COMMON ENTRANCE TEST - 2008

DATE	SUBJECT	TIME
19 - 04 - 2008	PHYSICS & CHEMISTRY (COMBINED PAPER)	10.00 AM to 12.30 PM

MAXIMUM MARKS	TOTAL DURATION	MAXIMUM TIME FOR ANSWERING
120	150 MINUTES	140 MINUTES

MENTION YOUR CET NUMBER	QUESTION BOOKLET DETAILS	
	VERSION CODE	SERIAL NUMBER
	A - 1	147385

IMPORTANT INSTRUCTIONS TO CANDIDATES

(Candidates are advised to read the following instructions carefully, before answering on OMR answer sheet.)

1. Ensure that CET No. has been entered and shaded the respective circles on the OMR answer sheet.
2. **ENSURE THAT THE TIMING, MARKS PRINTED ON THE OMR ANSWER SHEET ARE NOT DAMAGED/ MUTILATED / SPOILED.**
3. This Question Booklet is issued to you by the invigilator after the 2nd Bell. i.e., after 10.00 a.m.
4. Enter the Serial Number of this question booklet on the OMR answer sheet.
5. Carefully enter the Version Code of this question booklet on the OMR answer sheet and SHADE the respective circles completely.
6. As answer sheets are designed to suit the Optical Mark Reader (OMR) system, please take special care while filling and shading the CET NO. & Version Code of this question booklet.
7. DO NOT FORGET TO SIGN AT THE BOTTOM PORTION OF OMR ANSWER SHEET IN THE SPACE PROVIDED.
8. Until the 3rd Bell is rung at 10.10 a.m. :
   - Do not remove the staple present on the right hand side of this question booklet.
   - Do not look inside this question booklet.
   - Do not start answering on the OMR answer sheet.
9. After the 3rd Bell is rung at 10.10 a.m., remove the staple present on the right hand side of this question booklet and start answering on the OMR answer sheet.
10. This question booklet contains 120 questions and each question will have four different options / choices.
11. During the subsequent 140 minutes :
    - Read each question carefully.
    - Determine the correct answer from out of the four available options / choices given under each question.
    - **Completely darken / shade the relevant circle with a BLUE OR BLACK INK BALLPOINT PEN against the question number on the OMR answer sheet.**

CORRECT METHOD OF SHADING THE CIRCLE ON THE OMR SHEET IS AS SHOWN BELOW :

12. Please note that even a minute unintended ink dot on the OMR sheet will also be recognised and recorded by the scanner. Therefore, avoid multiple markings of any kind on the OMR answer sheet.
13. Use the space provided on each page of the question booklet for Rough Work AND do not use the OMR answer sheet for the same.
14. After the last bell is rung at 12.30 p.m., stop writing on the OMR answer sheet and affix your LEFT HAND THUMB IMPRESSION on the OMR answer sheet as per the instructions.
15. Hand over the OMR ANSWER SHEET to the room invigilator as it is.
16. After separating and retaining the top sheet (KEA Copy), the invigilator will return the bottom sheet replica (Candidate's copy) to you to carry home for self-evaluation.
17. Preserve the replica of the OMR answer sheet for a minimum period of One year.

PHYSICS

1. A ray of light enters from a rarer to a denser medium. The angle of incidence is i. Then the reflected and refracted rays are mutually perpendicular to each other. The critical angle for the pair of media is

   1) $Sin^{-1}(Tan\, i)$ 2) $Tan^{-1}(Sin\, i)$

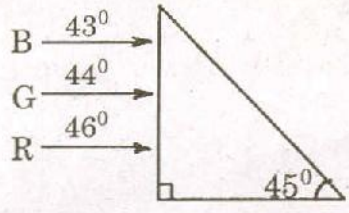
   3) $Sin^{-1}(Cot\, i)$ 4) $Cos^{-1}(Tan\, i)$

2. A fish in water (refractive index n) looks at a bird vertically above in the air. If y is the height of the bird and x is the depth of the fish from the surface, then the distance of the bird as estimated by the fish is

   1) $x + y\left(1 - \frac{1}{n}\right)$ 2) $x + ny$

   3) $x + y\left(1 + \frac{1}{n}\right)$ 4) $y + x\left(1 - \frac{1}{n}\right)$

3. Figure shows a mixture of blue, green and red coloured rays incident normally on a right angled prism. The critical angles of the material of the prism for red, green and blue are 46^0, 44^0 and 43^0 respectively. The arrangement will separate



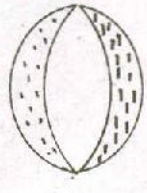
   1) red colour from blue and green
   2) blue colour from red and green
   3) green colour from red and blue
   4) all the three colours.

4. A convex and a concave lens seperated by distance d are then put in contact. The focal length of the combination

   1) decreases 2) increases

   3) becomes 0 4) remains the same

5. A convex lens is made of 3 layers of glass of 3 different materials as in the figure. A point object is placed on its axis. The number of images of the object are



   1) 1
   2) 2
   3) 3
   4) 4

(Space for Rough Work)

6. If μ_0 is permeability of free space and ϵ_0 is permittivity of free space, the speed of light in vacuum is given by

1) $\sqrt{\mu_0 \epsilon_0}$ 2) $\sqrt{\mu_0 / \epsilon_0}$

3) $\sqrt{\frac{1}{\mu_0 \epsilon_0}}$ 4) $\sqrt{\epsilon_0 / \mu_0}$

7. In Young's double slit experiment, a third slit is made in between the double slits. Then

1) intensity of fringes totally disappears.
2) only bright light is observed on the screen.
3) fringes of unequal width are formed.
4) contrast between bright and dark fringes is reduced.

