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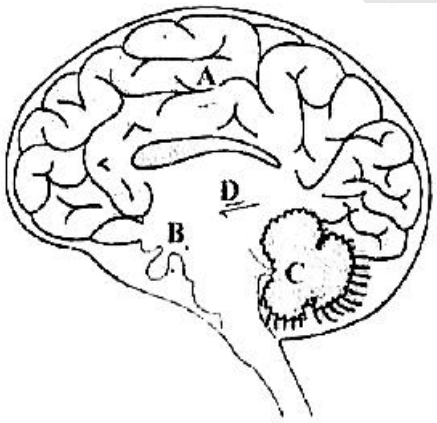
NATIONAL TALENT SEARCH EXAMINATION 2017 Stage-2
SCHOLASTIC APTITUDE TEST (SAT) (DATE : 14-05-17)

1. Small cut pieces of soft stems are placed in growth medium with following plant hormones. Which combination of plant hormones will show slowest growth ?
(1) Auxin + Cytokinin (2) Gibberellins + Auxin
(3) Gibberellins + Cytokinin (4) Abscisic Acid + Auxin
Ans. (4) Abscisic acid and auxin.
Sol. Abscisic acid is a growth inhibitor hence the combination will show slowest growth.

2. Which one of the following demonstrates the characteristics of cardiac muscle cells ?
(1) Involuntary and multinucleated (2) Unbranched and uninucleated
(3) Cylindrical and uninucleated (4) Unbranched and involuntary
Ans. (3) Cylindrical and uninucleated
Sol. Cardiac muscles are involuntary, branched, cylindrical and uninucleated.

3. From the given figure identify the part of human brain controlling most of the involuntary actions:



(1) A & B (2) B & C (3) C & D (4) D & A
Ans. (3) C and D
Sol. Involuntary activities are controlled by mid brain and hind brain. C and D are parts of Hind brain and Mid brain respectively.

4. An animal kept in a jar has the following features.
(I) It is bilaterally symmetrical. (II) It has coelomic cavity
(III) The body is segmented (IV) It has jointed appendages.
To which phylum does the animal belong to ?
(1) Arthropoda (2) Annelida (3) Platyhelminthes (4) Mollusca
Ans. (1) Arthropoda
Sol. Arthropoda involves animal with bilateral symmetry, coelomic cavity, segmented body and jointed appendages.

5. Read the following statements and select the correct option.
Statement - I : *Nostoc* and Bacteria are prokaryotes.
Statement - II : *Penicillium* and *Spirogyra* are fungi.
(1) Only statement I is true (2) Only statement II is true
(3) Both statements I and II are true (4) Both statements I and II are false

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Ans. (1) Only statement 1 is true.

Sol. Spirogyra is an Alga.

6. You find a herbaceous flowering plant growing in your school garden having leaves with parallel venation. Choose the correct additional features the given plant would be possessing.

(I) It has no secondary vascular tissues. (II) Its flower possesses three sepals.

(III) It possesses tap root. (IV) Its embryo has 2 cotyledons.

(1) (I) and (II) (2) (I) and (III) (3) (II) and (IV) (4) (III) and (IV)

Ans. (1) I and II

Sol. The given characters in the question match with monocot which does not show secondary vascular tissues, and flower has three sepals.

7. Varieties of vegetables such as cabbage, broccoli and cauliflower have been produced from a wild cabbage species. Such process of producing new varieties of living organisms is called

(1) Natural selection (2) Artificial selection (3) Speciation (4) Genetic drift

Ans. (2) Artificial selection

Sol. This is a type of divergent evolution performed by human.

8. Which of the following are pairs of analogous organs ?

(I) Forelimbs of horse – Wings of bat (II) Wings of bat – Wings of butterfly

(III) Forelimbs of horse – Wings of butterfly (IV) Wings of bird – Wings of bat

(1) (I) and (II) (2) (II) and (IV) (3) (III) and (IV) (4) (II) and (III)

Ans. (2) II and IV

Sol. Analogous organs are organs with different structure and same function.

9. Which of the following organisms is used as a biopesticide ?

(1) Azolla (2) Anabaena (3) Rhizobium (4) Trichoderma

Ans. (4) Trichoderma

Sol. Trichoderma is a fungicide and rest three are biofertilizers.

10. A tall plant (TT) is crossed with a dwarf plant (tt). All F1 plants showed tall phenotype. Which of the following correctly defines a test cross ?

(1) TT (F_1) ×Tt (P) (2) Tt (F_1) ×Tt (P) (3) tt (F_1) ×Tt (P) (4) Tt (F_1) ×tt (P)

Ans. (4) Tt(F_1) ×tt(P)

Sol. Test cross is a cross performed between hybrid of F_1 generation with recessive parent.

11. Which one of the following pairs of causative agent and type of disease are correct ?

(I) Leishmania – Sleeping sickness (II) Nematode – Elephantiasis

(III) Trypanosoma – Kala azar (IV) Staphylococcus – Acne

(1) (I) and (II) (2) (II) and (III) (3) (II) and (IV) (4) (III) and (IV)

Ans. (3) II and IV

Sol. *Wuchereria brancrofti* is a Nematoda which causes Elephantiasis. Staphylococcus bacteria causes Acne.

12. Pancreatic juice contains more than one enzyme. Which among the following combination is correct ?

(1) Pepsin and Lipase (2) Amylase and Pepsin

(3) Pepsin and Trypsin (4) Trypsin and Lipase

Ans. (4) Trypsin and Lipase

Sol. Pancreatic juice is an universal juice having Trypsin and Lipase.

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13. You discover a new species of a plant. You also discover that it produces motile sperms and dominant generation has diploid cells. It belongs to

(1) Bryophyte (2) Angiosperm (3) Gymnosperm (4) Pteridophyte

Ans. **(4) Pteridophyte**

Sol. Pteridophyte is a Cryptogamae having motile sperms and dominant generations has diploid cells.

14. At every 20 mintues, one bacterium divides into two. How many bacteria will be produced after two hours, if one starts with 10 bacteria ?

(1) $2^5 \times 10$ (2) $2^5 \times 10^5$ (3) $2^6 \times 10$ (4) $2^6 \times 10^6$

Ans. **(3) $2^6 \times 10$**

Sol. Given time $\rightarrow$ 120 minutes
Given no. of bacteria $\rightarrow$ 10
Shows divisions after $\rightarrow$ 20 minutes
So, [20 $\times$6 = 120 minutes]
Bacteria divides 6 times.
After 120 minutes we have $\rightarrow$ 640 bacteria [$2^6 \times$ 10]

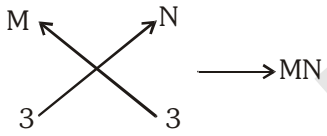
15. The metal (M) forms an oxide, M_2O_3. The formula of its nitride will be

(1) M_2N_3 (2) MN (3) M_2N (4) M_3N_2

Ans. **(2)**

Sol. Valency of metal M is 3.

$\therefore$ Formula of its nitride will be,



16. A solution is a homogeneous mixture of two or more substances. Which of the following is a solution?

(1) Milk (2) Smoke (3) Brass (4) Face Cream

Ans. **(3)**

Sol. Alloys are homogeneous mixture of two or more metals or non-metals. Hence Brass is a solution as it contains copper and zinc which are uniformly mixed.

17. 1.80 g of glucose is dissolved in 36.00 g of water in a beaker. The total number of oxygen atoms in the solution is

(1) 12.405×10^{23} (2) 12.405×10^{22} (3) 6.022×10^{23} (4) 6.022×10^{22}

Ans. **(1)**

Sol. In 180 gm of glucose number of oxygen atoms are 6 NA.

$\therefore$ In 1.8 gm of glucose, number of oxygen atoms = $\frac{6NA}{180} \times 1.8 = 0.06$ NA

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In 18 gm of water, number of oxygen atoms are NA.

$\therefore$ In 36.0 gm of water, number of oxygen atoms are $\frac{NA}{18} \times 36 = 2NA$

Total number of oxygen atoms in the solution = (0.06 + 2) NA = 2.06 NA

$= 2.06 \times 6.022 \times 10^{23}$

$= 12.405 \times 10^{23}$

18. ^{35}Cl and ^{37}Cl are the two isotopes of chlorine, in the ratio 3 : 1 respectively. If the isotope ratio is reversed, the average atomic mass of chlorine will be–

(1) 35.0 u (2) 35.5 u (3) 36.0 u (4) 36.5 u

Ans. (4)

Sol. Ratio of ^{35}Cl and ^{37}Cl is 1 : 3 respectively.

