local bodies. Outline the steps necessary to empower the local bodies to carryout these functions.

THE CONSTITUTION (74TH AMENDMENT) ACT, 1992

TWELFTH SCHEDULE

Suitable organizational structure

Rationalization of geographical jurisdiction

Management of resources – economic, social political and human – for optimum results

Logistical aids necessary for management capacity development

The procedures and practices that would be necessary for communication and coordination

The measures to be taken for city planning at the local level

Feb 2002

SECTION A

(75 marks)

This section contains TWO questions: AR – 1 (25 marks) and AR – 2 (50 marks)

AR.1 This question consists of TWENTYFIVE sub-questions (1.1 - 1.25) of ONE mark each. For each of these sub-questions, four possible answers (A, B, C and D) are given, out of which only ONE is correct.

- 1.1 The colour code for the storage of objects with radiation hazards according to the Occupational Safety Hazards Act (OSHA) is
 - a. Red with black
 - b. Purple with yellow
 - c. Orange with blue
 - d. Green with white
- 1.2 Terra-cotta is a kind of earthern work processed by
 - a. Drying in the sun
 - b. Burning at high temperature
 - c. Mixing with lime
 - d. Compacting under pressure
- 1.3 Sand blasting is a technique used for cleaning the surface of
 - a. <u>Stone work</u>
 - b. Concrete work
 - c. Wood work
 - d. Earth work

- 1.4 Series of columns in a straight row arrangement is termed as
 - a. Orthostyle
 - b. Peristyle
 - c. Tracery
 - d. Colonia
- 1.5 When the picture plane moves towards the observer, the size of the picture in perspective
 - a. Does not change
 - b. Increases
 - c. <u>Decreases</u>
 - d. Gets elongated
- 1.6 The term 'vedika' in Buddhist architecture is used for
 - a. <u>Railing around stupa</u>
 - b. Crown umbrella of stupa
 - c. Decorative entrance of stupa
 - d. Niche in the wall of stupa
- 1.7 Capital value of a property is equal to
 - a. Net rent per year multiplied by sinking fund
 - b. Annual rent minus outgoings
 - c. Net annual rent multiplied by year's purchase
 - d. Gross annual rent plus overhead cost
- 1.8 'demac gauge' is a device for
 - a. measuring mechanical strain in structures
 - b. measuring the dampness of inner walls
 - c. checking the thermal conductivity of walls
 - d. gauging air temperature
- 1.9 Funicular polygons are
 - a. stress diagrams
 - b. force diagrams
 - c. regular shapes
 - d. irregular shapes
- 1.10 The duct size for an air conditioning system is dependent on amount of air flow and its
 - a. velocity
 - b. temperature
 - c. relative humidity

- d. latent heat
- 1.11 the botanical name of 'neem' tree, used for roadside landscaping is
 - a. lagerstroemia speciosa
 - b. ficus benghalensis
 - c. kleinhama hospita
 - d. azadirachta indica
- 1.12 symbolic representation of water by sand is frequently found in
 - a. mughal garden
 - b. English garden
 - c. Japanese garden
 - d. Moorish garden
- 1.13 kenzo tange developed the concept of
 - a. deconstruction
 - b. arcology
 - c. metabolism
 - d. anamorphosis
- 1.14 the maximum slope in a ramp for wheel chair movement is
 - a. 1:8
 - b. <u>1:12</u>
 - c. 1:20
 - d. 1:25
- 1.15 preserving timber by charring is carried out for
 - a. wooden piles
 - b. wooden partitions
 - c. wooden doors
 - d. wooden truss
- 1.16 In construction work, Hoes are used for
 - a. transporting materials
 - b. excavating trenches
 - c. mixing concrete
 - d. compacting sand
- 1.17 'Swastika' form of settlement layout in ancient Indian town planning is basically
 - a. a grid iron pattern
 - b. <u>a radial pattern</u>

- c. a ring radial pattern
- d. an informal pattern
- 1.18 Pompidou center in Paris, designed by Renzo piano, illustrates the concept of
 - a. biological analogy
 - b. mechanical analogy
 - c. romantic analogy
 - d. pattern language analogy
- 1.19 the kandariya mahadev temple in khajuraho is an example of
 - a. rock cut architecture
 - b. nagara architecture
 - c. dravida architecture
 - d. indo saracenic architecture
- 1.20 Decision on phasing is required in the design of
 - a. channelized intersection
 - b. priority intersection
 - c. grade separated intersection
 - d. signalized intersection
- 1.21 For street lighting maximum lumen per watt is obtained from
 - a. sodium vapour lamps
 - b. <u>mercury vapour lamps</u>
 - c. incandescent lamps
 - d. fluorescent lamps
- 1.22 'Logit model' for discrete choice analysis has been developed by
 - a. A.O. Hirschman
 - b. D.McFadden
 - c. P.Nijkamp
 - d. T.Scitovsky
- 1.23 ET index can be obtained from nomograms showing
 - a. DBT, WBT and air velocity
 - b. DBT, AH and RH
 - c. AH, RH and air velocity
 - d. WBT and air velocity
- 1.24 SKPOLY command in AutoCad helps in
 - a. Sticking together two polylines

- b. Drawing street kerbs with polylines
- c. Creating polylines while sketching
- d. Creating K shortest path along polyline
- 1.25 Class II towns as defined in the Indian census relate to a minimum population size of
 - a. 2,00,000
 - b. 1,50,000
 - c. 1,00,000
 - d. <u>50,000</u>

AR.2 This question consists of TWENTYFIVE sub-questions (2.1 - 2.25) of TWO marks each. For each of these sub-questions, four possible answers (A,B,C and D) are given, out of which only ONE is correct.

- 2.1 A town, having a population of 88,236 (in the year 1971) has shown an arithmetic increase in its population. The growth rate was 12% per decade. Its population in 2001 was
 - a. 97,000
 - b. 1,03,000
 - c. <u>1,20,000</u>
 - d. 2,59,000
- 2.2 The series 1/1, 1/3, 1/5, 1/7, 1/9 ... is known as
 - a. geometric series
 - b. harmonic series
 - c. fibonacci series
 - d. golden mean series
- 2.3 For a split complementary colour scheme, the primary red colour should be associated with
 - a. blue violet red violet
 - b. red orange yellow orange
 - c. blue green yellow green
 - d. red violet blue green
- 2.4 The fixed end moment of a cantilever beam with an u.d.l. of 20 KN/m and span of 3m is
 - a. 60 KN m
 - b. 90 KN m
 - c. 120 KN m
 - d. 150 KN m
- 2.5 The buildable area available on a plot of one hectare with a FAR of 2.25 is

- a. 15500 sqm
- b. 20500 sqm
- c. <u>22500 sqm</u>
- d. 25500 sqm

2.6 For an open drain if the ratio of the area to the wetted perimeter is tripled, then the velocity of water in the drain increases by

- a. two times
- b. three times
- c. <u>four times</u>
- d. five times

2.7 In transportation planning Link-Node diagrams are required for

- a. estimation of zonal trips
- b. determination of trip characteristics
- c. trip assignment along roads
- d. determination of mode characteristics
- 2.8 Water while falling down from a horizontal surface with an edge lip creates
 - a. glassy sheet flow
 - b. vertical angular rhythm
 - c. agitated frothy surface in multiple layers
 - d. none of the above
- 2.9 The R.L at the basement floor of a building and the R.L.. at the road surface are 93.0 and 94.85 respectively. If the plinth height from the road is 600 mm then the depth of the basement is
 - a. 1.25
 - b. 1.85
 - c. 2.35
 - d. 2.45
- 2.10 Along a critical path crashing is carried out for the activity that has
 - a. minimum cost-time slope
 - b. maximum cost-time slope
 - c. <u>minimum cost slope</u>
 - d. maximum time slope
- 2.11 Archimedean solids have
 - a. Regular faces
 - b. Right angles
 - c. Irregular faces

- d. None of the above
- 2.12 If the scale of a map is 1:30,000, then 1 sq cm area of the map would represent
 - a. <u>9.00 hectare</u>
 - b. 15.00 hectare
 - c. 17.30 hectare
 - d. 30.00 hectare
- 2.13 The oxygen demand in the initial stage of the biological decomposition of sewage is due to the presence of
 - a. Nitrogenous matter
 - b. Phosphate matter
 - c. <u>Carbonaceous matter</u>
 - d. Calcareous matter
- 2.14 Number of modular bricks required for 10 cu m brickwork is
 - a. 4500
 - b. 4750
 - c. <u>5000</u>
 - d. 5225
- 2.15 GPS instrument is used for determining
 - a. Temperature of a place
 - b. Lat-long of a place
 - c. Rainfall of a place
 - d. Wind velocity of a place
- 2.16 An ideal example of a tensile roofing system is found in
 - a. Sydney opera house by J. Utzon
 - b. Olympic stadium in Tokyo by kenzo tange
 - c. TWA airport terminal by Eero Saarinen
 - d. Bahai Temple in New Delhi by Fairburz sahba
- 2.17 In measuring traffic noise, the noise level L90 represents
 - a. Background noise level
 - b. Lowest noise level
 - c. Average noise level
 - d. Peak noise level
- 2.18 The process of acquiring excess land for selling at a higher price after the completion of the project is known as
- a. Encroachment
- b. Enforcement
- c. Betterment
- d. Recoupment
- 2.19 Cadastral maps show
 - a. Cropping pattern
 - b. Land subdivisions
 - c. Land ownership
 - d. Depth of water bodies
- 2.20 Participation ratio is obtained from
 - a. Work force and population in working age group
 - b. <u>Work force and total population</u>
 - c. Male work force and female work force
 - d. Work force and in-migration
- 2.21 To perceive the backdrop of a building more than its facade details and the total facade Simultaneously, the height distance relationship should be at least
 - a. 1:1
 - b. 1:2
 - c. 1:4
 - d. 1:6
- 2.22 marble stone used in buildings, is a type of
 - a. metamorphic rock
 - b. calcareous rock
 - c. igneous rock
 - d. sedimentary rock
- 2.23 IRDP in India is associated with
 - a. Regional development
 - b. Rural development
 - c. River front development
 - d. Road development
- 2.24 Incentive zoning is related to
 - a. <u>Provision of extra advantage to developers</u>
 - b. Provision of extra advantage to common people
 - c. Provision of extra advantage to traffic
 - d. Provision of extra advantage to handicapped citizens

- 2.25 When the arrival rate of bank customers is lower than the service rate at the counters
 - a. Queues are quite often formed
 - b. <u>Queues are never formed</u>
 - c. Queues of infinite lengths are formed
 - d. Queues of particular length are always are formed

SECTION B (75 marks) attempt EITHER PART – I OR PART – II PART – I This part contains TWENTY questions out of which FIFTEEN are to be answered (All questions carry equal marks)

AR 3. Indicate the design principles of interior landscaping for an air-conditioned exhibition pavilion.

AR 4. In architectural design what is represented by 'Blue series' and 'Red series'? Explain the underlying concept and their applications

Le Corbusier, while working with the modular called the Fibonacci series arising from the relationship based on the unit 108, the red series, and that series based on the double unit 216 the blue series. He drew a man of a height of 1.75m, engaged at four points: zero, 108, 175, 216, then the red strip on the left, the blue on the right.