8. The maximum number of possible interference maxima when slit separation is equal to 4 times the wavelength of light used in a double slit experiment is

1) ∞ 2) 9

3) 8 4) 4

9. In a Fraunhofer diffraction experiment at a single slit using a light of wavelength 400 nm, the first minimum is formed at an angle of 30^0. The direction θ of the first secondary maximum is given by

1) $Sin^{-1}\ 2/3$ 2) $Sin^{-1}\ 3/4$

3) $Sin^{-1}\ 1/4$ 4) $Tan^{-1}\ 2/3$

10. Maximum diffraction takes place in a given slit for

1) γ - rays 2) ultraviolet light

3) infrared light 4) radio waves

(Space for Rough Work)

11. An unpolarised beam of intensity I_0 falls on a polaroid. The intensity of the emergent light is

1) $I_0/2$ 2) I_0

3) $I_0/4$ 4) Zero

12. Which of the following is a dichroic crystal ?

1) Quartz 2) Tourmaline

3) Mica 4) Selenite

13. Two identical metal spheres charged with $+12\mu F$ and $-8\mu F$ are kept at certain distance in air. They are brought into contact and then kept at the same distance. The ratio of the magnitudes of electrostatic forces between them before and after contact is

1) 12 : 1 2) 8 : 1

3) 24 : 1 4) 4 : 1

14. A small conducting sphere of radius r is lying concentrically inside a bigger hollow conducting sphere of radius R. The bigger and smaller spheres are charged with Q and q $(Q > q)$ and are insulated from each other. The potential difference between the spheres will be

1) $\frac{1}{4\pi\epsilon_0}\left(\frac{q}{r} - \frac{q}{R}\right)$ 2) $\frac{1}{4\pi\epsilon_0}\left(\frac{q}{R} - \frac{Q}{r}\right)$

3) $\frac{1}{4\pi\epsilon_0}\left(\frac{q}{r} - \frac{Q}{R}\right)$ 4) $\frac{1}{4\pi\epsilon_0}\left(\frac{Q}{R} + \frac{q}{r}\right)$

15. The charges Q, $+q$ and $+q$ are placed at the vertices of an equilateral triangle of side l. If the net electrostatic potential energy of the system is zero, then Q is equal to

1) $-q/2$ 2) $-q$

3) $+q/2$ 4) zero

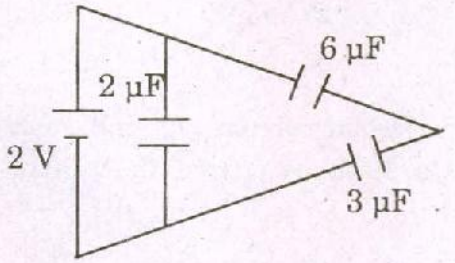
(Space for Rough Work)

16. How many $6\mu F$, 200 V condensers are needed to make a condenser of $18\mu F$, 600 V?

1) 9 2) 18

3) 3 4) 27

17. The total energy stored in the condenser system shown in the figure will be



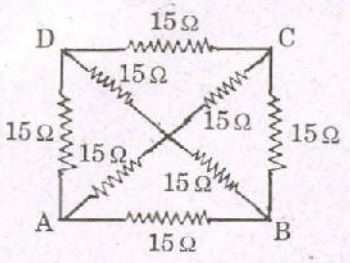
1) $2\mu J$ 2) $4\mu J$

3) $8\mu J$ 4) $16\mu J$

18. A metal wire is subjected to a constant potential difference. When the temperature of the metal wire increases, the drift velocity of the electron in it

1) increases, thermal velocity of the electron decreases
2) decreases, thermal velocity of the electron decreases
3) increases, thermal velocity of the electron increases
4) decreases, thermal velocity of the electron increases

19. The equivalent resistance between the points A and B will be (each resistance is 15 Ω)



1) 30 Ω
2) 8 Ω
3) 10 Ω
4) 40 Ω

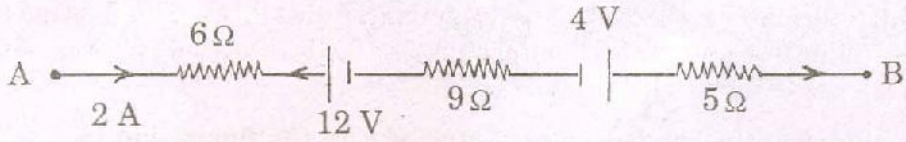
20. The terminals of a 18 V battery with an internal resistance of 24 Ω are connected to a circular wire of resistance 24 Ω at two points distant at one quarter of the circumference of a circular wire. The current through the bigger arc of the circle will be

1) 0.75 A 2) 1.5 A

3) 2.25 A 4) 3 A

(Space for Rough Work)

21. The potential difference between A and B in the following figure is

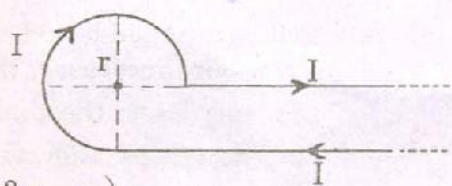


1) 32 V
2) 48 V
3) 24 V
4) 14 V

22. The magnetic field at the centre of a circular current carrying conductor of radius r is B_c. The magnetic field on its axis at a distance r from the centre is B_a. The value of $B_c : B_a$ will be

1) $1 : \sqrt{2}$
2) $1 : 2\sqrt{2}$
3) $2\sqrt{2} : 1$
4) $\sqrt{2} : 1$

23. Current 'I' is flowing in a conductor shaped as shown in the figure. The radius of the curved part is r and the length of straight portion is very large. The value of the magnetic field at the centre O will be

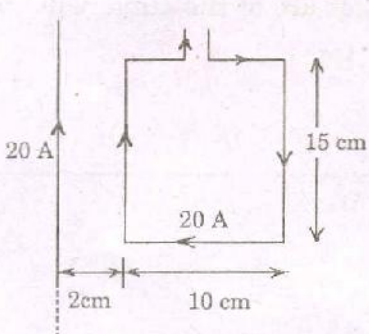


1) $\frac{\mu_0 I}{4\pi r}\left(\frac{3\pi}{2}+1\right)$
2) $\frac{\mu_0 I}{4\pi r}\left(\frac{3\pi}{2}-1\right)$
3) $\frac{\mu_0 I}{4\pi r}\left(\frac{\pi}{2}+1\right)$
4) $\frac{\mu_0 I}{4\pi r}\left(\frac{\pi}{2}-1\right)$

24. Two tangent galvanometers A and B are identical except in their number of turns. They are connected in series. On passing a current through them, deflections of 60^0 and 30^0 are produced. The ratio of the number of turns in A and B is