Average atomic mass = $\frac{35 \times 1 + 37 \times 3}{4}$

= 36.5 u

19. The turmeric solution will turn red by an aqueous solution of -

(1) potassium acetate (2) copper sulphate (3) sodium sulphate (4) ferric chloride

Ans. (1)

Sol. Turmeric solution will turn red by an aqueous solution of

(i) Potassium acetate (CH_3COOK), because potassium acetate is basic salt

20. A metal 'M' of moderate reactivity is present as its sulphide 'X'. On heating in air, 'X' converts into its oxide 'Y' and a gas evolves. On heating 'Y' and 'X' together, the metal 'M' is produced. 'X' and 'Y' respectively are –

(1) 'X' = cuprous sulphide, 'Y' = cuprous oxide
(2) 'X' = cupric sulphide, 'Y' = cupric oxide
(3) 'X' = sodium sulphide, 'Y' = sodium oxide
(4) 'X' = calcium sulphide, 'Y' = calcium oxide

Ans. (1)

Sol. $2Cu_2S + 3O_2 \xrightarrow{\Delta} 2Cu_2O + 2SO_2$

$2Cu_2O + Cu_2S \xrightarrow{\Delta} 6Cu + SO_2$

'X' = cuprous sulphide 'Y' = cuprous oxide

21. Which one of the following statement is incorrect about graphite and diamond ?

(1) Graphite is smooth and slippery.
(2) Diamond is good conductor of heat.
(3) Graphite is a good conductor of electricity.
(4) Physical and chemical properties of graphite and diamond are different.

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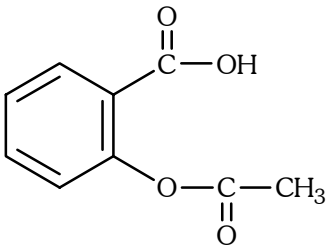
Ans. (4)

Sol. Incorrect statement is :
Physical and chemical properties of graphite and diamond are different

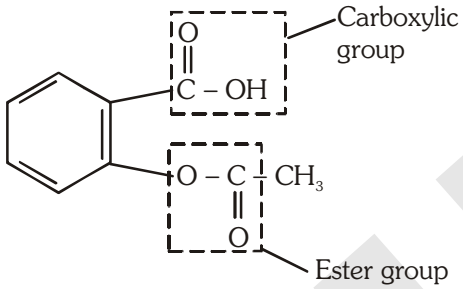
22. The functional groups present in the following compound are –



(1) alcohol, ketone and ester
(2) ester and carboxylic acid
(3) carboxylic acid and ketone
(4) ester and alcohol

Ans. (2)

Sol.



23. A part of the modern periodic table is presented below in which the alphabets represent the symbols of elements.

Table

Group → / Period ↓	1	2	14	15	16	17
2				M	Q	
3	A	J			R	
4	E		L			T
5	G					X

Consult the above part of the periodic table to predict which of the following is a covalent compound-
(1) RQ_2 (2) AT (3) JQ (4) JX_2

Ans. (1)

Sol. R & Q Both are Non metal so they form covalent bond.

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24. A compound 'X' reacts with a compound 'Y', to produce a colourless and odourless gas. The gas turns lime water milky. When 'X' reacts with methanol in the presences of concentrated H_2SO_4, a sweet smelling substance is produced. The molecular formula of the compound 'X' is–

(1) C_2H_4O (2) $C_2H_4O_2$ (3) C_2H_6O (4) $C_2H_6O_2$

Ans. (2)

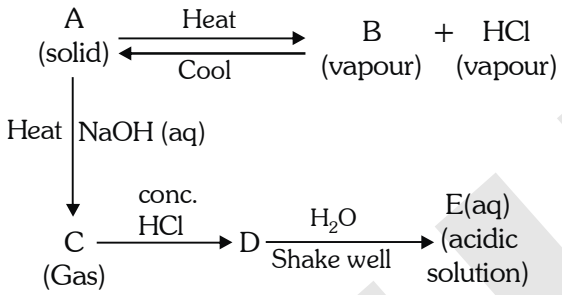
Sol. 'X' can be CH_3COOH (Acetic acid)

$$CH_3COOH + CH_3OH \xrightarrow[H_2SO_4]{\text{Conc.}} CH_3COOCH_3 + H_2O$$

X

Hence X is CH_3COOH or $C_2H_4O_2$

25. The schematic diagram is given below.



Which of the following is an incorrect statement ?

(1) A and E are chemically same. (2) A and D are chemically same.

(3) D and E are chemically same. (4) C and E are chemically same.

Ans. (4)

Sol. A $\longrightarrow NH_4Cl$, B $\longrightarrow NH_3$

When A reacts with $NaOH_{(aq)}$

$$NH_4Cl + NaOH \longrightarrow NaCl + NH_3 + H_2O$$

'C'

$C \longrightarrow NH_3$(gas)

When C reacts with conc. HCl it forms NH_4Cl.(D)

$D \longrightarrow NH_4Cl$.

When NH_4Cl is shaked well with water, it dissociates to form NH_4OH and HCl.

So E is HCl.

Hence incorrect is that C & E are chemically same.

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26. Which of the following is a feasible reaction ?

(1) $Ba(s) + K_2SO_4(aq) \rightarrow BaSO_4(aq) + 2K(s)$

(2) $Zn(s) + 2AgNO_3(aq) \rightarrow Zn(NO_3)_2(aq) + 2Ag(s)$

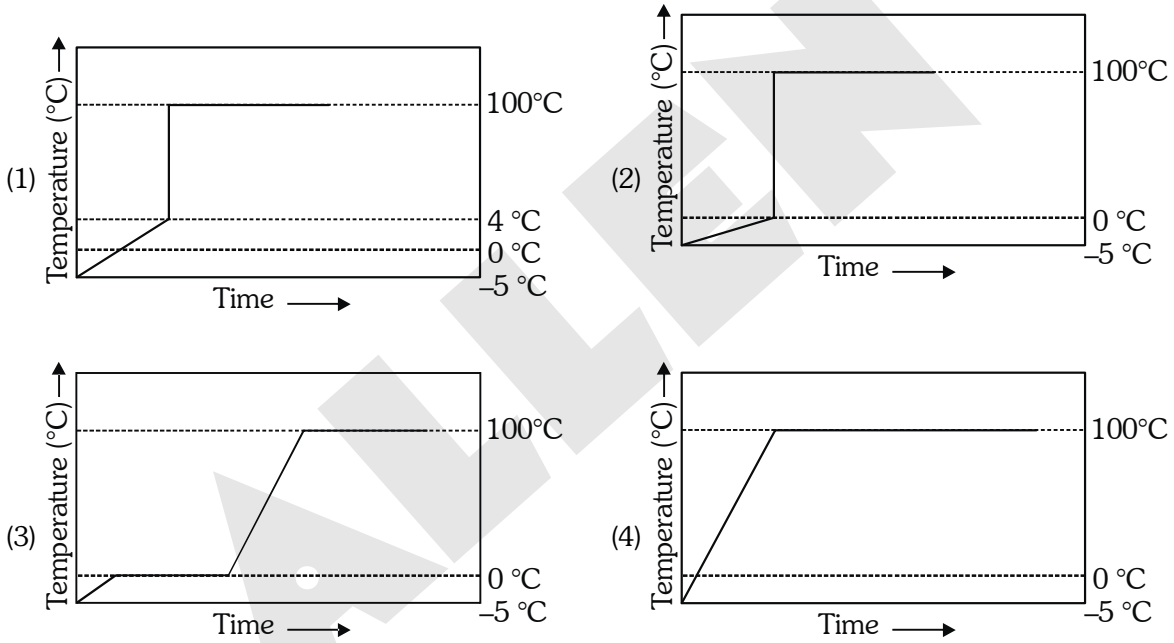
(3) $Mg(s) + Na_2SO_4(aq) \rightarrow MgSO_4(aq) + 2Na(s)$

(4) $Cu(s) + MgSO_4(aq) \rightarrow CuSO_4(aq) + Mg(s)$

Ans. (2)

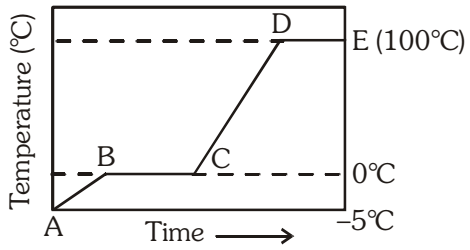
Sol. As zinc is more reactive than silver, the reaction is feasible.