- AR 5. Enlist the advantages of adopting membrane structural systems in architecture
 - the structural flexibility
 - ➤ can also be colorful
 - ➤ its durable
 - > it provides protection against high winds, rain and snow on a cost effective basis.
 - Offer unique design signatures, not only in large-scale structures, but also in smaller subordinate structures, such as walkway coverings between buildings and door entrances

AR 6. Design and draw the application of "occult balance" and "multidirectional symmetry" in window grills of size 1200 mm X 1200 mm

- AR 7. Mention five important factors in designing a reading enclosure for a college library
 - Should have enough lighting, preferably natural lighting
 - > The partition should give ample privacy for the readers

- > The table should have enough space to keep books, to read and write
- AR 8. Explain the "unit and mullion" curtain walling system for an office exterior with an exploded view highlighting all individual components
- AR 9. Explain the basic differences between "minimalism" and "deconstruction" in modern architectural movements
- AR 10. What should be the considerations for externally illuminating the famous shore temple at mahaballipuram?
- AR 11. Explain the principles of 'noticeable absence' and 'distant netting' in the urban built form design
- AR 12. Indicate the characteristics of a 'turn-key job' in building construction
- AR 13. A three hinged parabolic arch hinged at the crown and springing points, has a horizontal span of 16m and a central rise of 8m. A concentrated load of 100KN is applied on the arch at a distance of 4m from one of the springing point. Find out the reactions at the springing points.
- AR 14. Indicate AutoCad commands for drawing a regular tetrahedron illustrating all the steps
- AR 15. Sketch a three dimensional view of a shower cubicle showing the tray, water supply connection, waste water outlet and other accessories
- AR 16. Explain the advantages of an 'open office system' as compared to traditional 'Box office system'
- AR 17. How does the concept of 'Territoriality' ensure natural surveillance of an entrance lobby in a residential apartment building?
- AR 18. Explain with annotated sketches, the similarities and differences between the spatial organizations of a typical mosque and a typical church.
- AR 19. Mention the environmental utility of preserving water bodies in densely built urban areas
- AR 20. An academic campus of 80 hectares has 30% area under student's enclave, 25% area under staff housing and 15% area under major roads (of which 50% is within the academic complex). There are 5000 students and 1800 faculty and staff members having average family size of 4.45 living in campus. Find out the gross residential population density of the campus

Total area	= 80 hectares
30% area under student's enclave 25% area under staff housing 15% area under maior roads	= 24 hectares = 20 hectares
(of which 50% is within the academic complex) i.e 7.5%	= 6 hectares
Total area excluding academic complex	= 50 hectares

Total population in the residential area = 5000 (students) + 1800 (faculty & staff) = 6800

Family size = 4.45 No. of Dwelling units = 6800 / 4.45 = 1528 1528 Dwelling units are there in an area of 50 hectares Gross residential density = 1528 / 50 = 30.56 Dwelling units / hectare

AR 21. Draw a cross section of a passenger lift well for an eight-storied building, mentioning all the important components and critical dimensions

AR 22. Enlist special planning and design considerations for a housing complex in an earthquake prone area

Foundation

- > Hard grounds are found to be suitable for all buildings
- Construction of buildings on soils with low load bearing capacity and reclaimed sites should be avoided as far as possible in seismic areas
- Loose sands with high water table subjected to violent ground shaking may cause differential settlement tilting or sinking of buildings

Constructional aspects

- Proper detailing of joints (wall to roof, wall to wall, beam to column) for all type of construction should be made
- The frame of building should have adequate ductility so as to permit energy dissipation through plastic deformation

Behaviour of masonry walls

The behaviour of non-structural walls in recent earthquakes demonstrated the need for careful structural detailing and improved specifications and construction methods to avoid their brittle failure and to achieve effective composite action with the surrounding frame members Roofing

Use of lightweight roofs is recommended in the areas with medium, high and very high vulnerability. The use of A.C. and G.I. sheets is recommended

Building materials

- Most of the loss of life due to earthquakes was on account of collapse of non-engineered buildings constructed out of mud, stones, sun dried clay brick constructions etc.
- The major cause of damage to adobe and stone masonry buildings is the inherent weakness of the material and inadequate binding material used in construction against tensile and shearing stresses which developed during moderate to severe earthquakes

Building configuration

- Long building lengths subjected to differential ground vibrations ; unsymmetrical plans susceptible for torsion are some of the major causes of earthquake damages
- > The plan must be symmetrical as far as possible with respect to two orthogonal axes
- > The ratio of height to minimum width must be less than 2.5
- > The ratio of length to width must be less than 2
- The plan shall not have protruding portions with dimensions larger than 20% of the plan dimension measured parallel to the direction of the protruding portion
- Excessive penetration may lead to severe damages. The total opening areas does not exceed 20% of the plan area

Architectural features

- No architectural decorative elements should be incorporated in design without adequate structural detailing
- All the interior elements like heavy shelves, false ceilings, decorative electrical fixtures, wall tiles, claddings should be adequately tied to the supporting structure
- Provision of parking space on the ground floor in multi-storeyed apartment is a common phenomenon in most of the urban areas. This results in the presence of soft storey at the ground level and rigid walls above
- > The presence of large number of water storage units increased the extent of damage

PART II

This part contains TWENTY questions out of which FIFTEEN are to be answered. (All Questions carry equal marks)

AR 3. What should be the major considerations for landscaping a steep terrain along a highway?

AR 4. A city had grown geometrically at a rate of 7% per annum from 1991 to 2001. In the year 2001, the city had a population of 701276. The net migration rate for the city during the above

period had been 10 per thousand population. What was the net migration to the city during 1991 to 2001

Formula for geometric growth method : Pt = Po (1 + r) t where pt is the future population po is the current population r is the rate of change between current and initial population t is the no. of years for which projection is required

701276 = Po (1 + 7/100) 10 Po (population in the year 1991) = 356493 Increase in population = Pt - Po = 701276 - 356493 = 344783 Net migration rate is 10 per 1000 i.e. 1% Net migration to the city during 1991 to 2001 = 1% of increase in population from 1991 to 2001 = 1% of 344783 = 3447.83 ~ 3444 persons

AR 5. Mention the speed calming techniques to be adopted for a busy street passing through a residential neighbourhood

AR 6. Identify the factors, which weaken the sense of enclosure for an open space surrounded by buildings

AR 7. A project network has two activities, A & B on the critical path. The pessimistic time estimate for A & B are 25 weeks and 29 weeks respectively. The optimistic time estimates are 10 weeks and 12 weeks for A & B respectively. Determine the standard deviation of the critical path.

AR 8. Indicate the factors that govern the utility of Para - transits in urban areas? Para-transit – Auto, cycle rickshaw etc.,

- Frequency of public transport system
- Comfortable travel, particularly during peak hours
- To commute shorter distance
- To access remote areas
- Commutation of aged and handicapped persons
- AR 9. What are the parameters to be considered for determining the sample size for a house hold survey?
 - Level / degree of confidence (degree of accuracy of the collected sample expressed in percentage)
 - Variability of the parameter

> Population size

AR 10. Why green spaces should be given more importance in the building of towns in hot climates?

AR 11. State the major advantages of vertical aerial photographs over a map for its application in urban planning

Vertical aerial photographs are taken with the axis of the air borne camera vertical (a deviation of less than 3 degrees from the vertical is accepted). These photographs are commonly used for mapping and interpretation purposes (gives true geometry of the ground in the form of base map, provides information about vegetation cover, soils, geological and geomorphologic features and drainage pattern)

AR 12. Where check valves are used? Sketch a check valve labeling its parts

Check valve is also called as Reflux valve or non-return valve. This type of valve is generally provided in a pipeline, which is supplied directly by a pump. When the pump fails or is stopped, the water is prevented from running back to the pump. It is an automatic device used to allow water to flow in one direction only.

AR 13. What is "Human Development Index"? What are the advantages of using this index Every year since 1990, the United Nations development programme has studied the quality of life in many countries. The Human Development Index is the result of this study. The index uses factors such as life expectancy, adult literacy rate and per-capita income to determine the rankings.

AR 14. State the important stages in land acquisition procedure while acquiring land for public purpose

- Publication of preliminary notification by the Government that a particular land is needed or likely to be needed for a public purpose
- > Hearing of objections to the above mentioned notification from interested parties by the collector and his report to the Government in this matter
- > Declaration by the Government that the land is required for a public purpose
- Notification by collector declaring Government's intention to acquire land and calling for claims for compensation from interested parties
- > Enquiry into the compensation claims and passing of award by the collector
- Taking possession of the land by the collector after payment of compensation and handing it over to the authority requiring the same

AR 15. Explain through illustration the oxygen sag curve for determining the DO level of a stream?

AR 16. What are the various forms of non property taxes that can be imposed by a municipality for mobilization of development funds?

- Betterment tax
- Professional tax
- > Tax on real estate
- ➤ Water tax
- Sewerage tax etc.

AR 17. What is incremental housing? Why it is one of the preferred options in providing housing for economically weaker section of people?

- "a cage equipped with utilities. Residents could plug into this matrix their own units"
- > As the size of the family increases, depending upon the affordability the residents can progressively develop the size of their units. Since different plans are already given to them as how to develop the core they have options to develop their own units as per their need.

AR 18. Indicate the factors to be considered for describing the economic profile of a region

- > Per-capita income
- Demographic content of the region
- Industrial scenario
- Service sector
- Trade and commerce
- Informal sector employment

AR 19. Mention various criteria's for enlisting heritage structures and precincts

- Uniqueness of the monument or site
- > Its being representative of an important epoch in the national history
- > Its association with the life of a great national leader or personality
- > Outstanding architectural or artistic or archaeological value
- Accessibility to the public
- > Not being under intensive use by the public

AR 20. Enlist the precautionary measures for disposal of hazardous wastes produced in urban areas

AR 21. Which factors are to be considered for "life cycle cost analysis" while evaluating alternative materials in any urban construction project?

- Cost of the material
- Benefit obtained from the material
- Maintenance cost of that material

AR 22. Mention the limitation of GIS as a planning tool. Which are the other support systems that are to be interlinked with GIS to make it an effective planning tool?

All GIS applications require digital geographic data (common reference data & application data).

General

Introductory GIS

Rough lecture notes

Week 1

Thursday, 3 January, 2002

What do I do with a GIS?

You are now beginning the study of *geographic information science*. This discipline of study is centered around the fundamentals and applications of *geographic information systems* or **GIS** for short.

So what is GIS? What can they do? To give you some idea, consider an example in natural resources management. Assume that you have been given the following tasks for a particular region (*ie.* local government area, state, country, etc.):

- I Inventory available forest and mineral resources.
- 1 Obtain flora and fauna requirements.
- Determine water availability and quality.
- Examine extent of disease (ie. dieback).

U Which resources are protected or in short supply (ie. national heritage listing)?

I Evaluate how resources are currently being exploited.

Predict how availability and quality of these resources will change in the next 10, 20 or even 100 years.

Assess conflicts with environment, quality of life, populated areas, visual impact, etc.

© Comply with local, regional and national regulations and legislation.

Quite a task, eh? The more you think about it, the more complex it becomes. Just imagine what you may need: lots (I mean **lots**!) of data, access to a range of departments and agencies, various software and hardware, many personnel, etc. Well...it can be done - you guessed it - using GIS!

What is a geographic information system?

What is a Geographic Information System?

An information system applied to geographic data.

System:

A group of connected entities and activities which interact for a common purpose.

For a GIS, the "connected" refers to geography, and the "common purpose" is managing or planning or decision-making.

Information system attributes (which also apply to GIS):

- decision-oriented reporting
- effective processing of data
- effective management of data
- adequate flexibility
- a satisfying user environment

How do we formally define a GIS? No one definition exists since there are many different contexts in which GIS exists. A definition of GIS can be seen from a number of points of view.

The definition that we will use in this course takes into account the various components necessary for the successful establishment of any GIS:

- technology (hardware and software)
- people
- data

Geographic Information System:

"An organised collection of computer hardware, software, geographic data, and personnel designed to efficiently capture, store, update, manipulate, analyse, and display all forms of geographically referenced data."

GIS as an information system

GIS are one of many different types of information systems. The traditional Management Information Systems and Decision Support Systems do not cater for spatial information. There are, however, spatial information systems that are not geographic, such as Computer Aided Design/Computer Aided Manufacturing (CAD/CAM) systems which do not handle a "geographic" component.



Other terms for GIS

Spatial information system Land information system Geo-information system Geomatics Natural resources information system Geoscience information system Spatial data analysis system Multipurpose geographic data system Spatial data handling system Multipurpose cadastre AM/FM - Automated mapping and facilities management Land resources information system Land-related information system Planning information system Environmental information system Spatial data management system

Advantages of GIS

The advantages of GIS are many and relate to the fact that GIS is an *integrating technology* - one that brings together many different applications, data and users. One word that can be used to describe the benefit of GIS is **synergy**. In particular, the following can be sited as advantages of GIS:

- Integrates spatial and other (aspatial) data across a diverse range of applications
- Identifies connections between activities based on geographic proximity
- Manipulate and display geographic knowledge
- Provides access to administrative records
- A tool for enhancing decision making
- Increases ability to model science and management problems
- A catalyst to further development

Friday, 4 January 2002

Areas of application of GIS technology

The applications of GIS technology can be categorised into four broad areas:

Natural resources

- I wildlife habitat
- I wild and scenic rivers
- I recreation resources
- I floodplains
- ∥ wetlands
- agricultural lands
- aquifers
- l forests
- I minerals and
- exploration
- l oil and gas

Infrastructure

Land parcel-based

- zoning urban and regional
- subdivision planning and review
- environmental impact assessment
- water quality management
- maintenance of land ownership
- land valuation and taxation
- town planning schemes

Socio-economic

- transport route planning
- street address matching
- location analysis, site selection
- disaster planning and evacuation

usage and planning of roads, sewer and water reticulation, drainage, telephone lines, gas and electricity, etc..