1) 1 : 3
2) 3 : 1
3) 1 : 2
4) 2 : 1

25. The resultant force on the current loop $PQRS$ due to a long current carrying conductor will be



1) $10^{-4}N$
2) $3.6 \times 10^{-4}N$
3) $1.8 \times 10^{-4}N$
4) $5 \times 10^{-4}N$

(Space for Rough Work)

26. A certain current on passing through a galvanometer produces a deflection of 100 divisions. When a shunt of one ohm is connected, the deflection reduces to 1 division. The galvanometer resistance is

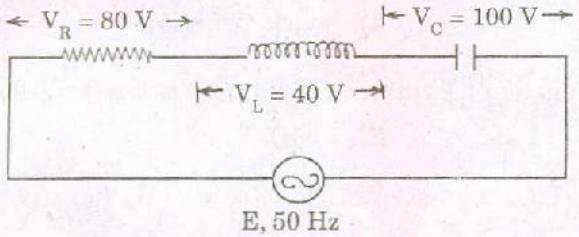
1) 100 Ω 2) 99 Ω

3) 10 Ω 4) 9.9 Ω

27. Two similar circular loops carry equal currents in the same direction. On moving the coils further apart, the electric current will

1) increase in both
2) decrease in both
3) remain unaltered
4) increases in one and decreases in the second

28. The value of alternating emf E in the given circuit will be



1) 220 V 2) 140 V

3) 100 V 4) 20 V

29. A current of 5A is flowing at 220 V in the primary coil of a transformer. If the voltage produced in the secondary coil is 2200 V and 50% of power is lost, then the current in the secondary will be

1) 2.5 A 2) 5 A

3) 0.25 A 4) 0.5 A

30. For a series LCR circuit at resonance, the statement which is not true is

1) Peak energy stored by a capacitor = peak energy stored by an inductor
2) Average power = apparent power
3) Wattless current is zero
4) Power factor is zero

(Space for Rough Work)

31. Solar spectrum is an example for

1) line emission spectrum
2) continuous emission spectrum
3) band absorption spectrum
4) line absorption spectrum

32. When a piece of metal is illuminated by a monochromatic light of wavelength λ, then stopping potential is $3Vs$. When same surface is illuminated by light of wavelength 2λ, then stopping potential becomes Vs. The value of threshold wavelength for photoelectric emission will be

1) 4λ
2) 8λ
3) $\frac{4}{3}\lambda$
4) 6λ

33. The maximum kinetic energy of emitted electrons in a photoelectric effect does not depend upon

1) wavelength
2) frequency
3) intensity
4) work function

34. The ratio of minimum wavelengths of Lyman and Balmer series will be

1) 1.25
2) 0.25
3) 5
4) 10

35. Hydrogen atom does not emit X-rays because

1) it contains only a single electron
2) energy levels in it are far apart
3) its size is very small
4) energy levels in it are very close to each other

(Space for Rough Work)

36. If an electron and a proton have the same de-Broglie wavelength, then the kinetic energy of the electron is

1) zero
2) less than that of a proton
3) more than that of a proton
4) equal to that of a proton

37. Two protons are kept at a separation of $40\overset{0}{A}$. F_n is the nuclear force and F_e is the electrostatic force between them. Then

1) $F_n >> F_e$
2) $F_n = F_e$
3) $F_n << F_e$
4) $F_n \approx F_e$

38. Blue colour of sea water is due to

1) interference of sunlight reflected from the water surface
2) scattering of sunlight by the water molecules
3) image of sky in water
4) refraction of sunlight

39. The ratio of the nuclear radii of elements with mass numbers 216 and 125 is

1) 216 : 125
2) $\sqrt{216} : \sqrt{125}$
3) 6 : 5
4) none of these

40. On bombarding U^{235} by slow neutron, 200 MeV energy is released. If the power output of atomic reactor is 1.6 MW, then the rate of fission will be

1) $5 \times 10^{22}/s$
2) $5 \times 10^{16}/s$
3) $8 \times 10^{16}/s$
4) $20 \times 10^{16}/s$

(Space for Rough Work)

41. The masses of two radioactive substances are same and their half lives are 1 year and 2 years respectively. The ratio of their activities after 6 years will be

1) 1 : 4 2) 1 : 2

3) 1 : 3 4) 1 : 6

42. $_{92}U^{235}$ undergoes successive disintegrations with the end product of $_{82}Pb^{203}$. The number of α and β particles emitted are

1) $\alpha = 6, \beta = 4$ 2) $\alpha = 6, \beta = 0$

3) $\alpha = 8, \beta = 6$ 4) $\alpha = 3, \beta = 3$

43. The most stable particle in Baryon group is

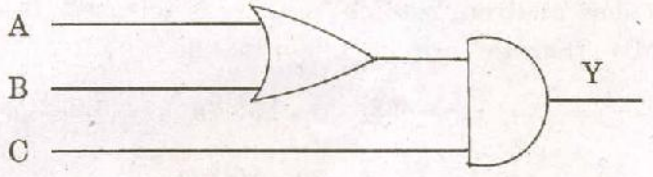
1) neutron 2) omega - particle

3) proton 4) lamda - particle

44. In an unbiased p-n junction

1) Potential at p is more than that at n
2) Potential at p is less than that at n
3) Potential at p is equal to that at n
4) Potential at p is +ve and that at n is –ve

45. To get an output $y = 1$ from the circuit shown, the inputs A, B and C must be respectively



1) 0, 1, 0 2) 1, 0, 0

3) 1, 0, 1 4) 1, 1, 0

(Space for Rough Work)

46. Dimensional formula for the universal gravitational constant G is

1) $M^{-1}L^{2}T^{-2}$ 2) $M^{0}L^{0}T^{0}$

3) $M^{-1}L^{3}T^{-2}$ 4) $M^{-1}L^{3}T^{-1}$

47. A body is projected vertically upwards. The times corresponding to height h while ascending and while descending are t_1 and t_2 respectively. Then the velocity of projection is (g is acceleration due to gravity)

1) $g\sqrt{t_1 t_2}$ 2) $\frac{g\,t_1 t_2}{t_1+t_2}$

3) $\frac{g\sqrt{t_1 t_2}}{2}$ 4) $\frac{g\,(t_1+t_2)}{2}$

48. A mass of 10 kg is suspended from a spring balance. It is pulled aside by a horizontal string so that it makes an angle of 60^0 with the vertical. The new reading of the balance is

1) 20 kg.wt 2) 10 kg.wt

3) $10\sqrt{3}$ kg.wt 4) $20\sqrt{3}$ kg.wt

49. A body weighs 50 grams in air and 40 grams in water. How much would it weigh in a liquid of specific gravity 1.5?

1) 30 grams 2) 35 grams

3) 65 grams 4) 45 grams

50. A body of mass 4 kg is accelerated upon by a constant force, travels a distance of 5 m in the first second and a distance of 2 m in the third second. The force acting on the body is

1) 2 N 2) 4 N

3) 6 N 4) 8 N

(Space for Rough Work)

51. A simple pendulum is suspended from the ceiling of a lift. When the lift is at rest its time period is T. With what acceleration should the lift be accelerated upwards in order to reduce its period to $T/2$? (g is acceleration due to gravity).