27. Some ice pieces kept at a temperature –5°C are heated gradually to 100°C in a beaker. The temperatures of the contents are plotted against time. The correct plot is-



Ans. (3)

Sol.



BC = Latent Heat of fusion.

DE = Latent Heat of vaporisation.

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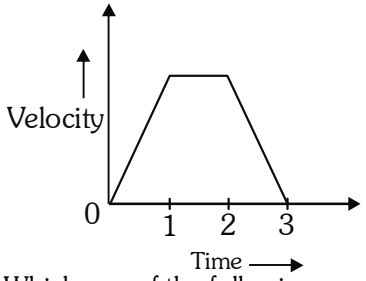
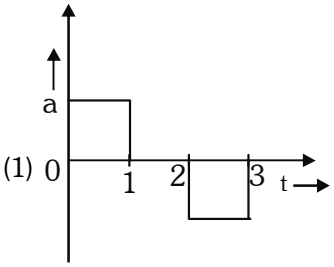
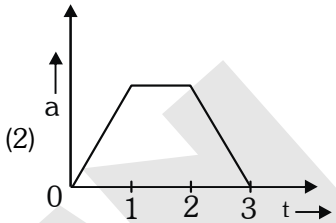
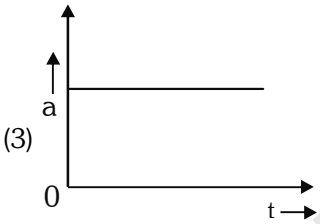
28. The velocity-time graph of an object moving along a straight line is shown below :

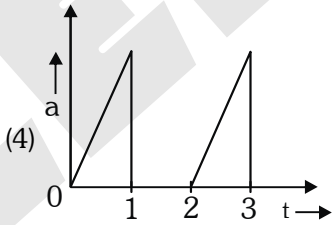


Which one of the following graphs represents the acceleration (a) - time (t) graph for the above motion?

(1)


(2)


(3)


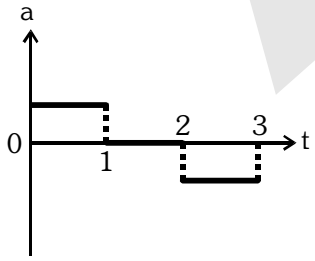
(4)


Ans. (1)

Sol. acceleration will be constant from 0 to 1 sec

a = 0 from 1 to 2 sec because v → cost

Negative acceleration from 2 to 3 sec



29. To read a poster on a wall, a person with defective vision needs to stand at a distance of 0.4m from the poster. A person with normal vision can read the poster from a distance of 2.0 m. Which one of the following lens may be used to correct the defective vision ?

(1) A concave lens of 0.5 D
(2) A concave lens of 1.0 D
(3) A concave lens of 2.0 D
(4) A convex lens of 2.0 D

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Ans. (3)

Sol. u = 2m, v = 0.4 m, f

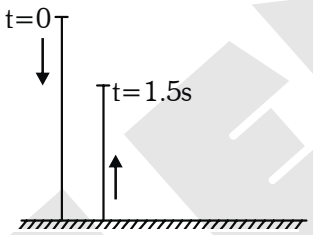
$$\frac{1}{f}=\frac{1}{v}-\frac{1}{u} \Rightarrow \frac{1}{f}=\frac{-5+1}{2}=\frac{-4}{2}$$

$$\frac{1}{f}=-2$$

$$P=\frac{1}{f}=2D$$

so concave lense of power 2D

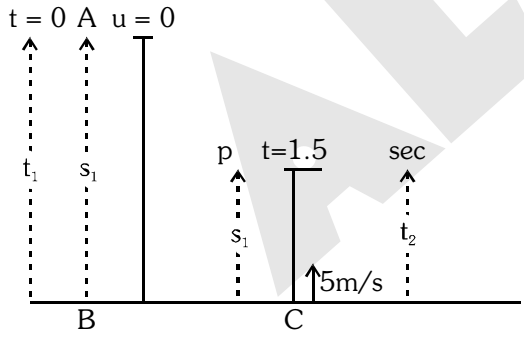
30. A ball released from rest at time t = 0 hits the ground. It rebounds inelastically with a velocity 5 m s^{-1} and reaches the top at t = 1.5 s, What is the net displacement of the ball from its initial position after 1.5s ? (g = 10 m/s^{-2})



(1) 1.25 m (2) 3.75 m (3) 5.00 m (4) 6.25 m

Ans. (2)

Sol.



C to D

u = 5 m/s, a = – 10 m/s^2, S_2 , V = 0, t_2

$V^2 = u^2 - 2a S$

$0 = 25 - 2 \times 10 \times S_2$

$$S_2 = \frac{5}{4}m \qquad ...(1)$$

$V = u - at$

$0 = 5 - 10 \times t_2$

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$t_2 = 0.5$ sec

so $t_1 + t_2 = 1.5$

$t_1 = 1$ sec

A to B

$u = 0$, $g = 10\ m/s^2$, S_1, $t = 1$ sec

$S_1 = ut + \frac{1}{2} at^{2\backslash}$

$S_1 = \frac{1}{2} \times 10 \times (1)^2 = 5m$

displacement from A to d

$= S_1 - S_2$

$= 5 - \frac{5}{4} = \frac{15}{4} = 3.75$ m

31. A horizontal jet of water is made to hit a vertical wall with a negligible rebound. If the speed of water from the jet is 'v', the diameter of the jet is 'd' and the density of water is 'ρ', then the force exerted on the wall by the jet of water is-

(1) $\frac{\pi}{4} d^2 \rho \upsilon$ (2) $\frac{\pi}{4} d^2 \rho \upsilon^2$ (3) $\frac{\pi}{8} d^2 \rho \upsilon^2$ (4) $\frac{\pi}{2} d^2 \rho \upsilon^2$

Ans. (2)

Sol. $u = v$, $v = 0$ $m = ?$

$\rho = \frac{m}{v}$

$m = \rho \times v$

$= \rho \times \pi r^2 \times \ell$

$m = \rho \pi \times \frac{d^2}{4} \times v \times t$ ...(1)

$\Delta\rho = \frac{\pi}{4} \rho d^2 v t\ (v - 0)$

$\Delta\rho = \frac{\pi}{4} \rho d^2 v^2 t$

$F = \frac{\Delta P}{t} = \frac{\pi}{4} \frac{\rho d^2 v^2 t}{t}$

$F = \frac{\pi}{4} \rho d^2 v^2$

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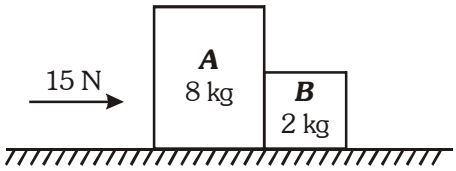
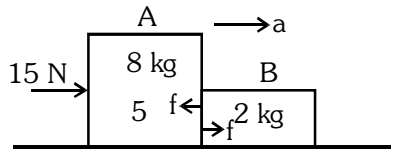
32. Two blocks A and B of masses 8 kg and 2 kg respectively, lie on a horizontal frictionless surface as shown in the figure. They are pushed by a horizontally applied force of 15 N. The force exeerted by B on A is



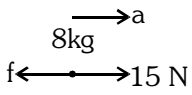
(1) 1.5 N (2) 3.0 N (3) 4.5 N (4) 6.0 N

Ans. (2)

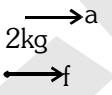
Sol.



FBO



$15 - f = 8a$ .... (2)



$f = 2a$ ...(1)

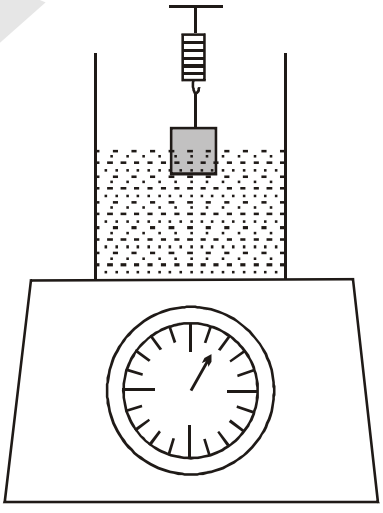
eq (1) + (2)

$15 = 10\ a \Rightarrow a = \frac{15}{10} = \frac{3}{2} m/s^2$

eq(1)

$f = 2 \times \frac{3}{2} = 3N$

33. A beaker half-filled with water is put on a platform balance which is then set to zero. A 800 g mass is immersed partially in water using a spring balance as shown in the figure. If the spring balance reads 300 g, what will be the reading on the platform balance ?