- population distribution and forecasting
- demographic marketing and analysis
- monitoring of patient health
- epidemiology
- police crime statistics and monitoring
- census information
 public services and access

GIS-related disciplines

GIS have developed over time across a wide range of disciplines. As a matter of fact, the whole foundational concept of GIS is multi-disciplinary.

Disciplines involved:

Computer science Remote sensing Cartography Statistics Geodesy Photogrammetry Surveying Geography Geosciences - geology, geophysics, minerals and petroleum, etc. Mathematics: geometry, graph theory Operations Research Civil Engineering Environmental biology Information systems Urban and regional planning etc.....

Many technical and conceptual developments within these areas have converged over time and have been integrated into what now is known as GIS.

"VAMBAY" HOUSING SCHEME

The Government of India have recently announced a new housing programme namely Valmiki Ambedkar Housing Scheme, which envisages the construction of new shelter units for the urban slum families. This programme will be funded with 50% grant from Government of India, 40% will be obtained as loan from the HUDCO, and the balance 10% will be from the beneficiaries as their contribution. Tamilnadu Slum Clearance Board, has programme in Chennai, Madurai, Coimbatore, Trichy, Salem and Tirunelveli during 2002-2003. The loan amount of Rs.1.60 crore to be drawn from the HUDCO for this programme will be repaid by Tamilnadu Slum Clearance Board with interest at the rate of 10% per annum over a period of 15 years. Besides works will be commenced to cover additional 6250 families at a total cost of Rs.25.00 crore under this programme during 2002-2003 with HUDCO's loan assistance of Rs. 10.00 crores, Government of India's grant of Rs. 12.50 crores and beneficiaries contribution of Rs. 2.50 crores.

REPAIRS AND RENEWALS TO SLUM TENEMENTS UNDER "VAMBAY" HOUSE UPGRADATION SCHEME

During the Silver Jubilee celebration of Tamilnadu Slum Clearance Board on 02.12.1995, the Hon`ble Chief Minister has announced the sanction of Rs.5.00 crore grant from the Government as a pioneering effort to carry out urgent structural repairs to the tenements in

order to ensure safety to the lives and properties of the occupants. Subsequently the Government have sanctioned Rs.9.50 crore during July 1997 to continue the repairs and renewal works for the slum tenements. Utilising the above funds the repairs and renewal works have been carried out for 45000 tenements in Chennai City by spending Rs.14.50 crore.

Tamil Nadu Slum Clearance Board has programmed to carry out the major structural repairs and renewal works to 30514 slum tenements constructed in Chennai, Madurai, Trichy and Erode, at a total cost of Rs.8.93 crore. This programme will be implemented utilizing the grant from the Government of India under VAMBAY and Ioan assistance from HUDCO on a 50:50 basis. The Ioan amount of Rs.4.465 crore to be drawn from HUDCO for this programme will be repaid by Tamilnadu Slum Clearance Board with interest at the rate of 10% per annum over a period of 15 years.

The following aspects were achieved by using the vastupurusha mandala: flexibility in the designing of interior spaces, axial circuiting, open-to-sky courts providing ample light and cross ventilation.

To understand vaastu , one should understand the VASTU PURUSHA MANDALA . Purusha and Mandala are associated with vaastu (site) . Vastu encompasses the house with the site and its environment. According to the Vedic thought , Purusha is not only the cause and life behind all prakriti , but also behind all creations of Man. Purusha is consciousness , the life source. It is also called atman. The Vastupurusha Mandala is a grid of square , regarded as a perfect figure , is conceived to be a fundamental form in architecture and all other shapes are derived from it. The Vastupurusha Mandala offered the formula to determine the functions of the building in relation to its orientation. The Vasturatnakara assigns specific functions to each direction. The south-east for example , is dedicated to fire and north-east to the element Water. Invariably , the correspondence with the elements would determine the position of the rooms in the house. The space assigned to the region of fire , for instance , would be used for building a kitchen or reserved as a source for heat and warmth. The Mandala also served as a guide to locate the buildings on site and determining the position of the shrines in a temple complex.

In today's stressful society we are looking the ways to improve the quality of our lives .Stepping into the garden is a wonderful way to relax and restore inner peace .Art is also useful in reducing stress because it draws us outside of ourselves .And if it's good art ,the contemplation of it enables us to look at the world with new eyes. Bringing the two together, placing art in the garden, can be a magical combination what better environment in which to contemplate and enjoy art.It adds sensory stimulation visually through colour and form or through texture. Art can also provide movement and sound by incorporating the natural

elements.

A house with well planned flowering plants not only enhances the aesthetic beauty of the place, but contributes considerably to our environment. Flowering house plants are not only restricted to residences. There is tremendous scope in the use of these flowering plants in beautifying small houses,gardens,offices,public buildings and hotels. Climbers play a large and important role int he field of ornamental horticulture. In India we have a number of beautiful flowering climbers which are eye catching.

The Value of Landscaping

Contact: Diane Relf, Extension Specialist, Environmental Horticulture, Virginia Tech

Publication Number 426-721, Revised 2001

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Enhancing our Environment

Promoting Economic Development

Dimproving Human Health

Dandscaping for the Future

Enhancing our Environment

- Plants protect water quality. Proper landscaping reduces nitrate leaching from the soil into the water supply. Plants also reduce surface water runoff, keeping phosphorus and other pollutants out of our waterways and preventing septic system overload.
- **Proper landscaping reduces soil erosion.** A dense cover of plants and mulch holds soil in place, keeping sediment out of lakes, streams, stormdrains, and roads; and reducing flooding, mudslides, and duststorms.

- Plants improve air quality. One tree can remove 26 pounds of carbon dioxide from the atmosphere annually, equaling 11,000 miles of car emissions. Landscape plants, including shrubs and turf, remove smoke, dust, and other pollutants from the air. One study showed that I acre of trees. has the ability to remove 13 tons of particles and gases annually.
- Landscaping lowers summer air temperatures. According to the EPA, urban forests reduce urban air temperatures significantly by shading heat sinks such as buildings and concrete, and returning humidity to the air through evaporative cooling. Trees shading homes can reduce attic temperatures as much as 40 degrees.
- Landscaping conserves natural resources. Properly placed deciduous trees reduce house temperatures in the summer, allowing air conditioning units to run 2 to 4 percent more efficiently, but allow the sun to warm the house in the winter. Homes sheltered by evergreen windbreaks can reduce winter heat loss and are generally warmer than homes without such protection. By using trees to modify temperatures and protect against wind, the amount of fossil fuels used for cooling and heating is reduced.
- Landscaping screens busy streets. Well-placed plantings offer privacy and tranquility by screening out busy street noises and reducing glare from headlights.

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Promoting Economic Development

- Landscaping increases property market value A 1991 study estimates that an attractive landscape increase the value of a home by an average of 7.5 percent, and reduces the time on the market by five to six weeks. The Wall Street Journal reported that landscape investments are recovered fully, and sometimes doubled, by the increased home value.
- **Good landscaping increases community appeal** Parks and street trees have been found to be second only to education in residents' perceived value of municipal services offered. Psychologist Rachel Kaplan found trees, well- landscaped grounds, and places for taking walks to. be among the most important factors considered when individuals chose a place to live.
- Landscaping reduces crime. In a California study, landscaped areas were relatively graffiti-free, while open, nonlandscaped areas were graffiti targets. Well planned and maintained landscapes are seen as safer than unmaintained plantings.
- Plants increase tourism revenues. Interior landscaping at the Opryland Hotel in Nashville, Tennessee, is credited for an unusually high (85 percent) occupancy rate. Guests willingly pay an extra \$30 per night for rooms overlooking the jungle-like display, netting \$7 million a year in additional room revenues. The city of Virginia Beach attributes, in part, their \$52 million in convention revenue for 1994 to the landscaping efforts of recent years.

- Views of plants increase job satisfaction. Employees with an outside view of plants experience less job pressure and greater job satisfaction than workers viewing man-made objects or having no outside view. They also report fewer headaches and other ailments than workers without the view.
- **Nature increases worker productivity.** Psychologists have found that plants and green spaces provide a sense of rest that allows workers with access to plants and nature to be more productive.
- Landscaping renews business districts. Greening of business districts increases community pride and positive perception of an area, drawing customers to the businesses.

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Improving Human Health

- **Gardening is excellent physical exercise.** Routine gardening tasks such as shoveling, rototilling, and even mowing grass with a push-type, reel lawn mower can measure up to the exertion rates of jogging, bicycling, or aerobics. Studies have shown that one hour of weeding bums 300 calories the same as walking or bicycling at a moderate pace.
- Gardens produce healthy food. Fresh food from the garden can have up to three times as many vitamins and minerals as canned or frozen food. Community garden plots have become a valuable means of providing food for the homeless.
- Horticulture is therapeutic Horticultural therapy is a treatment for a variety of diagnoses. Working with and around plants improves quality of life through psychological and physical changes. Nurturing a plant into maturity from seed is rewarding and builds self-confidence. Various horticulture-related tasks such as carrying plants, planting trees, or arranging flowers are used to improve coordination and motor control of injured or disabled individuals.
- Landscapes heal. Restorative gardens offer an environment for people who are sick, injured, and under stress to recover and regain confidence in themselves. Such landscapes are also currently used by hospices in treatment of Alzheimer and AIDS patients. Roger Ulrich showed through a study of hospital patients that those whose rooms overlooked vegetation recovered faster and required less pain medication than did patients without a view of nature.

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Landscaping for the Future

Landscaping is an integral part of our culture and plays an essential role in the quality of our environment, affecting our economic well-being and our physical and psychological health.

If we are to keep our communities strong and prosperous, we must take responsibility for our environment. Environmental responsibility is a step beyond awareness, developed only through experience. Through our gardens and landscapes, we acquire a personal awareness and responsibility for the environment while we relieve the tensions and frustrations of everyday life.

Landscaping offers many opportunities for the encouragement and education of responsible, productive citizens. School grounds represent the world environment of a child and should be designed and integrated into the curriculum to instill responsibility, knowledge, and experience in caring for the environment, while teaching the math, science, and art associated with the cultivation of plants.

Public and commercial landscapes have a major influence on our environment, and on peoples actions and attitudes. Sustainable landscape maintenance techniques can be used to protect the environment while enhancing economic development and improving worker productivity.

Landscaping is one of the most cost effective tools for improving and sustaining the quality of life, whether in the city, the suburbs, or the country.

History

INDIAN INDUS VALLEY VEDIC BUDDHIST INDO-ARYAN DRAVIDIAN

MUGHAL PERIODS

Building art in India attained its most sumptuous form. Relatively late phase of Islamic movement

During the early years, the country was too unsettled to produce any work of distinction, but gradually a form of building art emerged, expressive of the ruling dynasty.

The type of building evolved was no provincial or even regional manifestation. T was an imperial movement, affected only in a moderated degree by local influences, as it displayed the same uniformity in its architectural character as in its structural principles, wherever introduced.

Factors responsible for the development of building art and for high standard of production Wealth and power of the empire

Relatively settled conditions in most part of the country Pronounced aesthetic nature of the mughal rulers

Mughul style resolves itself into two phases

Buildings constructed of red sand stone – Akbar

Use of white marble

Fine character of mughuls due to each of these rulers was in most respects intellectually superior to those around him. In their cultured outlook and infallible good taste, they had few equals.

None of the historical instances does appear to have that effectively personal and intimate association between the crown and craftsman

Structures – occasionally influenced by conditions of environment – recognised by treatment in design & technique

Mughal style of Architecture did not take concrete form until the reign of Akbar, but the germinal principles of the movement were provided by Babur and Humayun.

AKBAR

Most dynamic personalities in the history of Asia.

Timurid ancestry – communicated in full measure to his successor who, ruling under more stable conditions, were in a position to materialise in stone and marble ornamental gardens and similar pleasances-Secular in nature – allowed to fall in decay

Two mosques have survived: one in Kabuli Bagh at panipat in Punjab & the other Jami masjid at sambhal

Fairly large structures but neither posses any distinctive architectural character He did not attempt to conceal his dissatisfaction at irregular planning and random design of their structures, faults, which would offend the inherent desire of his race for compositions, based on the qualities of strict formality and balance

HUMAYUN

Afghan king Sher shah sur – Humayun was driven from throne to spend the long period of fifteen years in exile. Two mosques remain of the buildings erected during his reign one in Agra and other in Fatehabad

HUMAYUN'S TOMB

Started in 1564, 8 years after the emperor's death, wife Haji Begum. Site Dinpanah or "world refuge" at this period Delhi appears to have lost much of its imperial status

Architect was Mirak Mirza Ghiyas. Near the tomb is an enclosure known as Arab serai artisan's accommodation while engaged on the work

Indian Interpretation of Persian conception

PERSIA dome, great arched alcove, complex of rooms and corridors forming the interior arrangement

INDIA fanciful kiosks – with elegant cupolas. Stone masonry combined with finer marble. Spacious Park like enclosure. Square garden with the tomb isolated in the centre – marked advances both in providing seclusion and securing an appropriate setting.