1) $2g$ 2) $3g$

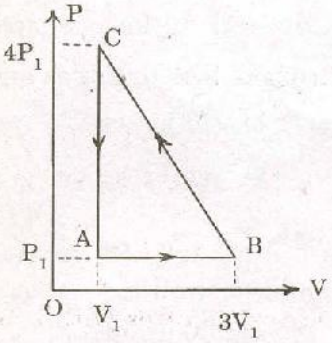
3) $4g$ 4) g

52. If γ is the ratio of specific heats and R is the universal gas constant, then the molar specific heat at constant volume C_v is given by

1) γR 2) $\frac{(\gamma-1)R}{\gamma}$

3) $\frac{R}{\gamma-1}$ 4) $\frac{\gamma R}{\gamma-1}$

53. An ideal gas is taken via path $ABCA$ as shown in figure. The network done in the whole cycle is



1) $3P_1V_1$

2) $-3P_1V_1$

3) $6P_1V_1$

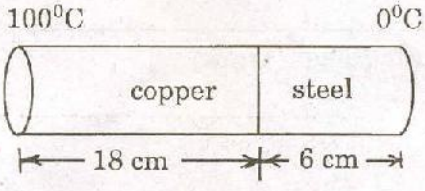
4) zero

54. In which of the processes, does the internal energy of the system remain constant ?

1) Adiabatic 2) Isochoric

3) Isobaric 4) Isothermal

55. The coefficient of thermal conductivity of copper is 9 times that of steel. In the composite cylindrical bar shown in the figure, what will be the temperature at the junction of copper and steel ?



1) 75^0C 2) 67^0C

3) 25^0C 4) 33^0C

(Space for Rough Work)

56. The equation of a simple harmonic wave is given by $y = 6Sin\,2\pi(2t - 0.1x)$, where x and y are in mm and t is in seconds. The phase difference between two particles 2 mm apart at any instant is

1) 18^0 2) 36^0

3) 54^0 4) 72^0

57. With what velocity should an observer approach a stationary sound source so that the apparent frequency of sound should appear double the actual frequency? (v is velocity of sound).

1) $v/2$ 2) $3v$

3) $2v$ 4) v

58. If a black body emits 0.5 joules of energy per second when it is at 27^0C, then the amount of energy emitted by it when it is at 627^0C will be

1) 40.5 J 2) 162 J

3) 13.5 J 4) 135 J

59. A string vibrates with a frequency of 200 Hz. When its length is doubled and tension is altered, it begins to vibrate with a frequency of 300 Hz. The ratio of the new tension to the original tension is

1) 9 : 1 2) 1 : 9

3) 3 : 1 4) 1 : 3

60. How many times more intense is a 60 dB sound than a 30 dB sound ?

1) 1000 2) 2

3) 100 4) 4

(Space for Rough Work)

CHEMISTRY

61. The correct order in which the first ionisation potential increases is

1) Na, K, Be 2) K, Na, Be

3) K, Be, Na 4) Be, Na, K

62. 10 cm^3 of 0.1 N monobasic acid requires 15 cm^3 of sodium hydroxide solution whose normality is

1) 1.5 N 2) 0.15 N

3) 0.066 N 4) 0.66 N

63. The IUPAC name for tertiary butyl iodide is

1) 4-Iodobutane 2) 2-Iodobutane

3) 1-Iodo, 3-methyl propane 4) 2-Iodo 2-methyl propane

64. When sulphur dioxide is passed in an acidified $K_2Cr_2O_7$ solution, the oxidation state of sulphur is changed from

1) + 4 to 0 2) + 4 to + 2

3) + 4 to + 6 4) + 6 to + 4

65. Mass of 0.1 mole of Methane is

1) 1 g 2) 16 g

3) 1.6 g 4) 0.1 g

(Space for Rough Work)

66. Methoxy methane and ethanol are

1) Position isomers
2) Chain isomers
3) Functional isomers
4) Optical isomers

67. When the azimuthal quantum number has the value of 2, the number of orbitals possible are

1) 7
2) 5
3) 3
4) 0

68. For the reaction $Fe_2O_3 + 3CO \longrightarrow 2Fe + 3CO_2$ the volume of carbon monoxide required to reduce one mole of ferric oxide is

1) 22.4 dm^3
2) 44.8 dm^3
3) 67.2 dm^3
4) 11.2 dm^3

69. The monomers of Buna-S rubber are

1) vinyl chloride and sulphur
2) butadiene
3) styrene and butadiene
4) isoprene and butadiene

70. An element with atomic number 21 is a

1) halogen
2) representative element
3) transition element
4) alkali metal

(Space for Rough Work)

71. The maximum number of hydrogen bonds that a molecule of water can have is

1) 1 2) 2

3) 3 4) 4

72. A gas deviates from ideal behaviour at a high pressure because its molecules

1) attract one another 2) show the Tyndall effect

3) have kinetic energy 4) are bound by covalent bonds

73. The reagent used to convert an alkyne to alkene is

1) Zn / HCl 2) Sn / HCl

3) $Zn-Hg$ / HCl 4) Pd / H_2

74. When compared to ΔG^0 for the formation of Al_2O_3, the ΔG^0 for the formation of Cr_2O_3 is

1) higher 2) lower

3) same 4) unpredicted

75. In order to increase the volume of a gas by 10%, the pressure of the gas should be

1) increased by 10 % 2) increased by 1 %

3) decreased by 10 % 4) decreased by 1 %

(Space for Rough Work)