(1) 200 g (2) 300 g (3) 500 g (4) 800 g

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Ans. (3)

Sol. Reading = $mg - F_b$

$300\ g = mg - F_b$

$F_b = 800\ g - 300\ g$

$= 500\ g$

Reading of the balance will be equal to buoyant force

$R = 500\ g$

34. An object falls a distance H in 50 s when dropped on the surface of the earth. How long would it take for the same object to fall through the same distance on the surface of a planet whose mass and radius are twice that of the earth ? (Neglect air resistance.)

(1) 35.4 g (2) 50.0 s (3) 70.7 s (4) 100.0 s

Ans. (3)

Sol. On plant M' = 2M

R' = 2R

$$g' = \frac{GM'}{(R')^2} = \frac{G \times 2M}{4R^2} = \frac{g}{2}$$

On earth

u = 0, t = 50 su, d = H, g

$$S = ut + \frac{1}{2}at^1$$

$$H = \frac{1}{2} \times g \times 2500 \quad \ldots (1)$$

On planet

$$u = 0,\ t,\ d = H,\ \frac{g}{2}$$

$$S = ut + \frac{1}{2}at^2$$

$$H = \frac{1}{2} \times \frac{g}{2} \times t^2$$

From equation (1)

$$\frac{1}{2}g \times 2500 = \frac{1}{2} \times \frac{g}{2} \times t^2$$

$t^2 = 5000$

$t = 50\sqrt{2}$

$= 70.7$ sec

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35. A source produces sound waves under water. Waves travel through water and then into air. Which of the following statements about the frequency (f) and the wavelength (λ) is correct ans sound passes from water to air?

(1) f remains unchanged but λ decreases. (2) f remains unchanged but λ increases.

(3) λ remains unchanged but f decreases. (4) λ remains unchanged but f increases.

Ans. (1)

Sol. Frequency of a source remains constant. As it depends on source itself.

When light travels from water to air. (denser to rarer)

R.I. decreases thus wavelength decreases for sound. ($\because$ speed decreases)

36. The diameter of a wire is reduced to one-fifth of its original value by stretching it. If its initial resistance is R, what would be its resistance after reduction of the diameter ?

(1) $\frac{R}{625}$ (2) $\frac{R}{25}$ (3) 25 R (4) 625 R

Ans. (4)

Sol. When diameter of wire is reduced to $\frac{d}{5}$.

Radius also reduces to $\frac{r}{5}$.

Thus area thus changed to $\frac{A}{25}$. (where $A = \pi r^2$)

Hence length streched by wire will be 25ℓ.

New resistance = $\frac{\rho(25\ell)}{A/25} = 625\ \frac{\rho\ell}{A}$ (Keeping volume constant)

$= 625\ R.$

Where R = old resistance.

37. An object of mass 'm' moving along a straight line with a velocity 'u' collides with a heavier mass 'M' and gets embedded into it. If the compound system of mass (m + M) keeps moving in the same direction then which of the given options is true ?

(1) The kinetic energies before and after collision are same.

(2) The kinetic energy after collision is $\frac{1}{2}(M+m)u^2$

(3) There will be a loss of kinetic energy equal to $\frac{1}{2}\frac{m^2u^2}{(M+m)}$

(4) There will be a loss of kinetic energy equal to $\frac{1}{2}\frac{Mm}{(M+m)}u^2$

Ans. (4)

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Sol. 

By momentum conservation
$mu = (M + m)v$

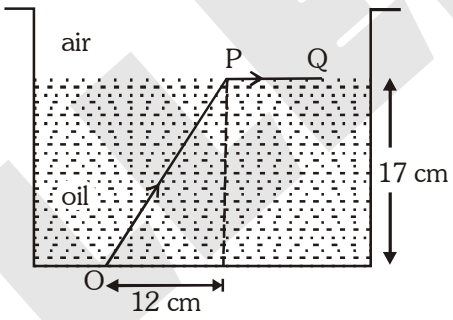
Hence $v = \frac{mu}{M+m}$ .....(1)

$KE_{initial} = \frac{1}{2}mu^2 + \frac{1}{2}M(0)^2$

$KE_{final} = \frac{1}{2}(M + m)v^2 = \frac{1}{2}\frac{m^2u^2}{M+m}$

$\Delta KE = \frac{1}{2}\frac{Mm}{(M+m)}u^2$

38. A vessel is filled with oil as shown in the diagram. A ray of light from point O at the bottom of vessel is incident on the oil-air intergace at point P and grazes the surface along PQ. The refractive index of the oil is close to –



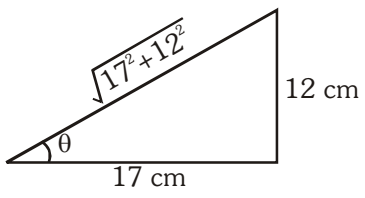
(1) 1.41 (2) 1.50 (3) 1.63 (4) 1.73

Ans. (4)

Sol. By Snell's law

$\eta_{oil} \times \sin\theta = \sin 90° \times \eta_{air}$

$\eta_{oil} = \frac{1}{\sin\theta}$ $(\eta_{air} = 1)$



$\eta_{oil} = \frac{1}{12} \times \sqrt{17^2 + 12^2}$

≈ 1.73

39. A charged particle placed in an electric field falls from rest through a distance *d* in time *t*. If the charge on the particle is doubled, the time of fall through the same distance will be

(1) 2t (2) t (3) $\frac{t}{\sqrt{2}}$ (4) $\frac{t}{2}$

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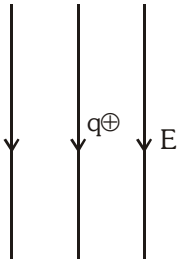
Ans. (3)

Sol. F = ma

Force in an electric field = qE

qE = ma

Hence $a = \frac{qE}{m}$

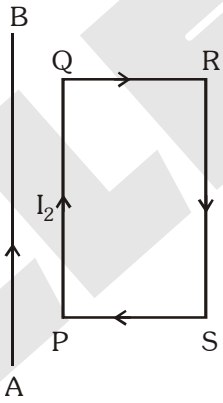


$S = \frac{1}{2}\left(\frac{qE}{m}\right)t^2 \qquad \Rightarrow \quad t = \sqrt{\frac{25m}{qE}}$

When charge is doubled time will be $\frac{t}{\sqrt{2}}$.

If ratio of $\frac{qE}{m} > g$. g can be neglected.

40. AB is a long wire carrying a current I_1, and PQRS is rectangular loop carrying current I_2 (as shown in the figure).



Which among the following statements are correct ?
(a) Arm PQ will get attracted to wire AB, and the arm RS will get repelled from wire AB.
(b) Arm PQ will get repelled from wire AB and arm RS attracted to weir AB.
(c) Forces on the arms PQ and RS wil be unequal and opposite.
(d) Forces on the arms QR and SP will be zero.
(1) only (a) (2) (b) and (c) (3) (a) and (c) (4) (b) and (d)

Ans. (3)

Sol. Current in AB & PQ branch are in some direction thus repel each other.
Similarly RS will be attracted by wire AB.
Force between wires is given by

$F = \frac{\mu_0}{2\pi d} i_1 i_2$

$F \propto \frac{1}{d}$ hence will be unequal and opposite for PQ & RS.