In the middle of each of four sides – an imposing gateway was introduced, West Side being the main entrance.

Formal arrangement of square and rectangular compartments with flowered partures and pavements carefully designed and proportioned, so as to form an integral part of the architectural composition. The central building stands on a wide and lofty sand stone terrace 22 feet in height, the sides being arcaded, each archway opening into a small room for accommodation of visitors.

Tomb 156 feet side and square in plan

Dome rising to height of 140 feet with a cluster of pillared kiosks having cupola roofs on each side.

Interior of the tomb – instead of comprising a single cell resolve into a group of compartments, the largest in t4eh centre of the cenotaph of the emperor, with a smaller one in each angle for those of his family. Each room is octagonal in plan and is connected with other by radiating or diagonal passages. Light is conveyed by means of clere storey windows formed of perforated screens fitted with in arched recess.

AKBAR

From 1545 (death of sher shah suri), until Akbar laid the foundation of fort of Agra, except Humayun's tomb, examples of building art are rare.

Main element s of Akbari style:

Red sandstone with insertions of white marble

Construction – trabeated order – Tudor arch often used. Style was arcuate and trabeated in equal proportions

Not far removed from a wooden archetype

During this earlier mughal period the dome was of "Lodi" type, sometimes built hollow Pillar shafts were usually many sided and the capitals in the form of bracket supports. Ornamentation : carved or boldly inlaid patterns were common while painted designs were often introduced on interior walls and ceilings

FORTRESS PALACE OF AGRA

Plan : irregular semi circle – chord 2700 feet in length – lying parallel to the right back of jumna river

Enclosure wall : solid sandstone rampart – under 70 feet in height 1-1/2 miles in circuit. In contemporary records, it is stated that "from top to bottom the fire-red stones, linked by iron rings are joined so closely that even a hair cannot find its way into their joints" Into their structure were embodied features as battlement embrasures, machicolations and stringcourses. Everything the mughals under took – even the most materialistic and commonplace productions, under their intellectual guidance became touched with artistic feeling and a reflection of their cultured ideals. It has two main gateways one on the south side intended for the private use and the other on the western side is known as Delhi gate. The Delhi gate being principal and ceremonial entrance consists of two large octagonal towers joined by an attractive archway, with arcaded terraces above surrounded by domes,

"chatris" and "guldastas". There are rooms for guards at rear side. Within the high bastioned walls of this fortress there were as many as 500 buildings built I red sand stone – many in fine styles of Bengal and Gujarat – the emperor was aware of the artistic nature of his more distant subjects and was utilising the proficiency. However, many of these were demolished after 65 years to provide an approach way for the marble pavilion of shah jahan. This fortress city consists of number of imperial buildings.

JAHANGIRI MAHAL

Probably built by Akbar for his son salim at a later stage.

Akbar's model – Gwalior fort highlighted the best in Hindu and Islamic traditions of architecture.

Configuration of rooms and chapels freely dispersed around two courts that are aligned along a central axis. The two storeyed façade – composed of central arched opening and deep horizontal chajjas over a wall of blind arches flanked by octagonal domed turrets. The entire scheme consists of typical Jain thoranas sprung across trabeate openings, richly carved stone piers and brackets and inclined struts supporting chajas and roofs LAHORE FORT

Plan: parallelogram measuring 1200 feet by 1050 feet contained within high bastioned wall. The whole rectangular area being divided longitudinally into 2 approximately equal spaces – south being reserved for the official and service buildings, while in the space at the rear where the royal palaces. Mainly in red sand stone with the combination of beam and bracket forming its principal structural system. The workmen engaged in Lahore are more imaginative in their ornamental accessories than at Agra. Remarkable display of tile decoration, which is, distributed over the exterior walls on its northern aspect. The picture gallery in colour glaze extends from the elephant gate (hathi pole) to the eastern tower of Jahangir's quadrangle.

ALLAHABAD FORTRESS

The palace fortress begun in 1583 – at the junction of the Jumna and Ganges. Plan : form of wedge or irregular segment of a circle. Widest dimension measures nearly 3000 feet across, but dismantled. Among the remains, one structure of significance – Baradari or Pavilion know as "zenana palace" – trabeated system of construction Chief beauty lies in the arrangement of its pillars around an interior hall. These pillars are designed in pairs except at the corners of the building when they are in the groups of fours. FATEHPUR SIKRI

26 miles west of Agra.

A great complex of palatial, residential, official and religious buildings, surrounded by bastioned wall. Irregular rectangular area 2 miles long by 1 mile in width.

The life of fatehpur sikri was an extremely short one, lasted for little more than a generation. Runs northeast to southwest, majority of its buildings are planned at an angle to this alignment as they face north and south. The main approach was from Agra – the road after passing through the gate and a naubat khana or drum house, where distinguished visitors were announced, led straight to diwan-l-am or hall of public audience. From this "forum" road, continue to the mosque. All the structures on the southern flank of the hill were accessible to public. Large area rear to the Diwan-I-am reserved solely for the royal palaces and similar apartments – strictly private part of the scheme.

Down the slope of the hill towards the northern side were – supplementary edifices such as offices, sarais, ornamental gardens, stables etc. principally of utilitarian order. Owing to its size and the speed, a considerable army of artificers had to be employed, and local guilds of craftsmen – each of these provincial group brought within it the particular architectural idioms of its region, so that it is possible to identify the workmanship of the more distinctive schools – Gujarat or Punjab.

The buildings comprising Akbar's capital may be resolved into two classes – religious and secular character.

Religious

Great mosque including its "triumphal gateway" or Buland darwaza and also within its courtyard the tomb of salim chisti

Secular

Palaces : jodhbai palace, house of Miriam, the sultana and the birbal. Those for administrative purposes and structures of miscellaneous order

JODHBAI'S PALACE

Discloses in its scheme some of the conditions of living that prevailed among the royal family under mughal rule

Plain outside wall

Principal building attached to its inner side, all facing an interior courtyard.

Entrance being allowed through a guarded gatehouse – the object being strict seclusion. Within this enclosure, every portion is self-contained.

Plan :

nearly square - measures 320 feet X 215 feet

enclosing walls - 32 feet in height, interrupted externally on 3 sides

eastern side - gatehouse

north - hanging pavilion or hawa mahal

southern - service and bathing apartments

central plane – 86 feet across is rectangular in shape – the greater part of its surface being occupied by an arched and domed recess, while the narrower faces on its wings are in three stories with varied openings in each stage.

The most striking feature of this façade is the large arched recess in the centre, the semi dome of which is carried on fine surfaces in the form of a half decagon, down to the ground crowning the whole of the façade is as handsome perforated parapet behind which rises a range of kiosks. The rear portion is less impressive, but is a fine mass of masonry consisting of three arched entrances and a parapet in two stages. TOMB OF SALIM CHISTI

A sand stone conception in the style of that period. It's present appearance is due to later development – i.e. beginning of shahjahan – sandstone fabric transformed into more refined and costly marble, but retaining its previous shape and character, enriching and elaborating it with additional details in the course of this process.

Square exterior of 24 feet side and containing a mortuary chamber of 16 feet diameter, the whole being covered by a low dome.

Around the outside a wide verandah is carried, its roof supported on pillars with inter spaces filled by perforated screens, the total exterior – 48 feet in diameter

On the southern face, a porch is projected. The effect depending not so much on its proportion or composition but on the elegant material.

Distinctive feature : pillars around the exterior particularly those forming the porch with their honey comb capitals and the brackets springing from their patterned shafts. Each bracket /strut consists of long serpentine volute with the spaces between the curves filled in with perforated foliations.

Most impressive part of fatehpur sikri – group of structures of religious nature – in which jami masjid predominates

As a whole it consists of a combination of 4 buildings

The great mosque itself

Its southern gateway or buland darwaza

Tomb of saint salim chisti

The mausoleum of Islam khan

Originally, the scheme included mosque only – rectangular area measuring 542 feet X 438 feet. Begun in 1571, at the same time grave of salim chisti situated towards northern end of the country and also commenced. When first constructed mosque was entered by three portals – middle of north, south and east sides.

In size mosque ranks among the largest of its kind in the country. Façade consists of a large rectangular front on its centre containing a spacious alcove, with a pillared arcade extending on each side to form the wings. Behind this central feature rises a larger dome and there are smaller domes over each wing, with ranges of pillared kiosks. Interior of the sanctuary, resolves itself into a nave, to which the three doorways in the alcove fronton form the entrance, while the aisles on each side correspond to the arcaded wings of the façade. The nave is a square hall – on its west midrib – covered by the dome. Much of the variety in the effect of this interior obtained by the open spaces of the nave and such chapels contrasting with pillared aisles by which these are connected. Mural decoration – most surfaces of interior – especially in nave and its adjacent compartments.

After 25 years of completion of mosque – Akbar returned from victorious campaign in Deccan – decided to erect a great triumphal archway commemorative of his conquests – finally decided on the southern side of the jami masjid. Demolish the existing doorway and raise the buland darwaza or "gate of magnificence"

Height 134 feet, approached by a steep flight of steps – 42 feet high Total height – 176 feet

Width – 130 feet Front to back – 123 feet

Owing to its vast size, it dominates every thing in its vicinity. main effect is produced by the front view with its façade embowed by means of three planes comprising a large central face and a lesser one on each side receding at an angle. Exterior has no outstanding feature.

Interior :

Symmetrical range of buildings surrounding a square quadrangle, most being two stories. In the middle of each side, these interior structures rise up into separate blocks, with a somewhat similar detached block at each angle both in double stories. Although confirming in its general principles with the other buildings of the city – presents through out the entire structure ascertain character of its own – resemblance of temple architecture of western India.

BIRBAL'S HOUSE

In two stories – four rooms and 2 porches forming the ground floor, but with 2 rooms above – as the remainder of this storey consists of open terraces.

There are cupolas over the upper rooms and pyramidical roofs over the porches, all constructed on a modified principle of the double dome as they have an inner and outer shell with an appreciable empty space in between – so the interior was kept cool. Exterior : rich character of the eave brackets.

DIWAN-I-KHAS OR HALL OF PRIVATE AUDIENCE

Rectangular in plan – 2 stories having a flat terraced roof with a pillared kiosk rising above each corner. Principal architectural feature is a large substantial pillar occupying a central position with its massive expanding capital supporting a circular stone platform. From this central platform, stone "bridges" radiate along each diagonal of the hall to connect with hanging galleries, which surround its upper portion. Emperor would sit enthroned on the central platform – listening to arguments representatives of the different religious communities gathered there. Central column : variously patterned shaft branching out into a series of thirty-six closely set volute and pendulous brackets carrying the throne platform. OFFICIAL / MISCELLANEOUS

Panch mahal or palace of five stories

Khwabgah or house of dreams

Astrologer's beat

Department of records and numerous other structures

SHAHJAHAN age of marble

Mouldings rare in contours, plain spaces are valuables they emphasize the beauty of the material. Essentially marble forms, decoration is occasionally plastic. With this change in technique ensured change in architectural elements of the style. Marble – obtained from the quarries of markrana I Jodhpur state.

Alteration of the character of the arch – the curves are now often foliated

The dome assumed another form – as the Persian type bulbous in its outlines and constricted at its neck – system of true double doming

Introduction of pillars with tapering or baluster shafts, volute brackets capitals and foliated bases. Structural ornamental elements of curvilinear order

Replacement of shahjahan of stone buildings in palace forts Agra by marble pavilion SHAHJAHANABAD

Transfer of capital from Agra to Delhi – in 1638 began to layout the city of shahjahanabad – right bank of river Jumna. The principal feature of this project consisted of a palace fortress for his own accommodation on a larger and more comprehensive scale than any previously produced, thus forming a city within a city. Most important portions of the work were designed and executed under the personal direction of shahjahan himself.

FORT OF DELHI

Approximately 3100 feet long and 1650 feet wide aligned north to south. Enclosed within a high an strong fortified wall

2 main gateways - west - principle and ceremonial entrance

south – private

Lahore gate : broad vaulted arcade

The inner area measuring 1600 feet by 1150 feet accommodates the whole of private and royal apartments, along the eastern wall - facing river. Outside this and within the rectangular space remaining are the service quarters such as barracks, servants houses etc.