76. Catalytic dehydrogenation of a primary alcohol gives a

1) secondary alcohol 2) aldehyde

3) ketone 4) ester

77. Excess of PCl_5 reacts with conc. H_2SO_4 giving

1) chlorosulphonic acid 2) thionyl chloride

3) sulphuryl chloride 4) sulphurous acid

78. If one mole of ammonia and one mole of hydrogen chloride are mixed in a closed container to form ammonium chloride gas, then

1) $\Delta H > \Delta u$ 2) $\Delta H = \Delta u$

3) $\Delta H < \Delta u$ 4) there is no relationship

79. The compound on dehydrogenation gives a ketone. The original compound is

1) primary alcohol 2) secondary alcohol

3) tertiary alcohol 4) carboxylic acid

80. Which is the most easily liquifiable rare gas ?

1) Xe 2) Kr

3) Ar 4) Ne

(Space for Rough Work)

81. Mesomeric effect involves delocalisation of

1) *pi* electrons 2) sigma electrons

3) protons 4) none of these

82. Which of the following has the maximum number of unpaired '*d*' electrons ?

1) Zn^{2+} 2) Fe^{2+}

3) Ni^{3+} 4) Cu^{+}

83. One mole of which of the following has the highest entropy?

1) liquid nitrogen 2) hydrogen gas

3) mercury 4) diamond

84. Which of the following species does not exert a resonance effect ?

1) $C_6H_5NH_2$ 2) $C_6H_5\overset{+}{N}H_3$

3) C_6H_5OH 4) C_6H_5Cl

85. A complex compound in which the oxidation number of a metal is zero is

1) $K_4[Fe(CN)_6]$ 2) $K_3[Fe(CN)_6]$

3) $[Ni(CO)_4]$ 4) $[Pl(NH_3)_4]Cl_2$

(Space for Rough Work)

86. Three moles of PCl_5, three moles of PCl_3 and two moles of Cl_2 are taken in a closed vessel. If at equilibrium the vessel has 1.5 moles of PCl_5, the number of moles of PCl_3 present in it is

1) 5 2) 3

3) 6 4) 4.5

87. How many optically active stereomers are possible for butan-2, 3-diol ?

1) 1 2) 2

3) 3 4) 4

88. An octahedral complex is formed when hybrid orbitals of the following type are involved

1) sp^3 2) $d\,sp^2$

3) d^2sp^3 4) sp^2d^2

89. For the reaction $2HI_{(g)} \rightleftharpoons H_{2(g)} + I_{2(g)} - Q\,KJ$, the equilibrium constant depends upon

1) temperature 2) pressure

3) catalyst 4) volume

90. The angle strain in cyclobutane is

1) $24^0 44'$ 2) $29^0 16'$

3) $19^0 22'$ 4) $9^0 44'$

(Space for Rough Work)

91. The number of nodal planes present in $\sigma^* s$ antibonding orbitals is

1) 1 2) 2

3) 0 4) 3

92. Which of the following electrolytic solutions has the least specific conductance ?

1) 0.02 N 2) 0.2 N

3) 2 N 4) 0.002 N

93. The overlapping of orbitals in benzene is of the type

1) $sp - sp$ 2) $p - p$

3) $sp^2 - sp^2$ 4) $sp^3 - sp^3$

94. The calculated bond order of superoxide ion $\left(O_2^-\right)$ is

1) 2.5 2) 2

3) 1.5 4) 1

95. Which of the following can be measured by the Ostwald-Walker dynamic method ?

1) Relative lowering of vapour pressure
2) Lowering of vapour pressure
3) Vapour pressure of the solvent
4) all of these

(Space for Rough Work)

96. *n*-propyl bromide on treating with alcoholic *KOH* produces

1) propane 2) propene

3) propyne 4) propanol

97. Mercury is a liquid metal because

1) it has a completely filled *s*-orbital
2) it has a small atomic size
3) it has a completely filled *d*-orbital that prevents *d-d* overlapping of orbitals
4) it has a completely filled *d*-orbital that causes *d-d* overlapping

98. A compound is formed by elements *A* and *B*. This crystallises in the cubic structure where the *A* atoms are at the corners of the cube and *B* atoms are at the body centres. The simplest formula of the compound is

1) AB 2) A_6B

3) A_8B_4 4) AB_6

99. Anisole can be prepared by the action of methyl iodide on sodium phenate. The reaction is called

1) Wurtz's reaction 2) Williamson's reaction

3) Fittig's reaction 4) Etard's reaction

100. Malleability and ductility of metals can be accounted due to

1) the presence of electrostatic force
2) the crystalline structure in metal
3) the capacity of layers of metal ions to slide over the other
4) the interaction of electrons with metal ions in the lattice

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(Space for Rough Work)

101. An ionic compound is expected to have tetrahedral structure if r_+/r_- lies in the range of

1) 0.414 to 0.732
2) 0.225 to 0.414
3) 0.155 to 0.225
4) 0.732 to 1

102. Among the following, which is least acidic ?

1) phenol
2) O-cresol
3) p-nitrophenol
4) p-chlorophenol

103. A ligand can also be regarded as

1) Lewis acid
2) Bronsted base
3) Lewis base
4) Bronsted acid

104. The colour of sky is due to

1) transmission of light
2) wavelength of scattered light
3) absorption of light by atmospheric gases
4) All of these

105. Which of the following organic compounds answers to both iodoform test and Fehling's test?

1) ethanol
2) methanal
3) ethanal
4) propanone

(Space for Rough Work)

106. Helium is used in balloons in place of hydrogen because it is

1) incombustible
2) lighter than hydrogen
3) radioactive
4) more abundant than hydrogen

107. The basic principle of Cottnell's precipitator is

1) Le-chatelier's principle
2) peptisation
3) neutralisation of charge on colloidal particles
4) scattering of light

108. When carbon monoxide is passed over solid caustic soda heated to 200^0C, it forms

1) Na_2CO_3
2) $NaHCO_3$
3) $HCOONa$
4) CH_3COONa

109. $N_2 + 3H_2 \rightleftharpoons 2NH_3$ + heat. What is the effect of the increase of temperature on the equilibrium of the reaction?