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41. The sum of all the possible remainders, which can be obtained when the cube of a natural number is divided by 9, is

(1) 5 (2) 6 (3) 8 (4) 9

Ans. (4)

Sol. Possible remainders =

$\Rightarrow 1^3 = 1 \rightarrow r_1 = 1$

$2^3 = 8 \rightarrow r_2 = 8$

$3^3 = 27 \rightarrow r_3 = 0$

$4^3 = 64 \rightarrow r_4 = 1$

Possible sum = 1 + 8 = 9

42. When a polynomial p(x) is divided by x – 1, the remainder is 3. When p(x) is divided by x – 3, the remainder is 5. If r(x) is the remainder when p(x) is divided by (x – 1)(x – 3), then the value of r(–2) is

(1) –2 (2) –1 (3) 0 (4) 4

Ans. (3)

Sol. p(x) = q(x) (x – 1) + 3 (given)

p(x) = q(x) (x – 3) + 5 (given)

Also, p(x) = (x – 1) (x – 3) + r(x)

for x = 1,

p(1) = r(3)

$\boxed{3 = r(1)}$

for x = 3,

p(3) = r(3)

$\boxed{5 = r(3)}$

Suppose r(x) = Ax + B

r(1) = A + B = 3

r(3) = 3A + B = 5

$\therefore$ $\boxed{A = 1}$ and $\boxed{B = 2}$

r(x) = Ax + B

r(–2) = –2A + B

r(–2) = –2(1) + 2

r(–2) = –2 + 2

$\boxed{r(-2) = 0}$

43. For what value of p, the following pair of linear equations in two variables will have infinitely many solutions ?

px + 3y – (p – 3) = 0

12x + py – p = 0

(1) 6 (2) –6 (3) 0 (4) 2

Ans. (1)

Sol. Condition for infinite many solutions.

$$\frac{p}{12} = \frac{3}{p} = \frac{p-3}{p}$$

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$\boxed{p = \pm 6}$ (from (1) and (2))

$\boxed{p = +6}$ (from (2) and (3))

$p = 6$

44. Two quadratic equations $x^2 - bx + 6 = 0$ and $x^2 - 6x + c = 0$ have a common root. If the remaining roots of the first and second equations are positive integers and are in the ration 3 : 4 respectively, then the common root is

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

Ans. (2)

Sol. Let α, β be the roots of $x^2 - bx + 6 = 0$ and α, γ be the roots of $x^2 - 6x + c = 0$

$x^2 - bx + 6 = 0$ $\quad \alpha + \beta = b, \alpha + \gamma = 6$

$x^2 - 6x + c = 0$ $\quad \alpha\beta = 6, \alpha\gamma = c$

Given, $\frac{\beta}{\gamma} = \frac{3}{4}$

$$\frac{\alpha\beta}{\alpha\gamma} = \frac{6}{c}$$

$$\frac{\beta}{\gamma} = \frac{6}{c} \Rightarrow \frac{3}{4} = \frac{6}{c} \qquad \therefore \boxed{c = 8}$$

$x^2 - 6x + c = 0$

$\Rightarrow x^2 - 6x + 8 = 0$

$x^2 - 4x - 2x + 8 = 0$

$x(x - 4) - 2(x - 4) = 0$

$(x - 4)(x - 2) = 0$

$\boxed{x = 4 \text{ or } 2}$

Now, $x^2 - bx + 6 = 0$

$x^2 - bx + 6 = 0$

$4^2 - b(4) + 6 = 0$ or $2^2 - b(2) + 6 = 0$

$16 + 6 - 4b = 0$ or $4 + 6 = 2b$

$22 = 4b$ $\qquad 10 = 2b$

$\boxed{\frac{11}{2} = b}$ $\qquad \boxed{5 = b}$

For b = 5 satisfies, $\alpha + \beta = 5$

$\alpha \cdot \beta = 6$ (Possible values $\alpha = 2, \beta = 3$)

So the common root will be 2.

45. First term of an arithmetic progression is 2. If the sum of its first five terms is equal to one-fourth of the sum of the next five terms, then the sum of its first 30 terms is

(1) 2670 (2) 2610 (3) –2520 (4) –2550

Ans. (4)

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Sol. $a = 2$

$S_5 = \frac{1}{4}(S_{10} - S_5)$

$4S_5 = S_{10} - S_5$

$5S_5 = S_{10}$

$5\left[\frac{5}{2}\{2\times 2+(5-1)d\}\right] = \frac{10}{2}\left[2\times 2+(10-1)d\right]$

$\Rightarrow 5 \times \frac{5}{2}(4 + 4d) = \frac{10}{2}[4 + 9d]$

$\Rightarrow 20 + 20d = 8 + 18d$

$\Rightarrow d = -6$

$S_{30} = \frac{30}{2}[2 \times 2 + (30 - 1)(-6)]$

$= \frac{30}{2}[4 + 29 \times (-6)]$

$= \frac{30}{2} \times (-170)$

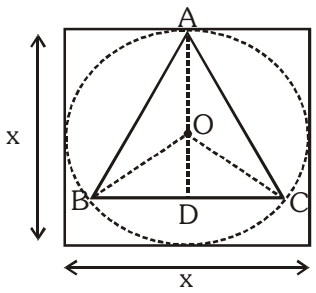
$= \frac{-5100}{2} = -2550$

46. A circle C is drawn inside a squar S so that the four sides of S are tangents to C. An equilateral triangle T is drawn indide C with its vertices on C. If the area of S is k times the are of T, then the value of k is

(1) $\frac{16}{3\sqrt{3}}$ (2) $\frac{16}{\sqrt{3}}$ (3) $\frac{32}{3\sqrt{3}}$ (4) $\frac{32}{\sqrt{3}}$

Ans. (1)

Sol. Let the side of square be x units.
Then, Diameter of a circle = x units



So, radius of O circle = $\frac{x}{2}$

$\Rightarrow OA = OB = OC = \frac{x}{2}$

$\therefore OD = \frac{x}{4}$

Let the side of equilateral Δ be y units
Then
$\Rightarrow AD^2 + DC^2 = AC^2$

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$\Rightarrow \left(\frac{3x}{4}\right)^2 + \left(\frac{y}{2}\right)^2 = y^2$

$\Rightarrow \frac{9x^2}{16} = \frac{3y^2}{4}$

$\Rightarrow x^2 = \frac{4}{3}\, y^2$

$\Rightarrow x^2 = \frac{4}{3} \cdot \frac{4}{\sqrt{3}} \left(\frac{\sqrt{3}}{4} y^2\right)$

$\Rightarrow$ ar.(Square) $= \frac{16}{3\sqrt{3}}$ ar.(Triangle)

$\Rightarrow$ ar.(Square) = k ar.(Triangle)

$= \frac{16}{3\sqrt{3}}$ ar.(Triangle)

$\Rightarrow \boxed{k = \frac{16}{3\sqrt{3}}}$

So, option (1) is correct

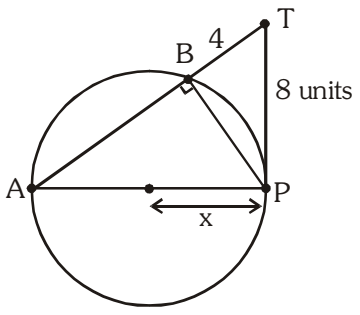
47. Let AP be a diameter of a circle of radius r and PT be the tangent to the circle at the point P such that the line AT intersects the circle at B. If PT = 8 units and BT = 4 units, then r is equal to

(1) $4\sqrt{3}$ units (2) 4 units (3) $\frac{4}{\sqrt{3}}$ units (4) $2\sqrt{3}$ units

Ans. (1)

Sol. Here, PT = 8 units
and BT = 4 units
Then,
TB $\times$TA = TP^2
$\Rightarrow$ 4 $\times$TA = $(8)^2$
$\Rightarrow$ TA = 16

$\therefore$ $\boxed{BA = 12}$



Also, In ΔBTP,
$TP^2 = TB^2 + BP^2$
$\Rightarrow$ $8^2 = 4^2 + BP^2$
$\Rightarrow$ $BP^2 = 64 - 16 = 48$
$\Rightarrow$ $BP = 4\sqrt{3}$

Also In ΔABP
$AB^2 + BP^2 = AP^2$

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$\Rightarrow (12)^2 + \left(4\sqrt{3}\right)^2 = (2x)^2$

$\Rightarrow$ $\boxed{r = 4\sqrt{3}\text{ units}}$ So, option (1) is correct

48. If the quadratic equation $x^2 + bx + 72 = 0$ has two distinct integer roots, then the number of all possible value for b is–

(1) 12 (2) 9 (3) 15 (4) 18

Ans. (1)

Sol. $x^2 + bx + 72 = 0$ (given)

$\therefore\ \alpha\beta = 72$

Possible roots for $\alpha, \beta \in$ +ive

α	β	b
1	72	–73
2	36	–38
3	24	–27
4	18	–22
6	12	–18
8	9	–17

Possible roots for $\alpha, \beta \in$ –ive

α	β	b
–1	–72	73
–2	–36	38
–3	–24	27
–4	–18	22
–6	–12	18
–8	–9	17

So Total possible values of b will be 12

49. If the area of a square inscribed in a semicircle is $2cm^2$, then the area of the square inscribed in a full circle of the same radius is–