This palace enclosure resolves itself into 4 parts

a large central quadrangle containing Diwan-i-Am or hall of public audience on each side of this are

&

consisting of 2 square open spaces designed in the form of ornamental gardens and courtyards while

is a range of marble palaces, one side facing the gardens and the other side the river. every feature of this plan is regular and formal

six marble structures rising at irregular intervals above the ramparts, their balconies, oriel windows and turrets surmounted by gilt cupolas giving this outer aspect of the for picturesque and romantic appearance.

Besides the palaces were hall of private audiences and luxurious hamam (bathing establishments)

Two of these buildings were larger than the other and of exceptional richness in their architectural and decorative treatment

hall of audience

rang mahal

these buildings have much in common and to the style as whole.

Each structure takes the form of an open pavilion in one story

Engrailed arches shaded by a wide eaves or chajja above which rises a parapet and from each corner a graceful kiosk

Interior consists of engrailed arches in intersecting arcades divide the whole space into square or oblong bays, each bay having a cavetto (simple concave moulding) or cyma recta cornice and a flat highly decorated ceiling

Instead, of pillars massive square – 12-sided piers – which gives spacious soffit to the arches.

Rang mahal : regarded as the crowning jewel of shahjahan

In plan 153 feet by 69 feet, consists of main central hall with small compartments at each end. The central hall is divided up into 15 bays each 20 feet square by means of ornamental piers. Originally its exterior arches appear to have been filled in with perforated marble screens and there were triple arches of lattice work place in the across the center of each side

DIWAN-I-KHAS

Large hall 90 feet by 67 feet. Façade consists of an arcade of its equal arches, with others of varying sizes disposed on its shorter sides – no part is enclosed. Interior is divided into 15 bays by engrailed arches supported on square marble piers. Eastern side overhanging the rampart has arched window openings and elegant perforated tracery.

WATER CONDUIT

Provision of full and continuous water supply throughout the entire enclosure – by means of conduit called NAHAR_I_BAHISHT or "canal of paradise" – enter the fort through a sluice under the shah Burj or king towers at north-east corner – such a constant stream enabled the chain of gardens to be ornamented with fountains, cascades, water falls and pools. Chief objects of this supply – carried by channels under and around the marble pavements of the royal pavilions.

FOUNTAIN & SETTING I RANG MAHALL

Consists of a shallow marble basin sunk in the pavement and occupying the entire middle bay of 20 feet square side, the perfumed water bubbling up out of a silver lotus flower on a slender stem rising from the center

The design of the basin also represents a large lotus form of delicately modeled petals contained within a square bordered frame.

DIWAN-I-AM hall of public audience

Not so decoratively treated as the palaces

Place for transaction of official business.

Originally planned square courtyard surrounded by a collonade with th4e open pillared hall on its eastern side

Now remains are hall itself, sandstone building measuring 185 feet by 70 feet. Façade formed of an arcade of nine arches with double pillars between each arch and a group of four at the corner. Three aisles of pillars with large engrailed arches form the interior Although this structure is sandstone, when first erected every part of the masonry was covered with an overlay of shell plaster, ivory polished, the preparation of this exceedingly fine chunam and its application being a technical process – craftsmen from Rajputana. Significant feature of the interior – alcove in the back wall where the emperor sat in state. On ceremonial occasions, the famous peacock throne was installed.

Decoration on the walls of this alcove above the throne special interest – series of design pietra sura

One small panel at the top depicts a characteristically occidental representation of "orphers and his lute" – evidence of Italian influence

Jami masjid

The lofty plinth on which it stands contributes a great deal to its majestic appearance. The entrance is from three gateways approached by high flight of steps. The eastern gateway was reserved for members of royal families while those on south and north were meant for the public. The courtyard is enclosed by pillared cloisters on its three sides with beautifully designed kiosks at each corner and broken in the center by three huge gateways. The corners of the wings are two tall minarets 40m high, in four stages surmounted by kiosks and pinnacles – guldasta over the sanctuary rise 3 bulbous domes that in the center being the largest. The interior of the sanctuary consists of broad wave divided into aisles by huge piers supporting the arches. There are elegant arched mihrabs on the western wall in each bay. The masjid with its imposing appearance is remarkable for its bold treatment and

structural perfection.

Yet, aesthetically the structure does not give a pleasing impression and lacks artistic appeal.

TAJMAHAL

"CROWN OF THE PALACE" built in white marble along the river Jumna at Agra by SHAHJAHAN in the memory of his wife ARJUAND BANU BEGAM (Mumtaz) Built by Turk Ustad Isa (Architects) Ustad Lahori

Geronimo Veroneo

Planned as a RAUZA (tomb) & URS (pilgrimage center) therefore includes garden, bazaar and service quarters

Approach either by road or river Earlier days favourite way was by water

Site Plan rectangle aligned north-south measuring 1900' x 1000' Central area divided off into square garden of 1000' side

South : system of roads & service dwellings, courtyards and stables North : raised terrace containing white marble tomb and two detached red sandstone buildings West : Mosque East : Mihmam – Khana (Guest house) Majlis – khana (assembly hall) The entire garden portion including the tomb is enclosed within a high boundary wall, having broad octagonal pavilions at each corner & a monumental entrance gateway in the center of the southern side

Mausoleum Elevated on a plinth 22' high

186 square with chamfered angles to form an eight sided structure – this shape is carried up to form a building 108' in height, having a marble cupola over each corner.

In the center towering to a height of 187' is the great bulbous dome. The elevation, equal on four sides is typically Islamic in design. In the center it has magnificient arcyhed recess framed by a rectangular wall that rises above the parapet of the roof. Smaller arched recesses in two storeys flank the main arch and are echoed in the narrower beveled wall surfaces. These arched recesses contain the doors and windows. Perforated marble screens, so deliberately carved that they resemble lace work, fill the windows. Floral designs, inlaid with semi precious stones decorate the spandrels of the arches. To extend and distribute the architectural effect a minaret in 3 stages and crowned by a kiosk rises from each corner of the plinth to a height of 137'

Proportion entire width is equal to the height Height of the façade in the center is the same height as the dome

Although all these factors are considered the facile grouping, rhythmical disposal, and skillful interrelation of each part in the total unity that cause the appearance of this building to react on the aesthetic perceptions in a most inspiring manner

Dome crowning glory of the elevation Body of the feature is seen to be a globe, its lower part truncated by the drum, while its upper curves, produced tangentially, rise up to form the foliated base of the finial

Interior interior arrangement of the compartments – same as that of Humayun's tomb. I.e. octagonal central hall with subsidiary chambers in the angles and all are connected by radiating passages. Main hall is also in two stories of arcades, over which is a semi circular vault forming the inner shell of the double dome Most of the mural enrichment consists of inlaid patterns

Material undoubtedlymuch of its charm is produced by the quality & texture of the material used the marble is of such a nature that it takes on incredibly subtle variations f tint and

tone, according to the changes in light. for every hour of the day and for every atmospheric condition the Taj has its own colour values from

- Soft dreaminess at dawn
- Dazzling whiteness at midday
- Cold splendour in moon light

Garden from the central pool (pond) the water channels flow in the four directions dividing the garden at right angles into four from charbagh or four portioned garden plan. The inclination and level of the garden is carefully designed to keep the water constantly flowing from the river behind the Raj. The gardens were so planned to prepare the spectator for the exquisite appearance and lovely dignity of the central structure, each of its formal elements being designed with the express object of either harmonizing with its architecture or bringing it into pleasing perspective. The shahjahan's intention to duplicate the entire scheme of the Taj by the erection of another mausoleum in black marble to enshrine his own remains, on the opposite bank of the jumna and to connect the two by a bridge. However, the war which he had with his son interrupted his plan.

JAHANGIR

School of miniature painting

Partiality for the minor arts

Formal gardens and similar ornamental retreats

Most remarkable building - Akbar's tomb, sikandra near agra

Perimeter walls enclose a garden of great zsize

In middle of each side of the enclosure wall is a gatehouse, three of these being false doorways added for symmetry, south is the main entrance

The entrance gateway is a structure of exceptional elegance

Pleasing proportions and bold inlaid ornamentation provided with four graceaful white mrble minarets, one rising above each corner

Plan of the ornamental gardens leading upto the central structure, arrangement shows how the garden designer & builder collaborated with the object of co-ordinatintg each element in rder to produce an unified composition

Wide pathways expanded at suitable intervals into a square terrace containing a fountain and sunk basin

Tomb : square of 320' side, with a total height of 100' – general outline takes the shape of a low truncated pyramid, built up in three stories

A massive terrace comprising the basement

An orderly arrangement of red sand stone pavilions in three tiers forming the middle portion Crowning all an ope court, surrounded by a marble screen producing the uppermost storey

Basement or ground storey superb conception over 300' side and 30' high, seires of arcfhes recessed withits four sides

Interposed in the center of each stage of these sids rises a tall rectangular structure, containing an arched alcove

Above parapet is graceful marble kiosk

Doorway in the southern alcove – a corridor leads to the tomb chamber, a small cell confined

Ground storey – powerful substructure – constructed during the last years of akbar's regn Contrast

The storey immediately above consists of ranges of sand stone pavilion – the composition becomes light and fanciful uppermost storey of Akbar's mausoleum – a contrast to the rest of the buildings as it is composed of white marble. A massive structure with a solid projecting cornice – appearance is lightened by being contained within a range of delicately perforated screens while above each corner rises a tall and graceful kiosk.

The interior of this storey is an open court surrounded by arcaded cloisters – cenotaph occupying the center.

Several processes such as fresco painting, inlay, mosaic tiles, colour work being used in the interior, the inlay on the pavements and sides of the minarets, the tiles on the dadoos of the corridors, while semi precious stones enrich with graceful scrolls the white marble of the cenotaph

Tomb of Itmad-ud-daulah, agra

(father of jahangir's queen nurmahall)

connecting link between the style of akbar and that of shahjahan

small but elegant structure

walled enclosure of 540' side stands in garden with green cypress trees against gateways of red standstone.

Surrounde by lawns, pastures, pathways, tanks and fountains the tomb building in the flawless white marble reposes like gem with in its casket.

Comprise a central structure with broad octagonal towers in the form of minarets thrown at each angle a small pavilion rising above the roof. Three arched openings in each side Cornices on brackets and wide eave to the upper portion provide horizontal lines and shadows.

The interior of the ground storey consists of series of rooms and passages corresponding to an enclosed verandah, which surrounds a central chamber containing the cenotaph. The pavilion above is a square compartment – walls formed of finest marble traery and on its patterned and polighed pavement are 2 yellow porphery cenotaphs. White marble is subdued by the subtle tints of the inlay Mausoleum is one of the most ambitious productionsattempted by the mughals. Although a superb effort the result is architecturally ineffective as it lacks substance and volume a as well as the qualities of unity and definition

JAHANGIR'S TOMB AT SHADERA near Lahore – most of which was sconstructed by Nur mahall begum

In the center of an immense garden, square in plan and over 1500 feet side on the old bank of Ravi river. Enclosed by a high brick wall with a gateway in middle ofeach side The garden is one of the largest – divided into 16 equal squares by paved causeways – fountain and ornamental pool at each intersection. In every one of the parteres a different flower was grown

In the center – 325' side – one storey structure – with octagonal minarets rising up from each corner to a height of nearly 100' above ground level

No capacious interior effect was aimed at. The interior arrangement consists of a corridor leading to a range of rooms continued round the outer sides of the building and a series of compartments are leading from the middle of each side of the tomb

Vaulted chamber contains inlaid marble cenotaph – illuminated by a simple aperture in the center of the ceiling.

Architecturally, except the four minarets structure is un impressive principal effect being obtained through colour decoration distributed all over the surface.

EUROPEAN EGYPTIAN GREEK ROMAN MEDIEVAL RENAISSANCE PERIODS.

SITE PLANNING

Site planning has been described as 'the art of arranging the external physical environment to support human behaviour ... site plans locate structures and activities in three-dimensional space and, when appropriate, in time. The preparation or consideration of a site plan will often relate to a detailed design for a specific use such as housing, shops or offices in a particular area. Sometimes it might involve mixed development, but always the nature of the use and the form of its layout will be governed by the relevant provisions of the development plan, the general accessibility and location of the area, the requirements of the client and the topography and characteristics of the site.

PRINCIPLES OF LANDSCAPE DESIGN AND SITE PLANNING

HISTORY AND LANDSCAPE STYLES

LANDSCAPE ELEMENTS AND MATERIALS

PLANTING DESIGN

Suggest the action programmes for top soil conservation or protection

- Protection of soil from impact of raindrops
- > Increasing the permeability i.e. encouraging ore water to enter the sol
- > To prevent water from concentrating and moving down the slope in a narrow path
- > To slow down the water movement down the slope
- Reducing the wind velocity near the ground by growing vegetation cover and retaining the land surface

Outline the salient features of the historical landscape gardening style of Japan.