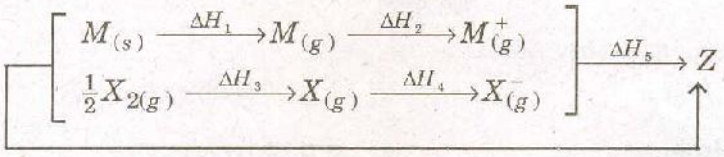
1) equilibrium is shifted to the left
2) equilibrium is shifted to the right
3) equilibrium is unaltered
4) reaction rate does not change

110. Hydrogen gas is not liberated when the following metal is added to dil. HCl

1) Ag
2) Zn
3) Mg
4) Sn

(Space for Rough Work)

111. Consider the Born-Haber cycle for the formation of an ionic compound given below and identify the compound (Z) formed.



1) M^+X^- 2) $M^-X^-_{(s)}$

3) MX 4) $M^+X^-_{(g)}$

112. In the brown ring test, the brown colour of the ring is due to

1) ferrous nitrate 2) ferric nitrate

3) a mixture of NO and NO_2 4) nitrosoferrous sulphate

113. Amines behave as

1) Lewis acids 2) Lewis base

3) aprotic acid 4) neutral compound

114. Dalda is prepared from oils by

1) oxidation 2) reduction

3) hydrolysis 4) distillation

115. The chemical name of anisole is

1) Ethanoic acid 2) Methoxy benzene

3) Propanone 4) Acetone

(Space for Rough Work)

116. The number of disulphide linkages present in insulin are

1) 1 2) 2

3) 3 4) 4

117. 80 g of oxygen contains as many atoms as in

1) 80 g of hydrogen 2) 1 g of hydrogen

3) 10 g of hydrogen 4) 5 g of hydrogen

118. Which metal has a greater tendency to form metal oxide ?

1) Cr 2) Fe

3) Al 4) Ca

119. Identify the reaction that does not take place in a blast furnace.

1) $CaCO_3 \longrightarrow CaO + CO_2$ 2) $CaO + SiO_2 \longrightarrow CaSiO_3$

3) $2Fe_2O_3 + 3C \longrightarrow 4Fe + 3CO_2$ 4) $CO_2 + C \longrightarrow 2CO$

120. Waxes are esters of

1) glycerol
2) long chain alcohols
3) glycerol and fatty acid
4) long chain alcohols and long chain fatty acids

(Space for Rough Work)

BIOLOGY

1. Human egg is
   1) Telolecithal
   2) Megalecithal
   3) Alecithal
   4) Centrolecithal

2. There are 64 codons in the genetic dictionary as
   1) There are 64 amino acids to be coded
   2) Genetic code has a triplet nature
   3) There are 3 nonsense codons and 61 sense codons
   4) There are 64 different types of t-RNA

3. Vassopressin released from the neurohypophysis is mainly responsible for
   1) Facultative reabsorption of water through DCT
   2) Obligatory reabsorption of water through PCT
   3) Facultation reabsorption of water through Henlis loop
   4) Obligatory reabsorption of water through Bowman's capsule

4. Identify the substage of prophase I of méiosis during which synapsis takes place
   1) Leptotene
   2) Pachytene
   3) Diplotene
   4) Zygotene

5. Protein part of a Holoenzyme is called
   1) Coenzyme
   2) Apoenzyme
   3) Exoenzyme
   4) Endoenzyme

(Space for Rough Work)

6. Intercalary meristem is a derivative of
   1) Primary meristem
   2) Secondary meristem
   3) Lateral meristem
   4) Promeristem

7. Which one of the following is not a device to promote cross-pollination ?
   1) Herkogamy
   2) Dichogamy
   3) Cleistogamy
   4) Heterostyly

8. Anterior choroid plexus is present on the
   1) Roof of Diencephalon
   2) Roof of medulla oblongata
   3) Floor of Diencephalon
   4) Cerebral hemispheres

9. Which of the following statements is true about viruses?
   1) Viruses are filterable facultative parasites
   2) Viruses are capable of performing metabolic activities on their own.
   3) All viruses known to man are obligate parasites
   4) Some viruses have cellular structure and are saprophytes

10. A condition where a certain gene is present in only a single copy in a diploid cel is called
   1) Homozygous
   2) Hemizygous
   3) Heterozygous
   4) Monogamous

(Space for Rough Work)

11. Genetically dwarf plants can be induced to grow tall by using

1) Auxins
2) Cytokinins
3) Gibberellins
4) Phycobillins

12. Match the phenomenon listed under column I with those listed under column II. Select the correct answer from the options given.

	Column I		Column II
A	Warburg effect	p	Change in gene frequency by chance
B	Pasteur effect	q	Postponing severance in the leaves by applying cytokinin
C	Emerson effect	r	Decline in the consumption of respiratory substrate due to a change from anaerobic to aerobic respiration
D	Wright effect	s	Inhibitory effect of O_2 on photosynthesis
		t	Enhancement of photosynthesis by subjecting chlorophyll to the effect two different wavelengths of light

1) A = t, B = s, C = p, D = q
2) A = s, B = r, C = t, D = p
3) A = s, B = t, C = q, D = r
4) A = t, B = r, C = p, D = s

13. Which of the following is an agrostologic method of soil conservation ?

1) Dry farming
2) Mulching
3) Basin listing
4) Terracing

14. The sequence of events mentioned below are symbolised by alphabets. Choose the correct answer where the alphabets are matched with the processes.

$$RNA \xrightarrow{(A)} DNA \xrightarrow{(B)} DNA \xrightarrow{(C)} mRNA \xrightarrow{(D)} Polypeptide$$

1) A = Replication, B = Transcription, C = Translation, D = Transduction
2) A = Reverse transcription, B = Translation, C = Transcription, D = Replication
3) A = Replication, B = Transformation, C = Transcription, D = Translation
4) A = Reverse transcription, B = Replication, C = Transcription, D = Translation

15. Identify the alga known for a biological activity called bioluminescence.

1) Cyclotella
2) Noctiluca
3) Spirogyra
4) Chlorella

(Space for Rough Work)

16. The problem of necrosis and gradual senescence while performing tissue culture can overcome by
    1) Suspension culture
    2) Subculture
    3) Spraying auxins
    4) Spraying cytokinins