(1) 5 cm^2 (2) 10 cm^2 (3) $5\sqrt{2}$ cm^2 (4) 25 cm^2

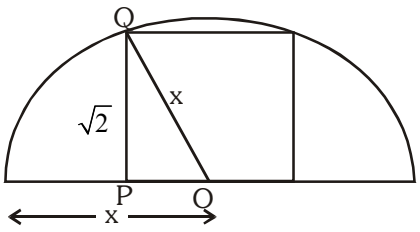
Ans. (1)

Sol. Area of square = 2 cm^2

Side of square = $\sqrt{2}$ cm

OP = $\frac{\sqrt{2}}{2}$ cm, OQ = x cm

$x^2 = (\sqrt{2})^2 + \left(\frac{\sqrt{2}}{2}\right)^2$



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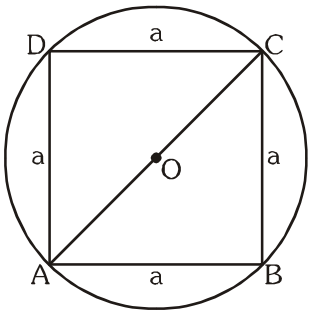
$x^2 = 2 + \frac{2}{4}$

$x^2 = \frac{5}{2} \Rightarrow x = \sqrt{\frac{5}{2}}$ cm.



$AC = 2\sqrt{\frac{5}{2}}$ cm (AC = Diameter)

$a^2 + a^2 = \left(2\sqrt{\frac{5}{2}}\right)^2$

$2a^2 = 4 \times \frac{5}{2}$

$a^2 = 5$ cm^2

Area of square = 5 cm^2

50. If the discriminants of two quadratic equations are equal and the equations have a common root 1, then the other roots–

(1) are either equal or their sum is 2 (2) have to be always equal

(3) are either equal or their sum is 1 (4) have their sum equal to 1

Ans. (1)

Sol. Let $a_1x^2 + b_1x + c_1 = 0$ and $a_2x^2 + b_2x + c_2 = 0$ be the two quadratic equation

since 1 is a common root.

Then,

$\Rightarrow a_1 + b_1 + c_1 = a_2 + b_2 + c_2 = 0$

$\Rightarrow b_1 = -(a_1 + c_1)$ and $b_2 = -(a_2 + c_2)$

Also, the discriminants of two quadratic equations are equal

Then

$\Rightarrow b_1^2 - 4a_1c_1 = b_2^2 - 4a_2c_2$

$\Rightarrow (a_1 + c_1)^2 - 4a_1c_1 = (a_2 + c_2)^2 - 4a_2c_2$

$\Rightarrow (a_1 - c_1)^2 = (a_2 - c_2)^2$

$\Rightarrow a_1 - c_1 = \pm (a_2 - c_2)$

$\Rightarrow \boxed{a_1 - a_2 = c_1 - c_2}$ or $\boxed{a_1 + a_2 = c_1 + c_2}$

Now, the roots of equation, $x = -\frac{b_1 \pm \sqrt{D_1}}{2} = a_1$ and c_1

and the roots of equation 2, $x = \frac{-b_2 \pm \sqrt{\Delta_2}}{2} = a_1$ and c_2

If $a_1 = a_2 = 1$ be the common roots

Then, other roots are c_1 and c_2

$\Rightarrow c_1 - c_2 = a_1 - a_2 = 0$ or $c_1 + c_2 = a_1 + a_2$

$\Rightarrow \boxed{c_1 = c_2}$ $\boxed{c_1 + c_2 = 2}$

Hence, roots are either equal or their sum is 2.

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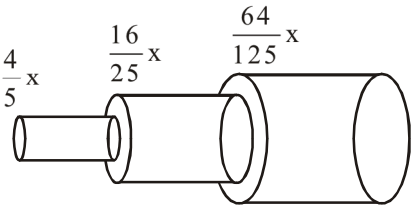
51. Three circular wires are attached in series such that, if one wire is rotated, other two also get rotated. If the diameter of a wire is 4/5 times that of immediate left wire and the left most wire rotates at the speed of 32 revolutions per minute, then the number of revolutions made by right most wire per minute will be–

(1) 40 (2) 49 (3) 50 (4) 60

Ans. (3)

Sol.



$D_1 N_1 = D_2 N_2$

$\frac{4}{5}x \times 32 = \frac{16}{25}x \times N_2$

$\boxed{N_2 = 40}$

Now, $N_2D_2 = N_3D_3$

$40 \times \frac{16x}{25} = \frac{16x}{125} \times N_3$

$\boxed{N_3 = 50}$

52. Let ABC be an equilateral triangle. If the co-ordinates of A are (1, 2) and co-ordinates of B are (2, –1), then–

(1) C cannot lie in the first quadrant (2) C cannot lie in the second quadrant

(3) C is the origin (4) C cannot lie in the third quadrant

Ans. (2)

Sol. Let the third point be C(x, y)

Then,

$\Rightarrow$ CA = CB = AB

$\Rightarrow CA^2 = CB^2 = AB^2$

$\Rightarrow (x-1)^2 + (y-2)^2 = (x-2)^2 + (y+1)^2 = (1-2)^2 + (2+1)^2$

$\Rightarrow x^2 + 1 - 2x + y^2 + 4 - 4y = x^2 + 4 - 4x + y^2 + 1 + 2y$

$\Rightarrow 2x - 6y = 0$

$\Rightarrow x = 3y$ .....(1)

$\therefore (x-1)^2 + (y-2)^2 = 10$

$\Rightarrow (3y-1)^2 + (y-2)^2 = 10$ ($\because x = 3y$)

$\Rightarrow 2y^2 - 2y - 1 = 0$

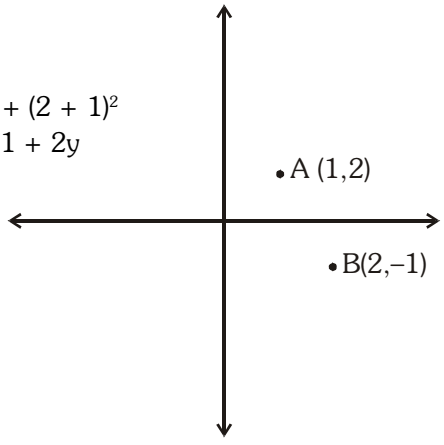
On solving we get,

$\Rightarrow y = 1 \pm \sqrt{3}$

$\therefore x = 3(1 \pm \sqrt{3})$

Hence C(x, y) lies in either 1st quadrant or 3rd quadrant.

So, C cannot lies in the second quadrant



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53. Shyam wants to make a solid brick shape structure from 400 wooden cubes of unit volume each. If the sides of the solid brick have the ratio 1 : 2 : 3, then the maximum number of cubes, which can be used, will be–

(1) 400 (2) 288 (3) 300 (4) 384

Ans. (4)

Sol. Let sides of the solid brick be x, 2x and 3x

Volume = Number of bricks = $6x^3$

Let

$x = 1,\ 6 \times 1 = 6$

$x = 2,\ 6 \times 8 = 48$

$x = 3,\ 6 \times 27 = 222$

$x = 4,\ 6 \times 64 = 384$

$x = 5,\ 6 \times 125 = 750$

At x = 5, no. of cubes are going above 400.

54. Positive integers from 1 to 21 are arranged in 3 groups of 7 integers each, in some particular order. Then the highest possible mean of the medians of these 3 groups is–

(1) 16 (2) 12.5 (3) 11 (4) 14

Ans. (4)

Sol. Pattern to be followed.

1 2 3 (18) 19 20 21

4 5 6 (14) 15 16 17

7 8 9 (10) 11 12 13

Medians are 18 , 14, 10

$$\text{Mean} = \frac{18+14+10}{3}$$

$$= \frac{42}{3} = 14$$

55. On dividing 2272 as well as 875 by a 3-digit number N, we get the same remainder in each case. The sum of the digits of N is–

(1) 10 (2) 11 (3) 12 (4) 13

Ans. (1)

Sol. Clearly 2272 – 875 = 1397, is exactly divisible by N.

Now, $1397 = 11 \times 127$

$\therefore$ The required 3 – digit number is 127, the sum of whose digit is 10.