- Close connection between house and garden a complete harmony between the house and garden is maintained
- > A garden is not just a faithful copy of nature, but reflects an idealized concept of nature
- The influence of Buddhism and zensect and tea ceremony
- To achieve an impression of silence all brilliant colours are denounced and preference is given to the various kinds of predominantly green plants so that auniform colour is attained
- > The Japanese garden is Monochrome in nature. The main garden elements are
 - 10. garden stones
 - 11. stepping stones
 - 12. stone water basin
 - 13. stone lantern
 - 14. water
 - 15. bridges
 - 16. tea houses
 - 17. fences
 - 18. vegetation

SRM DEEMED UNIVERSITY M. Arch Entrance exam

- 1. Hardness of water is measured in parts per million by weight in terms of
 - a. Calcium carbonate
 - b. Ferrous oxide
 - c. Carbon dioxide
 - d. Magnesium sulphate
- 2. The oxygen demand in the initial stage of the biological decomposition of sewage is due to the presence of
 - a. Nitrogenous matter
 - b. Phosphate matter
 - c. Carbonaceous matter
 - d. Calcareous matter
- 3. Water seal in water closet is used to
 - a. Prevent foul gases from entering the house through external sewer pipe
 - b. Prevent water from leaking through the pipe
 - c. Keep the water closet moist throughout
 - d. None of the above
- 4. The minimum water supply requirement per head per day for residential purposes including drainage and sanitation is
 - a. 70 litres
 - b. 135 litres
 - c. 180 litres
 - d. 210 litres
- 5. For Indian metropolitan cities the quantity of solid waste accumulation per head per day is approximately
 - a. 0.5kg
 - b. 1.5 kg
 - c. 2.5 kg
 - d. 3.5 kg
- 6. Turbidity of water is due to
 - a. Algae
 - b. Fungi

- c. Organic salt
- d. Suspended matters
- 7. The velocity head f water supply line is measured in terms of
 - a. m/sec
 - b. m/sec²
 - c. m
 - d. m²/sec
- 8. the most commonly used disinfectant for purification of municipal water is
 - a. boric powder
 - b. alum
 - c. bleaching powder
 - d. camphor
- 9. an 'aquifuge' is
 - a. impermeable layer which neither contain water, but to not transmit water appreciably
 - b. perched aquifer
 - c. artesian aquifer
 - d. impermeable layer which neither contain water nor transmit any water
- 10. in sewers, velocity of flow should not be
 - a. more than self cleaning velocity
 - b. less than velocity of water at flushing
 - c. less than dry water flow velocity
 - d. less than self cleansing velocity
- 11. Acidity of soil is indicated by
 - a. BOD
 - b. Ph
 - c. Gl
 - d. CIO
- 12. The pH scale runs from 0-14, the nearest value of drinking water is
 - a. 0
 - b. 4.5
 - c. 7.0

- d. 12.6
- 13. The most sanitary method of disposal of refuse suitable for crowded cities is
 - a dumping
 - b composting
 - c incineration
 - d sanitary land filling
- 14. potable water is nothing but
 - a. waste water
 - b. drinking water
 - c. hard water
 - d. storm water
- 15. the automatic device which allows to flow in one direction only is
 - a sluice valve
 - b scour valve
 - c reflex valve
 - d air valve

16. in completion of a project, critical path is the one which requires

- a. maximum time
- b. minimum time
- c. optimum time
- d. critical time
- 17. Along a critical path crashing is carried out for the activity that has
 - a. minimum cost-time slope
 - b. maximum cost-time slope
 - c. minimum cost slope
 - d. maximum time slope
- 18. In network analysis, the amount of time by which the start of an activity may be delayed without hampering the start of a succeeding activity, is called
 - a. Total float
 - b. Free float
 - c. Time lag
 - d. Start lag
- 19. Two critical activities A and B need 5 and 8 days respectively, to complete. Another noncritical activity C needs 5 days to complete with a free float of 2 days. If C is completed in 4 days now, how much compression in project time is achieved?
 - a. 0 days
 - b. 1 day
 - c. 2 days
 - d. 3 days
- 20. Variability of project duration in PERT analysis is measured in terms of
 - a. Pessimistic time difference
 - b. Optimistic time difference
 - c. Time difference of activities
 - d. Square of standard deviation of activity duration
- 21. 'Crash time of a project indicates the
 - a. optimum time in which a project is completed
 - b. Shortest time in which a project can be completed
 - c. maximum delay that the project can undergo
 - d. point of time at which the project will fail
- 22. if 'a' is the optimistic time, 'b' is the pessimistic time and 'm' is the most likely time of an activity, the expected time of the activity is
 - a. (a+5m+b)/6
 - b. (a+4m+b) / 6
 - c. (a+2m+b) / 6
 - d. (a+m+b) / 6
- 23. An 'activity' in project Management means
 - a. Start or completion of task in time and resource
 - b. Total project time for completion of work
 - c. Least total time required to complete the work
 - d. Actual performance of task consumes time and resources
- 24. The minimum possible time in which an activity can be completed, by employing extra resources is called
 - a. Normal time
 - b. Crash time
 - c. Project time
 - d. Scheduled time

- 25. The method of rescheduling a project since the resources are considered to be limited is called
 - a. Resource smoothing
 - b. Resource levelling
 - c. Resource updating
 - d. Resource planning
- 26. BASIC is a
 - a. Compiler
 - b. Hardware item
 - c. Interpreter
 - d. Plotter type
- 27. DIM in AutoCAD refers to
 - a. Dimension of array
 - b. Dimension function
 - c. Brightness of visual screen
 - d. None of the above
- 28. In computer program a valid real constant is
 - a. 1
 - b. -1/2
 - c. 1.5
 - d. 58,634.2
- 29. SKPOLY command in AutoCAD helps in
 - a. Sticking together two polylines
 - b. Drawing street kerbs with polylines
 - c. Creating polylines while sketching
 - d. Creating K shortest path along polyline
- 30. UCS in AutoCAD
 - a. Cannot be altered
 - b. Can only be rotated
 - c. Can only be translated
 - d. Can be rotated and translated
- 31. The fixed end moment of a cantilever beam with an u.d.l. of 20 KN/m and span of 3m is
 - a. 60 KN m
 - b. 90 KN m
 - c. 120 KN m

- d. 150 KN m
- 32. Maximum tensile stress is possible in
 - a. Wood
 - b. Stabilized mud block
 - c. Stone block
 - d. Steel
- 33. In a wooden structural member the strength is
 - a. Maximum parallel to the grain
 - b. Maximum perpendicular to the grain
 - c. Equal in all directions
 - d. None of the above
- 34. The minimum diameter of longitudinal reinforcement in R.C.Column is
 - a. 8 mm.
 - b. 10 mm.
 - c. 12 mm.
 - d. 16 mm.
- 35. In a simply supported team, the maximum bending moment occurs at
 - a. The point where shear force is zero
 - b. The point where shear force is maximum
 - c. Mid span point
 - d. None of the above
- 36. Maximum air-flow at body level in a room can achieved through
 - a. High inlet and high outlet
 - b. High inlet and low outlet
 - c. Low inlet and high outlet
 - d. Low inlet and low outlet
- 37. ET index can be obtained from nomograms showing
 - a. DBT, WBT and air velocity
 - b. DBT, AH and RH
 - c. AH, RH and air velocity
 - d. WBT and air velocity
- 38. The extent of wind shadow on the leeward side is more dependent on
 - a. Height of the building
 - b. Depth of building

- c. Width of building
- d. All of the above
- 39. To ensure comfort condition inside the room, the temperature and relative humidity values should preferably be
 - a. 20 C and 65% respectively
 - b. 15 C and 45% respectively
 - c. 25 C and 50% respectively
 - d. 30 C and 65% respectively
- 40. increased height of the room gives better ventilation due to
 - a. stack effect
 - b. wind effect
 - c. effective temperature
 - d. positive ventilation
- 41. The term 'vedika' in Buddhist architecture is used for
 - a. Railing around stupa
 - b. Crown umbrella of stupa
 - c. Decorative entrance of stupa
 - d. Niche in the wall of stupa
- 42. 'Architrave' is the
 - a. slab of stone on top of classical orders
 - b. lowest part of entablature
 - c. wall supporting the weight of an arch or vault
 - d. topmost part of a classical Greek column
- 43. 'kailash Temple' of Ellora is an example of rock-cut architecture of
 - a. Brahmanical style
 - b. Dravidian style
 - c. Pallava style
 - d. Mamalla style
- 44. Mihrab is found
 - a. On the west wall of a mosque
 - b. Inside wall of mausoleum
 - c. In the stepped well of Gujarat

- d. On the crowns of minaret
- 45. Optical corrections were employed in
 - a. Gothic architecture
 - b. Greek architecture
 - c. Indian architecture
 - d. Islamic architecture
- 46. Botanical name for 'Gulmohar tree' is
 - a. Hamelia patens
 - b. Cordia Sebestina
 - c. Delonix Regia
 - d. Gmelina philippensis
- 47. 'Habit' of plants refers to
 - a. growth rate
 - b. branching pattern
 - c. foliage
 - d. life span
- 48. Which of the following sequences of names constitute the botanical name for identification and use of landscape plants?
 - a. Species and order
 - b. Order and genera
 - c. Family and species
 - d. Genera and species
- 49. the botanical name of 'neem' tree, used for roadside landscaping is
 - a. lagerstroemia speciosa
 - b. ficus benghalensis
 - c. kleinhama hospita
 - d. azadirachta indica
- 50. symbolic representation of water by sand is frequently found in
 - a. mughal garden
 - b. English garden
 - c. Japanese garden
 - d. Moorish garden

- 51. The concept 'architecture as expression of inner structure' is attributed to
 - a. Alvar alto
 - b. Mies Vander rohe
 - c. Walter gropius
 - d. Le corbusier
- 52. The new Guggenheim Museum in Bilboo, Spain was designed by
 - a. Frank Gehry
 - b. F.L.Wright
 - c. Roger Änger
 - d. Norman Foster
- 53. J.N.U., New Delhi campus has been designed by
 - a. A.P. Kanvinde
 - b. Louis I. Khan
 - c. C.P.Kukreja
 - d. J.A.Stein
- 54. One who is associated with crystal palace is
 - a. Charles correa
 - b. Joseph Paxton
 - c. Mies Vander rohe
 - d. Eero saarinen
- 55. Decision on phasing is required in the design of
 - a. channelised intersection
 - b. Priority intersection
 - c. Grade separated intersection
 - d. Signalised intersection
- 56. Class II towns as defined in the Indian census relate to a minimum population size of
 - a. 2,00,000
 - b. 1,50,000
 - c. 1,00,000
 - d. 50,000
- 57. The concept of 'Ekistics' was propagated by
 - a. Amos Rapoport
 - b. Constantine Doxiadis
 - c. Buck minister Fuller

- d. Adam Hardy
- 58. The first Garden City, Letch worth, was designed by
 - a. Ebenezer Howard
 - b. Antonio sant Elia
 - c. Raymond Unwin
 - d. Clarence Perry
- 59. For a four-way road intersection the following alternative traffic management schemes are proposed
 - (i) Signalized intersection
 - (ii) Manually controlled intersection
 - (iii) Rotary intersection

Considering the above alternatives, which of the following statements is INCORRECT?