17. The immunoglobulin present in mother's milk is
    1) IgM
    2) IgA
    3) IgD
    4) IgE

18. The diagram given by the side represents the sectional view of

    1) Anatropous ovule
    2) Orthotropous ovule
    3) Amphitropous ovule
    4) Campylotropous ovule

19. In CAM plants, CO_2 required for photosynthesis enters the plant body during
    1) Daytime when the stomata are open
    2) Night when the hydathodes are open
    3) Daytime through the lenticels
    4) Night through the stomata which are kept open

20. A detrivorous animal of economic importance is
    1) Caterpillar larva
    2) Leech
    3) Earthworm
    4) Giriraja fowl

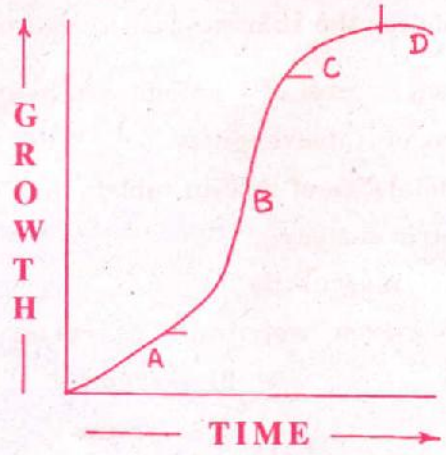
(Space for Rough Work)

21. Benedicts reagent test is conducted to confirm the presence of
    1) Reducing sugars
    2) Proteins
    3) Polysaccharides like starch
    4) Lipids

22. An alkaloid called 'Reserpine' is extracted from
    1) Leaves of Sarpaganda
    2) Roots of Ashwaganda
    3) Leaves of Ashwaganda
    4) Roots of Sarpaganda

23. Nobel prize for medicine was given for confirming the role of Helicobacter pylori in causing
    1) Bronchitis
    2) Peptic ulcer
    3) Nephritis
    4) Rhinitis

24. In the sigmoid growth curve given by the side, the alphabets indicate the sequence of events. Choose the correct option where the alphabet specifies the event.



    1) A = Diminishing growth B = Exponential growth
       C = Slow growth D = Stationary growth
    2) A = Stationary phase B = Phase of slow growth
       C = Phase of rapid growth D = Phase of diminishing growth
    3) A = Phase of slow growth B = Phase of exponential growth
       C = Phase of diminishing growth D = Stationary phase
    4) A = Phase of rapid growth B = Phase of diminishing growth
       C = Stationary phase D = Phase of slow growth

25. Transformation of the early reducing atmosphere of the earth into an oxidizing atmosphere was mainly due to the activities of
    1) Aerobic photosynthesizers
    2) Anaerobic heterotrophs
    3) Anaerobic photosynthesizers
    4) Anaerobic chemoheterotrophs

(Space for Rough Work)

26. A leaf peeling of Tradescantia is kept in a medium having 10% *NaCl*. After a few minut if we observe the leaf peel under the microscope, we are likely to see

1) Diffusion of *NaCl* into the cell
2) Exit of water from the cell
3) Entry of water into the cell
4) The cells bursting out

27. Early leaf spot disease in Arachis hypogea is caused due to infection of

1) Agrobacterium tumefaciens
2) Phytophthora infestans
3) Circospora personata
4) Gibberella fujikuroi

28. Excessive growth of hair on the pinna is a feature found only in males because

1) The gene responsible for the character is recessive in females and dominant only in males
2) The character is induced in males as males produce testosterone
3) The female sex hormone estrogen suppresses the character in females
4) The gene responsible for the character is present on the *Y* chromosome only

29. Rapid increase in the blood sugar level of a patient can be immediately reduced by

1) Administering glucogon intravenously
2) Consuming large quantities of insulin tablets
3) Injecting insulin intravenously
4) Injecting insulin intramuscularly

30. Which of the following is found exclusively in the sea water ?

1) Prawns
2) Trygon
3) Crabs
4) Oysters

(Space for Rough Work)

31. A gradual decrease in the size of the tail during metamorphosis in the life cycle of frog is a good example for

1) cell senescence
2) pinocytic activity
3) programmed cell death
4) cell necrosis

32. Spot out the zone of our country considered as the Hot Spot of biodiversity and regarded as the 'Cradle of Speciation'.

1) Himalayan base
2) Deccan plateau
3) Western ghats
4) North East

33. In Bt cotton, a transgenic plant, Bt refers to

1) Biotechnology
2) Bacillus thurungiensis
3) Botanical
4) Beta

34. Sequence of cellular layers from the periphery towards the cortex in an old dicot stem is

1) Epidermis, Hypodermis, Cortex, Endodermis
2) Epidermis, Phellum, Phellogen, Phelloderm
3) Epidermis, Hypodermis, Phellogen, Phelloderm
4) Epidermis, Phellogen, Phellum, Epidermis

35. Higher frequency of melanie British moths and DDT resistance in mosquitoes are cited as examples for

1) Arrival of the fittest
2) Genetic drift
3) Natural selection
4) Point mutation

(Space for Rough Work)

36. Who among the following is recognised as the father of Immunology ?
1) Edward Jenner
2) Louis Pasteur
3) Robert Koch
4) Ferdinand Kohn

37. Whether a child died after normal birth or died before birth can be confirmed measuring
1) the weight of the child
2) the dead space air
3) tidal volume of air
4) residual volume of air

38. Syndactyly, prehensile tail and long protrusible tongue are the unique features of
1) Horse fish
2) Chameleon
3) Rhesus monkey
4) Archaeopteryx

39. Match the hormones listed under column I with their functions listed under column Choose the answer which gives the correct combination of the alphabets of the t columns.

	Column I		Column II
A	Oxytocin	p	Stimulates ovulation
B	Prolactin	q	Implantation and maintainance of pregnancy
C	Luteinising hormone	r	Lactation after child birth
D	Progesteron	s	Uterine contraction during labour
		t	Reabsorption of water by Nephrons

1) A = s, B = r, C = p, D = q
2) A = t, B = p, C = s, D = r
3) A = s, B = q, C = r, D = t
4) A = t, B = r, C = p, D = s

40. A dihybrid test cross-yielding a result of 1 : 1 : 1 : 1 ratio is indicative of
1) 4 different types of F_1 generation dihybrids
2) 4 different types of gametes produced by the P_1 parent
3) 4 different types of gametes produced by the F_1 dihybrid
4) Homozygous condition of the F_1 dihybrid

(Space for Rough Work)

41. Given below are two statements *A* and *B*. Choose the correct answer related to the statements.

Statement *A* - Amino acids are amphoteric in their function.