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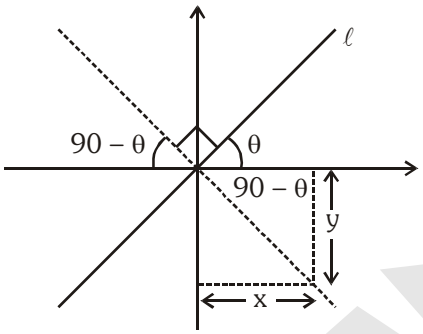
56. A line *l* passing through the origin makes an angle θ with positive direction of x-axis such that $\sin\theta = \frac{3}{5}$. The co-ordinates of the point, which lies in the fourth quadrant at a unit distance from the origin and on perpendicular to *l*, are

(1) $\left(\frac{3}{5}, -\frac{4}{5}\right)$ (2) $\left(\frac{4}{5}, -\frac{3}{5}\right)$ (3) (3, –4) (4) (4, –3)

Ans. (1)

Sol. Given



$\sin\theta = \frac{3}{5}$

$\cos\theta = \frac{4}{5}$

Now, $\sin(90-\theta) = \frac{y}{1}$

$\Rightarrow y = \cos\theta$

$\Rightarrow \boxed{y = \frac{4}{5}}$

$\cos(90-\theta) = \frac{x}{1}$

$\Rightarrow x = \sin\theta \ \boxed{x = \frac{3}{5}}$

57. The value(s) of k for which $x^2 + 5kx + k^2 + 5$ is exactly divisible by x + 2 but not by x + 3 is (are)

(1) 1 (2) 5 (3) 1, 9 (4) 9

Ans. (4)

Sol. Here, $P(x) = x^2 + 5Kx + K^2 + 5$

and $P(-2) = 0$

$P(-3) \neq 0$

$\therefore\ 4 - 10K + K^2 + 5 = 0$

$\Rightarrow K^2 - 10K + 9 = 0$

$\Rightarrow (K-9)(K-1) = 0$

$\Rightarrow K = 1, 9$ .....(1)

Also $P(-3) \neq 0$

$\Rightarrow 9 - 15K + K^2 + 5 \neq 0$

$\Rightarrow K^2 - 15K + 14 \neq 0$

$\Rightarrow (K-14)(K-1) \neq 0$

$\Rightarrow K \neq 14, 1$ .....(2)

From (1) and (2)

K = 9 Option (4) is correct.

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58. If $\cos^4\theta + \sin^2\theta = m$, then–

(1) $1 \le m \le 2$ (2) $\frac{1}{2} \le m \le 1$ (3) $\frac{3}{4} \le m \le 1$ (4) $\frac{3}{4} \le m \le \frac{13}{16}$

Ans. (3)

Sol. $\cos^4\theta + \sin^2\theta = m$,

$\Rightarrow \cos^4\theta + 1 - \cos^2\theta = m$

let $\cos^2\theta = x$

Then

$\Rightarrow m = x^2 - x + 1$

$= \left(x - \frac{1}{2}\right)^2 + \frac{3}{4}$

Now, $0 \le \left(x - \frac{1}{2}\right)^2 \le \frac{1}{4}$

$\Rightarrow \frac{3}{4} \le \left(x - \frac{1}{2}\right)^2 + \frac{3}{4} \le \frac{1}{4} + \frac{3}{4}$

$\Rightarrow \boxed{\frac{3}{4} \le m \le 1}$ option (3) is correct.

59. Cost of 2 apples, 3 bananas and one coconut is Rs. 26. Also the cost of 3 apples, 2 bananas and two coconuts is Rs. 35. Then the cost of 12 apples, 13 bananas and 7 coconuts is–

(1) Rs. 172 (2) Rs. 148 (3) Rs. 143 (4) Rs. 126

Ans. (2)

Sol. Let number of apples, bananas and cocounut be x, y and z respectively.

$2x + 3y + z = 26$ ..... (1)

$3x + 2y + 2z = 35$ ..... (2)

(1) $\times 3$, (2) $\times 2$

$$\begin{array}{r} 6x + 6y + 3z = 78 \\ 6x + 4y + 4z = 70 \\ \hline 12x + 13y + 7z = 148 \end{array}$$

Cost of 12 apples, 13 bananas and 7 cocounts is Rs.148

60. ABC is a field in the form of an equilateral triangle. Two vertical poles of heights 45m and 20m are erected at A and B respectively. The angles of elevation of the tops of the two poles from C are complementary to each other. There is a point D on AB such that from it, the angles of elevation of the tops of the two poles are equal. Then AD is equal to–

(1) $17\frac{5}{12}$ m (2) $20\frac{10}{13}$ m (3) $20\frac{5}{13}$ m (4) $17\frac{10}{12}$ m

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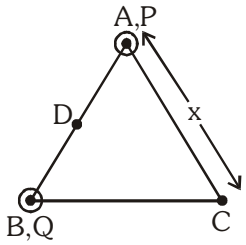
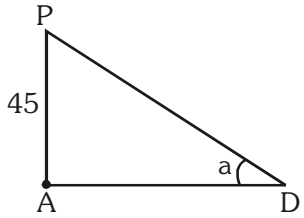
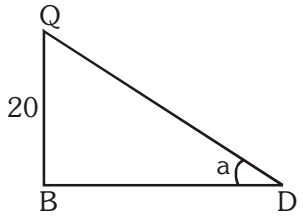
Ans. (2)

Sol.

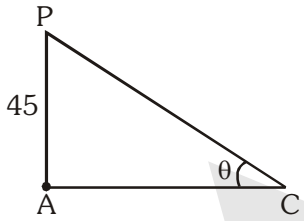


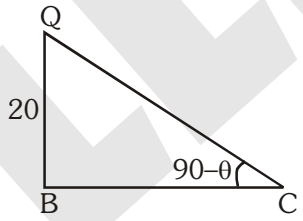




$\frac{45}{AD} = \frac{20}{BD}$ (tangent in both triangles)

$\boxed{\frac{AD}{BD} = \frac{9}{4}}$





$\tan(90 - \theta) = \cot\theta$

$\frac{20}{BC} = \frac{AC}{45}$ (let AC = BC = x)

$x^2 = 900$ $\boxed{x = 30}$

Let AD = 9y, BD = 4y

$\therefore$ 9y + 4y = 30

$y = \frac{30}{13}$

$\therefore$ $AD = \frac{9\times 30}{13} = \frac{270}{13}$ $\boxed{AD = 20\left(\frac{10}{13}\right)m}$

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61. Arrange the developments related to European history in a chronological sequence.

I. Napoleon invaded Italy.

II. Unification of Italy.

III. Unification of Germany.

IV. Vienna Settlement.

(1) I, III, II and IV (2) I, II, IV and III (3) I, IV, II and III (4) I, II, III and IV

Ans. (3)

Sol. Option 3 is the correct chronological order

62. Which of the following statements about Liberals in 19th century Europe are correct?

I. They favoured the Catholic Church.

II. They opposed dynastic rule with unlimited power.

III. They were democrats.

IV. They did not want any voting rights for women.

(1) I, II and III (2) I, II and IV (3) II and IV (4) III and IV

Ans. (3)

Sol. The liberals were not democrats and they favoured all religions

63. Which of the following statements are correct?

I. In the beginning Bombay was under the Portuguese control.

II. Control of Bombay passed onto the French in the 17th century.

III. The Marathas replaced the French in Bombay.

IV. Bombay became the capital of the Presidency in early 19th century.

(1) I, II and IV (2) I and IV (3) I, II and III (4) II, III and IV

Ans. (2)

Sol. The control of Bombay was not passed into the hands of French in 17th century rather was given to the British

64. Which of the following statements are correct?

I. The Chinese introduced printing.

II. The Buddhist missionaries introduced printing in Japan.

III. The Chinese developed printing to facilitate their expanding trade.

IV. Printing reached Europe through Italy.

(1) I, II and III (2) I, II and IV (3) II, III and IV (4) I and IV

Ans. (2)

Sol. Option 3 is wrong because Chinese did not developed print to facilitate their trade

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Direction (Questions 65 – 72)

Read the statements are select the correct answer from the options given below.

1. Statement I is true, Statement II is false.
2. Statement I is false, Statement II is true.
3. Both Statements are true, and Statement II provides explanation to Statement I.
4. Both Statements are true, but Statement II does not provide explanation of Statement I.