- a All are equally space consuming
- b 'i' is more power consuming than 'ii' and 'iii'
- c 'ii' is more manpower consuming than 'i' and 'iii'
- d 'iii' is less power and manpower consuming than 'i' and 'ii'
- 60. the term 'Conservative Surgery' was coined by
 - a. Patrick Geddes
 - b. Le Corbusier
 - c. Edwin Lutyens
 - d. Frank Lloyd Wright
- 61. The term 'Necropolis' refers to
 - a. Small size metropolis
 - b. The new metropolis
 - c. Dead city
 - d. The city in space
- 62. Vidyadhar Nagar was planned by
 - a. HK Mewada
 - b. Vidyadhar Bhattacharya
 - c. BV Doshi
 - d. Charles Correa
- 63. The concept of 'la ciudad linear' is associated with
 - a. Le corbusier
 - b. Tony garnier
 - c. S y Mata

- d. Robert Owen
- 64. Concept of self supporting "industrial Town was proposed by
 - a. Lewis Mum ford
 - b. Henry Wright
 - c. Robert Owen
 - d. Ebenezer Howard
- 65. Letch worth was designed based on the concept of
 - a. Newtown
 - b. Garden city
 - c. Factory town
 - d. Linear city
- 66. The word "Ecumenopolis" was coined by
 - a. Patrick Geddes
 - b. Le corbusier
 - c. Doxiadis
 - d. Ebenezer Howard
- 67. The principle of conservative surgery was suggested by
 - a. Patrick Geddes
 - b. Lewis Mum ford
 - c. Charles Abraham
 - d. Ebenezer Howard
- 68. The greater London plan 1911, was prepared by
 - a. Christopher wren
 - b. Ebenezer Howard
 - c. prince Charles
 - d. Patrick Abercombe
- 69. If the scale of a map is 1:30,000, then 1 sq cm area of the map would represent
 - a. 9.00 hectare
 - b. 15.00 hectare
 - c. 17.30 hectare
 - d. 30.00 hectare
- 70. Number of modular bricks required for 10 cu m brickwork is
 - a. 4500
 - b. 4750

- c. 5000
- d. 5225
- 71. a residential plot of 20 metre frontage and 25 metre depth is governed by the development regulations of maximum F.A.R. of 2 and maximum plot coverage of 50%. Up to what maximum height can the plot be built?
 - a. 2 floors
 - b. 3 floors
 - c. 4 floors
 - d. 10 floors
- 72. The buildable area available on a plot of one hectare with a FAR of 2.25 is
 - a. 15500 sqm
 - b. 20500 sqm
 - c. 22500 sqm
 - d. 25500 sqm
- 73. Which of the following is the closest approximation to a land of area measuring 1.5 acres?
 - a. 1500 sq.m.
 - b. 3035 sq.m.
 - c. 9060 sq.m.
 - d. 6070 sq.m.
- 74. IRDP in India is associated with
 - a. Regional development
 - b. Rural development
 - c. River front development
 - d. Road development
- 75. When the picture plane moves towards the observer, the size of the picture in perspective
 - a. Does not change
 - b. Increases
 - c. Decreases
 - d. Gets elongated
- 76. The book 'Design with Nature' was written by
 - a. Lawrence Halprin
 - b. Frederick Law Olmsted
 - c. Ian Mc Harg
 - d. Andre Le Notre

- 77. with every doubling of distance from source the noise level will reduce by
 - a. 6 dbA
 - b. 8 dbA
 - c. 10 dbA
 - d. 12 dbA
- 78. Terra-cotta is a kind of earthen work processed by
 - a. Drying in the sun
 - b. Burning at high temperature
 - c. Mixing with lime
 - d. Compacting under pressure
- 79. CPCB is an organization which deals with
 - a. Pest control
 - b. Poverty control
 - c. Population control
 - d. Pollution control
- 80. as per the National Building Code the minimum area of a habitable room is
 - a. 8.5 sqm
 - b. 9.5 sqm
 - c. 10.5 sqm
 - d. 11.5 sqm
- 81. intensity of colour refers to
 - a. brightness
 - b. darkness
 - c. pigment density
 - d. quantity
- 82. Occupancy Rate refers to
 - a. Number of buildings per unit area
 - b. Number of persons per habitable room
 - c. Number of habitable rooms per acre
 - d. Number of persons working in an office
- 83. The only architect-president of a nation was

- a. Richard Nixon
- b. F.Marcos
- c. Thomas Jefferson
- d. L.B.Johnson

84. The unit of measurement for intensity of sound level is

- a. bel
- b. decibel
- c. hertz
- d. sones
- 85. The Pritzker Architecture prize, 1996, has been awarded to
 - a. Charles Correa
 - b. Jose Rafael Moneo
 - c. Robert Venturi
 - d. Ricardo Legorretta
- 86. Jharoka is an architectural element used in buildings as
 - a. Gateway
 - b. Balcony
 - c. Column decoration
 - d. Ceiling decoration
- 87. In a lecture auditorium the seating pattern from the speaker should fall within maximum angle of
 - a. 0º
 - b. 90°
 - c. 120º
 - d. 140º
- 88. Belgium Embassy in New Delhi was designed by
 - a. Raj rewal
 - b. Satish Gujral
 - c. Laurie Baker
 - d. Richard neutra
- 89. Individual parking space for car is
 - a. 3m x 6m
 - b. 2.5 x 5m
 - c. 3.75m x 7m

- d. 3m x 5m
- 90. settlement with 'mile high' structure was conceived by
 - a. Le Corbusier
 - b. Antonia Gaudi
 - c. F.L Wright
 - d. Kevin lynch
- 91. Aranya project of indore is planned by
 - a. BV Doshi
 - b. U.C. Jain
 - c. Amos rappoport
 - d. C.P.Kukreja
- 92. Eopolis is a
 - a. city
 - b. city in cosmos
 - c. village
 - d. universal city
- 93. the minimum height of habitable room as prescribed by NBC is
 - a. 1.85 m
 - b. 3.0 m
 - c. 2.75 m
 - d. 3.2m
- 94. Gopuram refers to
 - a. Gateway
 - b. Temple
 - c. Village
 - d. Dome
- 95. Workability of concrete mix with low water-cement ratio is determined by
 - a. Slump test
 - b. Tensile strength test
 - c. Flexural strength test
 - d. Compaction factor test
- 96. 'Zeolite' is
 - a. hydrated alumino-silicate
 - b. sodium carbonate

- c. hydrated calcium hydroxide
- d. calcium bi-carbonate
- 97. which of the building was not designed by Charles correa
 - a. Hotel Cidade de goa
 - b. LIC building, Delhi
 - c. CMC Ltd., Mumbai
 - d. Bharat bhavan, Bhopal
- 98. The memorial at sri-perumbudur, where Rajiv Gandhi was assassinated is designed by
 - a. Charles correa
 - b. K.T. Ravindran
 - c. Raj rewal
 - d. J.A.Stein
- 99. "The Architects Act" was enacted by parliament in the year
 - a. 1976
 - b. 1962
 - c. 1972
 - d. 1973
- 100. The book "complexity and contradiction in Architecture" is written by
 - a. Kevin Lynch
 - b. Robert venturi
 - c. E.N.Bacon
 - d. Lewis Mumford
- 101. According to census classification of towns, Class-1 town has a population a. 50,000 to 99,999
 - a. 50,000 10 99,9 b. > 1,00,000
 - J. > 1,00,00
 - C. < 5000
 - d. 10,000 to 19,999
- 102. When output is obtained on paper it is called
 - a. Hard copy
 - b. Soft copy
 - c. File copy
 - d. Xerox copy
- 103. The program that performs the operation of translating a high level language into a machine language is

- a. compiler
- b. assembler
- c. processor
- d. hardware
- 104. 1 byte is equal to
 - a. 8 bits
 - b. 64 bits
 - c. 128 bits
 - d. 256 bits

105. the term used to denote collectively the input/ output and secondary storage devices is called

- a. compiler
- b. package
- c. peripheral
- d. assembler

106. a group of wires that act as paths for digital signals

- a. modem
- b. bus
- c. wires
- d. mouse
- 107. Special purpose temporary storage location in ALU & control unit are called
 - a. Floppy disk
 - b. hard disk
 - c. Registers
 - d. Compact disk
- 108. a method of prestressing concrete in which prestressing steel is tensioned against the hardened concrete is called
 - a. re tensioning
 - b. pre tensioning
 - c. post tensioning
 - d. tensioning

- 109. Columns in a straight line is called
 - a. Ortho style
 - b. Peri-style
 - c. arcade
 - d. linear style
- 110. Best season for pruning is
 - a. End of February
 - b. Week ends
 - c. Beginning of may
 - d. None of the above
- 111. The book "site planning" was written by
 - a. Victor olgag
 - b. Kevin lynch
 - c. Joseph Paxton
 - d. William penn
- 112. The ratio of Golden mean is
 - a. 1:2
 - b. 1:2.634
 - c. 1:1.618
 - d. 1:1.411
- 113. C.P Kukreja designed
 - a. Amba Deep, New Delhi
 - b. International stadium, cochin
 - c. IIT, Delhi
 - d. Indian embassy, Katmandu
- 114. Design of Bauhaus school building was done by
 - a. Walter gropius
 - b. Mies Vander rohe
 - c. Louis Sullivan
 - d. Eero saarinen
- 115. One of the following is not a part of the definition of Urban area as per census
 - a. A density of not less than 400 per sq. km
 - b. A population of 5000 or more
 - c. ¾ of the population engaged in non-traditional/agricultural activities
 - d. ³/₄ of the population should be educated

- 116. the intent of Transfer of Development Rights (TDR) is to
 - a. control the land price
 - b. to concentrate development in areas where it is wanted and to restrict in areas where it is not
 - c. to protect the right of the land developers
 - d. to increase the revenue of the local body
- 117. CIDCO (City and industrial development corporation) was formed to create a twin city in the state of
 - a. Tamil nadu
 - b. Karnataka
 - c. maharastra
 - d. kerala
- 118. In Egyptian architecture, an upright stone slab in the offering room with inscription of the name of deceased is called
 - a. stele
 - b. serdad
 - c. mastaba
 - d. sphinx
- 119. Post occupancy evaluation refers to
 - a. evaluating the building after the tenant has vacated the building
 - b. evaluating the rented house
 - c. evaluating the building after the client has occupied it
 - d. evaluating the building to sell it
- 120. the study of science of human settlements is called
 - a. anthropometrics
 - b. ekistics
 - c. logistics
 - d. ergonomics

BEHAVIOURAL CHARACTERISTICS OF ALL TYPES OF BUILDING MATERIALS

MUD, TIMBER, BAMBOO, BRICK, CONCRETE, STEEL, GLASS, FRP

PRINCIPLES OF STRENGTH OF MATERIALS DESIGN OF STRUCTURAL ELEMENTS IN WOOD, STEEL AND RCC; ELASTIC AND LIMIT STATE DESIGN COMPLEX STRUCTURAL SYSTEMS PRINCIPLES OF PRE-STRESSING.

Mention the advantages of poly carbonate sheets or Fiberglass reinforced plastic

- > Light in weight
- Easy to repair
- Durability
- Corrosion resistance
- Freedom of design i.e. flexibility
- Low investment in tooling
- Easy maintenance

Outline the utility of mixing sand in mortar

Sand forms an important ingredient of mortar

Sand is used in mortar for the following purposes

- Bulk: it does not increase the strength of mortar. But it acts as adulterant. Hence, bulk or volume of mortar is increased which results in reduction in cost
- Setting: if building material is fat lime, carbon dioxide is absorbed through the voids of sand and setting of fat lime occurs effectively
- Shrinkage: it prevents excessive shrinkage of the mortar in the course of drying and hence, cracking of mortar during setting is avoided
- Strength: it helps in the adjustment of strength of mortar or concrete by variation of its proportion with cement or lime. It also increases the resistance of mortar against crushing
- Surface area: it subdivides the past of the binding material into a thin film and thus more surface area is offered for its spreading and adhering

Indicate five major advantages for which you will recommend steel structure for a multi-storied building

- Elegant, slender members
- ➢ High strength to weight ratio
- Load on foundation is less

What is the significance of water cement ratio in building construction? Indicate the critical observations required in this context

- > Crushing strength of concrete is affected by water-cement ratio
- > Wearing and tearing strength also depends on this ratio

> Workability of concrete

> Hence simple tests can be carried out to maintain and determine the water-cement ratio

AR 23. What are the reasons for efflorescence on porous building materials?

- > Presence of salt in the material
- Absorption of ground water containing salt. When dampness occur salt is brought to the surface and when dried, it leave the salt on the surface carrying patches
- > Use of Portland cement mortar and certain other lime mortar
- ➢ In stone work, water is absorbed by the stone and on drying salt is left on the surface and results in decay

AR 23. Enlist the advantages of adopting membrane structural systems in architecture

- ➤ the structural flexibility
- Can also be colorful
- ➤ its durable
- > it provides protection against high winds, rain and snow on a cost effective basis.
- Offer unique design signatures, not only in large-scale structures, but also in smaller subordinate structures, such as walkway coverings between buildings and door entrances
- 121. The ratio of Golden mean is
 - a. 1:2
 - b. 1:2.634
 - c. 1:1.618
 - d. 1:1.411

122.

123.

124.