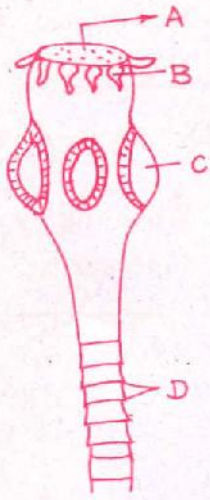
Statement *B* - All amino acids are necessary for our body.

1) Statement *A* is wrong, statement *B* is correct
2) Both the statements *A* and *B* are wrong
3) Statement *A* is correct, statement *B* is wrong
4) Both the statements *A* and *B* are correct

42. Plants like Aegle mormelos, Ocimum sanctum and Ficus religeosa are a group of plants designated as

1) Traditional food crops
2) Sacred species of plants
3) Medicinal plant species
4) Lesser known food plants

43. In the diagram given by the side, different parts are indicated by alphabets. Choose the answer in which these alphabets correctly match with the parts they indicate.



1) A = mouth, B = Tentacles, C = Sucker, D = Segments
2) A = Sucker, B = Hairs, C = Ring, D = Proglottids
3) A = Rostellum, B = Hooks, C = Sucker, D = Proglottids
4) A = Suctorial mouth, B = Hooks, C = Sucker, D = Segments

44. In a vascular bundle, if xylem vessels develop in a centripetal fashion, the xylem is likely to be

1) Endarch
2) Exarch
3) Mesarch
4) Centrarch

45. Which of the following plant material is an efficient water imbibant ?

1) Agar
2) Cellulose
3) Lignin
4) Pectin

(Space for Rough Work)

46. When body tissues are injured resulting in the loss of blood, the process of blood clott begins and the blood platelets release

1) Prothrombin
2) Thrombin
3) Fibrinogen
4) Thromboplastin

47. According to the lac-operon concept, which functional unit of the bacterial gen material is responsible for suppressing the activity of the operator gene in the abse of lactose ?

1) Promoter gene
2) Repressor protein
3) Regulator gene
4) Structural gene

48. A hybrid where the cytoplasm of two parent cells are fused by retaining only one pare nucleus is called

1) An interbreed
2) Symmetric somatic hybrid
3) Asymmetric somatic hybrid
4) Cybrid

49. A sexually transmitted disease symptomised by the development of chancre on genitals is caused by the infection of

1) Human immunodeficiency virus
2) Hepatitis B virus
3) Treponema pallidium
4) Neisseria gonorrhoeae

50. A phenomenon where the third base of t-RNA at its 5' end can pair with a n complementary base of m-RNA is called

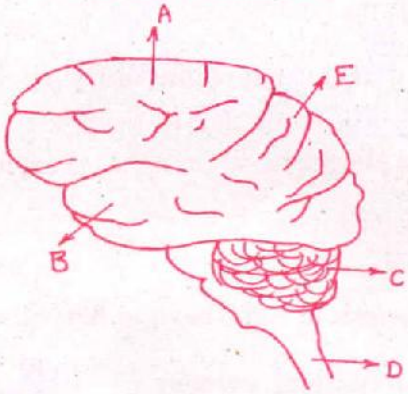
1) Degenerency
2) Wobbling
3) Universality
4) Colinearity

(Space for Rough Work)

51. Identify the plant parts whose transverse sections show a clear and prominent pith.

1) Dicot root and monocot root
2) Dicot stem and dicot root
3) Dicot stem and monocot stem
4) Dicot stem and monocot root

52. In the diagram of the lateral view of the human brain, parts are indicated by alphabets. Choose the answer in which these alphabets have been correctly matched with the parts which they indicate.



1) A = Temporal lobe, B = Parietal lobe, C = Cerebrum, D = Medulla oblongata, E = Frontal lobe
2) A = Frontal lobe, B = Temporal lobe, C = Cerebellum, D = Medulla oblongata, E = Parietal lobe
3) A = Temporal lobe, B = Parietal lobe, C = Cerebellum, D = Medulla oblongata, E = Frontal lobe
4) A = Frontal lobe, B = Temporal lobe, C = Cerebrum, D = Medulla oblongata, E = Occipetal lobe

53. Of all the environmental factors which is the most influential in determining the rate of transpiration?

1) Relative humidity of atmosphere
2) Temperature
3) Light
4) Water

54. Curved portion of the Henle's loop of the Nephrons are lined by

1) Ciliated epithelium
2) Cuboidal epithelium
3) Squamous epithelium
4) Columnar epithelium

55. In succulent plants like opuntia, the RQ value will be

1) Infinity
2) zero
3) less than 1
4) more than 1

(Space for Rough Work)

56. An autosomal genetic disorder called 'cri-du-chat' is caused due to
    1) Deletion
    2) Duplication
    3) Non-disjunction
    4) Mutation

57. Notochord, skeletal system and dermis of the skin are the derivatives of
    1) Ectoderm
    2) Endoderm
    3) Mesoderm
    4) All the three layers

58. Photosynthesis cannot continue for long if during light reaction, only cyc photophosphorylation takes place. This is because
    1) There is unidirectional cyclic movement of the electrons
    2) There is no evolution of O_2
    3) Only ATP is formed $NADPH^+ + H^+$ is not formed
    4) Photosystem I stops getting excited at a wavelength of light beyond 680 nm

59. Which of the following sequences is truely a systemic circulation pathway ?
    1) Left auricle → left ventricle → pulmonary aorta → tissues → right auric
    2) Left auricle → left ventricle → aorta → arteries → tissues → veins → right atrium
    3) Right ventricle → pulmonary aorta → tissues → pulmonary veins → left auricle
    4) Right auricle → left ventricle → aorta → tissues → veins → right auricle

60. Oxalosuccinic acid, an intermediary compound of Krib's cycle is a
    1) 4 carbon compound
    2) 3 carbon compound
    3) 5 carbon compound
    4) 6 carbon compound

(Space for Rough Work)