- 125. Intensity of colour refers to
 - a. brightness
 - b. darkness
 - c. pigment density
 - d. quantity

For a split complementary colour scheme, the primary red colour should be associated with

- e. blue violet red violet
- f. red orange yellow orange
- g. blue green yellow green
- h. red violet blue green

- 126.
- 127.
- 128.
- 129. 130.
- 130.
- 131.
- 133.
- 134.
- 135.
- 136. Hardness of water is measured in parts per million by weight in terms of

a. Calcium carbonate

- b. Ferrous oxide
- c. Carbon dioxide
- d. Magnesium sulphate

137. Water seal in water closet is used to

a. Prevent foul gases from entering the house

- b. Prevent water from leaking through the pipe
- c. Keep the water closet moist throughout
- d. None of the above
- 138. The minimum water supply requirement per head per day for residential purposes including drainage and sanitation is
 - a. 70 litres
 - b. 135 litres
 - c. 180 litres
 - d. 210 litres
- 139. For Indian metropolitan cities the quantity of solid waste accumulation per head per day is approximately
 - a. 0.5kg
 - b. 1.5 kg
 - c. 2.5 kg
 - d. 3.5 kg
- 140. Turbidity of water is due to
 - a. Algae
 - b. Fungi
 - c. Organic salt

d. Suspended matters

- 141. the most commonly used disinfectant for purification of municipal water is
 - a. boric powder
 - b. alum
 - c. bleaching powder
 - d. camphor
- 142. in sewers, velocity of flow should not be
 - a. less than velocity of water at flushing
 - b. less than dry water flow velocity
 - c. less than self cleansing velocity
 - d. none of the above
- 143. The pH scale runs from 0-14, the nearest value of drinking water is
 - a. 0
 - b. 4.5
 - c. 7.0
 - d. 12.6

144. The most sanitary method of disposal of refuse suitable for crowded cities is

- e dumping
- f composting
- g incineration
- h throwing in sea
- 145. potable water is nothing but
 - a. waste water
 - b. drinking water
 - c. hard water
 - d. storm water
- 146. the automatic device which allows to flow in one direction only is
 - e sluice valve
 - f scour valve
 - g reflex valve
 - h air valve

147. The term 'vedika' in Buddhist architecture is used for

- a. Railing around stupa
- b. Crown umbrella of stupa
- c. Decorative entrance of stupa
- d. Niche in the wall of stupa
- 148. 'Architrave' is the
 - a. slab of stone on top of classical orders
 - b. lowest part of entablature
 - c. wall supporting the weight of an arch or vault
 - d. topmost part of a classical Greek column

149. 'kailash Temple' of Ellora is an example of rock-cut architecture of

- a. Brahmanical style
- b. Dravidian style
- c. Pallava style
- d. Mamalla style
- 150. Mihrab is found
 - a. On the west wall of a mosque
 - b. Inside wall of mausoleum
 - c. In the stepped well of Gujarat
 - d. On the crowns of minaret
- 151. Optical corrections were employed in
 - a. Gothic architecture
 - b. Greek architecture
 - c. Indian architecture
 - d. Islamic architecture
- 1.26 Temples of many shikaras are
 - a. Indo-aryan temples
 - b. Dravidian temples
 - c. Besara temples

- d. Khajuraho temples
- 1.27 Jharoka is an architectural element used in buildings as
 - a. Gateway
 - b. Balcony
 - c. Column decoration
 - d. Ceiling decoration

- 152. Maximum air-flow at body level in a room can achieved through
 - a. High inlet and high outlet
 - b. High inlet and low outlet
 - c. Low inlet and high outlet
 - d. Low inlet and low outlet
- 153. ET index can be obtained from nomograms showing
 - a. DBT, WBT and air velocity
 - b. DBT, AH and RH
 - c. AH, RH and air velocity
 - d. WBT and air velocity
- 154. The extent of wind shadow on the leeward side is more dependent on
 - a. Height of the building
 - b. Depth of building
 - c. Width of building
 - d. All of the above
- 155. To ensure comfort condition inside the room, the temperature and relative humidity values should preferably be
 - a. 20 C and 65% respectively
 - b. 15 C and 45% respectively
 - c. 25 C and 50% respectively
 - d. 30 C and 65% respectively
- 156. increased height of the room gives better ventilation due to
 - a. stack effect

- b. wind effect
- c. effective temperature
- d. positive ventilation

- 157. The concept 'architecture as expression of inner structure' is attributed to
 - a. Alvar alto
 - b. Mies Vander rohe
 - c. Walter gropius
 - d. Le corbusier
- 158. J.N.U., New Delhi campus has been designed by
 - e. A.P. Kanvinde
 - f. Louis I. Khan
 - g. C.P.Kukreja
 - h. J.A.Stein

159. IRDP in India is associated with

- a. Regional development
- b. Rural development
- c. River front development
- d. Road development
- 160. Terra-cotta is a kind of earthen work processed by
 - a. Drying in the sun
 - b. Burning at high temperature
 - c. Mixing with lime
 - d. Compacting under pressure
- 161. CPCB is an organization which deals with
 - a. Pest control
 - b. Poverty control
 - c. Population control
 - d. Pollution control

- 162. as per the National Building Code the minimum area of a habitable room is
 - a. 8.5 sqm
 - b. 9.5 sqm
 - c. 10.5 sqm
 - d. 11.5 sqm
- 163. Jharoka is an architectural element used in buildings as
 - a. Gateway
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164. Belgium Embassy in New Delhi was designed by

- a. Raj rewal
- b. Satish Gujral
- c. Laurie Baker
- d. Richard neutra

165. Aranya project of indore is planned by

- a. BV Doshi
- b. U.C. Jain
- c. Amos rappoport
- d. C.P.Kukreja

166. the minimum height of habitable room as prescribed by NBC is

- a. 1.85 m
- b. 3.0 m
- c. 2.75 m
- d. 3.2m
- 167. Gopuram refers to
 - a. Gateway
 - b. Temple
 - c. Village
 - d. Dome
- 168. Workability of concrete mix with low water-cement ratio is determined by
 - a. Slump test

- b. Tensile strength test
- c. Flexural strength test
- d. Compaction factor test
- 169. 'Zeolite' is
 - a. hydrated alumino-silicate
 - b. sodium carbonate
 - c. hydrated calcium hydroxide
 - d. calcium bi-carbonate
- 170. which of the building was not designed by Charles correa
 - a. Hotel Cidade de goa
 - b. LIC building, Delhi
 - c. CMC Ltd., Mumbai
 - d. Bharat bhavan, Bhopal
- 171. The memorial at sri-perumbudur, where Rajiv Gandhi was assassinated is designed by
 - a. Charles correa
 - b. K.T. Ravindran
 - c. Raj rewal
 - d. J.A.Stein
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d. evaluating the building to sell it

Q-1 Unlike the Greeks, the Romans often used more than one order of columns in tiered arcades. Which order was almost invariably the base?

a) Ionic

- b) Doric
- c) Corinthian
- d) Composite

Q-2 Which Roman author wrote what became the standard text on classical architecture?

- a) Marcus Agrippa
- b) Isidore of Miletus
- c) Anthemius of Tralles
- d) Vitruvius

Q-3 What would be most effective in reducing the deflection of a uniformly-loaded, simply-supported beam?

- a) Reducing the load by 10%
- b) reducing the span by 10%
- c) increasing the moment of inertia, I, by 10%
- d) all of the above are equally effective

Q-9. Which is the incorrect colour coding as per Vaastu for the specified element

- a) Water = Blue
- b) Fire = Red
- c) Ether = White
- d) Earth = Yellow

Q-11 In what architectural style was the Temple of Athena constructed?

- a) Composite
- b) Doric
- c) Ionic
- d) Corinthian

Q-12 The first known Corinthian column capital was seen in the construction of which temple?

- a) The Temple of Apollo
- b) The Temple of Artemis
- c) The Temple of Athena
- d) The Temple of Hephaestus

Q-13 'True Style' later came to be known as _____

- a) Mannerism
- b) Carolingian
- c) Neoclassicism
- d) Gothic

Q-15 Converted into a church during the Byzantine period was which of the following temples, built in the Doric style?

- a) The Temple of Paestum
- b) The Temple of Hera
- c) The Temple of Attalus
- d) The Temple of Hephaestus

Q-17 Of what materials was the statue of Athena that stood in the Parthenon made?

- a) Gold and Limestone
- b) Marble and Gold
- c) Ivory and Gold
- d) Marble and Ivory

Q-19. Which of the following is not correct for Stone masonry...

a) In RUBBLE stone masonry, the stones are left in their natural state, without any kind of shaping

b) In ASHLAR masonry, the faces of stones that are to be placed in surface positions are squared

so that the surfaces of the finished structure will be more or less continuous plane surfaces.

c) Both rubble and ashlar work may be either RANDOM or COURSED.

d) Rubble stone masonry work is random but ashlar work is always coursed

- 2.26 a residential plot of 20 metre frontage and 25 metre depth is governed by the development regulations of maximum F.A.R. of 200 and maximum plot coverage of 50%. Upto what maximum height can the plot be built?
 - a. 2 floors
 - b. 3 floors
 - c. <u>4 floors</u>
 - d. 10 floors
- 2.27 the dampers placed in the air conditioning ducts are provided to control the
 - a. velocity and volume of air
 - b. Exhaust air and velocity
 - c. Foul air and exhaust air
 - d. Volume of air and foul air
- 2.28 A site map drawn to scale 1:10,000 shows six contour lines at 5 metres contour interval. The highest cntour elevtaionis 250 metres. The average distance between the highest and the lowest contour lines on the map is 2.1 cms. What is the average slope between the highest and lowest contour elevations
 - a. 1 in 25
 - b. 1 in 21
 - c. 1 in 30
 - d. 1 in 7

1.61 the total quantity of runoff for an area of 18 hectares n a lateritic region (runoff oefficient = 0.5 and rainfall = 10 mm/hour), is

- a. 55 m^3 / hr
- b. $108 \text{ m}^3 / \text{hr}$
- c. $90 \text{ m}^3 / \text{hr}$
- d. $180 \text{ m}^3 / \text{hr}$
- 1.62 the average lux required on a pavement, having width 4m., is 8. the mounting height of the lamp (lumen 2000) is 4m. the spacing of the lamps (for the coefficient of the utilization is 0.5 and maintenance factor is 0.8) is
 - a. 25 m
 - b. 75 m
 - c. 10 m
 - d. 15 m

PROJECT MANAGEMENT, PERT, CPM.

A **project** presupposes commitment of task(s) to be performed within well-defined objectives, schedules and budget. Management refers to an act of managing, controlling, coordinating, directing etc of a host of activities

Project management is an organized venture for managing projects. It involves scientific application of modern tools and techniques in planning, financing, implementing, monitoring, controlling and coordinating unique activities or tasks to produce desirable outputs in consonance with pre-determined objectives within the constraints of time, cost, quantity and quality. Project management involves the following three phases : Planning, scheduling and controlling

PERT CPM

Event is a particular instant of time at which some specific part of a plan is to be achieved **Activities** are clearly recognizable jobs or operations

Resources

Material resource (what) Equipment resource (how) Space resource (where) Effort or manpower resource (who) Time resource (when)

Role of Project Manager in an Architect's office

Project under-run Project over-run

Cost under-run / Cost over-run

There is cost over-run when the cost incurred is more than the value of work done. Similarly there is cost under-run when the cost incurred is less than the value of work done.

Cost over-run = ((actual cost – value of work completed) / value of work completed) * 100 (Under-run)

Project programming Resource balancing Monitoring of project

NETWORK

Network compression Compression potential Crashed program

Use of computers in Project management

Work bread down structure

The work break down structure represents a systematic and logical breakdown of the project into its component parts. It is constructed by dividing the project into its major parts, with each of these being further divided into sub-parts. This is continued till a breakdown is done in terms of manageable units of work for which responsibility can be defined.

PERT Slack

СРМ

The *earliest start time* for an activity is the earliest time by which it can commence. This is naturally equal to the earliest event time associated with the tail of the activity arrow. The *late start time* for an activity is the latest time by which an activity can be started without delaying the completion of the project. For 'no delay' condition to be fulfilled it should be naturally equal to the latest finish time minus the activity duration. The earliest finish time The latest finish time

COST Cost slope Crashing of an activity Time-cost trade-off curve

UPDATING Project updating

LEVELING & SMOOTHING Resource smoothing **Resource leveling**

PRINCIPLES OF VISUAL COMPOSITION PROPORTION SCALE RHYTHM SYMMETRY HARMONY BALANCE FORM COLOUR

SENSE OF PLACE AND SPACE DIVISION OF SPACE FOCAL POINT VISTA IMAGEABILITY VISUAL SURVEY.

Outline the mechanism to scale down a large public square flanked by buildings all round By installing a sculpture/ outdoor murals in the public square By planting trees By suggesting the direction of movement in the form of channel of space – covered corridor or hedges or floorscape or pavement design By installing 'Graffiti' on vertial plane Entrance gateways By placing awnings above windows or doors

for all architecture books & Gate Architecture material and revit training

http://kavali.4shared.com/ password : sujith

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Regards

Kavali Sujith Kumar +91 9940286543 Help the environment – please don't print this email unless you really need to !!