65. **Statement I** : During the years of the Great Depression the economic crisis was worse in Germany.
Statement II : The President of the Weimar Republic had the power to impose emergency.
Ans. **(4)**
Sol. Statement II is the political reason , not realated to economic crisis

66. **Statement I** : The Forest Act of 1878 categorized some forests as 'reserved forests'.
Statement II : They were considered the best forests for people's use.
Ans. **(1)**
Sol. Best forest for people's use was Village forest

67. **Statement I** : Shifting cultivation was widely prevalent in different parts of India in the 19^{th} century.
Statement II : More and more people took to shifting cultivation when forest laws were enacted.
Ans. **(1)**
Sol. Shifting cultuivation was banned after forest laws were enacted

68. **Statement I** : Cricket emerged as a colonial game.
Statement II : Cricket was started in England.
Ans. **(3)**
Sol. Cricket came to India from England as India was a colony

69. **Statement I :** Mahatma Gandhi wished everyone had clothes to wear.
Statement II : He wanted everyone to wear the single loin cloth as he did.
Ans. **(1)**
Sol. Mahatma Gandhi wanted everyone to have clothes but not single lion cloth as he did

70. **Statement I :** The Spanish conquest of America was not a conventional military conquest.
Statement II : One of the most powerful weapon was the spread of smallpox.
Ans. **(3)**
Sol. Spanish conquest on America was through disease Smallpox

71. **Statement I :** The silk routes led to trade and cultural links between distant parts of the world.
Statement II : Early Christian missionaries travelled to Asia through this route.
Ans. **(3)**
Sol. Christian Missionaries travelled to Asia through Silk Route and led to trade and cultural link with distant parts of the world

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72. **Statement I :** The French used forced labour in Indo-China for building canals.
Statement II : Vietnam became a major exporter of rice in the world.

Ans. **(4)**

Sol. Becoming major exporter of rice had various reasons

73. Match List I (Layers of Atmosphere and List II (Characteristics) and select the correct answer using the code given below.

	List I (Layer of Atmosphere)		**List II (Characteristics)**
(A)	Ionosphere	(I)	Contains Ozone
(B)	Stratosphere	(II)	Reflects radio Waves
(C)	Exosphere	(III)	Fall in Temperature
(D)	Troposphere	(IV)	Extremely low air density

(1) A–II, B–III, C–IV, D–I (2) A–II, B–I, C–IV, D–III
(3) A–II, B–III, C–I, D–IV (4) A–III, B–I, C–IV, D–II

Ans. **(2)**

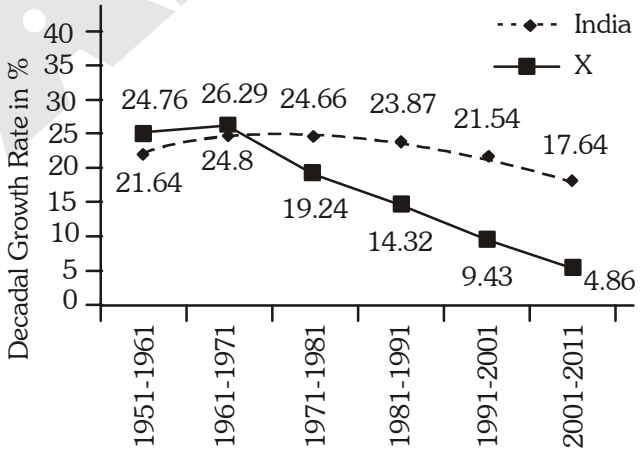
Sol. Given option only matches correctly

74. Which of the following statements are correct?
I. Rann of Kachchh is formed by the recession of the sea.
II. Kuchaman, Sambhar and Didwana are salt water lakes.
III. The land to the east of Aravallis is known as Bagar.
IV. the fertile flood plains formed by small streams in Rajasthan are known as Rohi.
(1) I, II and IV (2) I, III and IV (3) II, III and IV (4) I, II, III and IV

Ans. **(1)**

Sol. Bagar lies to the West of Aravallis

75. Observe the graph given below :



Identify the state with population growth rate marked by **'X'** in the given graph.
(1) Goa (2) Kerala (3) Sikkim (4) Nagaland

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Ans. (2)

Sol. The decadal rate of growth of population in Kerala 2001-11 has been 4.91 % approx

76. River Alaknanda forms confluences (Prayags) in Uttrakhand. Match the codes given in Figure with Table (Prayags) and select the correct answer using the code given below.

Figure

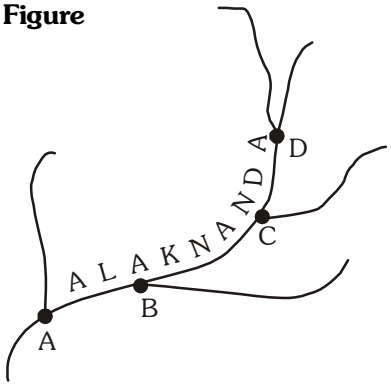

Table (Prayags)

(I) Karn Prayag

(II) Rudra Prayag

(III) Nand Prayag

(IV) Vishnu Prayag

(1) A–II, B–I, C–, D–IV (2) A–II, B–III, C–I, D–IV

(3) A–III, B–II, C–I, D–IV (4) A–III, B–I, C–II, D–IV

Ans. (1)

Sol. The given option is the only correct sequence among all the options

77. Match List I (Original Rock) with List II (Metamorphic Rock) and select the correct answer using the code given below :

	List I (Original Rock)		**List II (Metamorphic Rock)**
(A)	Granite	(I)	Diamond
(B)	Coal	(II)	Marble
(C)	Limestone	(III)	Slate
(D)	Shale	(IV)	Gneiss

(1) A–III, B–IV, C–II, D–I (2) A–III, B–II, C–IV, D–I

(3) A–IV, B–II, C–I, D–III (4) A–IV, B–I, C–II, D–III

Ans. (4)

Sol. Given option only matches correctly

78. Observe the given map.

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Which one of the following statement is NOT true about the shaded state indicated on the map?
(1) Society predominantly follows right of female ultimogeniture
(2) The state is an example of areas with karst topography
(3) the state is a major producer of potatoes in India
(4) Some parts of the state receive extremely high rainfall

Ans. (3)

Sol. UP is the largest producer of Potatoes in India

79. Match List I (Mineral Oil Refineries) with List II (States) and select the correct anwer using the code given below :

	List I (Mineral Oil Refineries)		**List II (States)**
(A)	Numaligarh	(I)	Punjab
(B)	Bathinda	(II)	Andhra Pradesh
(C)	Tatipaka	(III)	Madhya Pradesh
(D)	Bina	(IV)	Assam

(1) A–IV, B–II, C–III, D–I (2) A–IV, B–I, C–II, D–III
(3) A–II, B–I, C–IV, D–III (4) A–IV, B–III, C–II, D–I

Ans. (2)

Sol. given option only matches correctly

80. 'Slash and Burn Agriculture' is known by specific name in different states of India. Match the shaded states marked in the given map with codes given in the table (Different names of Slash an Burn Agriculture) and select the correct answer using the code given below.

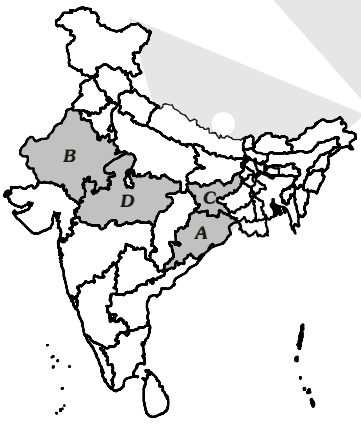

Table (Different Names of Slash and Burn Agriculture)

(I) Bringa
(II) Waltre
(III) Dahiya
(IV) Kuruwa

(1) A–III, B–IV, C–II, D–I (2) A–III, B–II, C–IV, D–I
(3) A–I, B–IV, C–II, D–III (4) A–I, B–II, C–IV, D–III

Ans. (4)

Sol. Given option only matches correctly

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81. Match List I (Industries) with List II (Important Centers) and select the correct answer using the code given below :

	List I (Industries)		**List II (Important Centers)**
(A)	Cotton textile	(I)	Ludhiana
(B)	Hosiery	(II)	Rishra
(C)	Jute	(III)	Coimbatore
(D)	Silk textile	(IV)	Mysuru

(1) A–I, B–III, C–IV, D–II (2) A–IV, B–I, C–II, D–III

(2) A–III, B–II, C–I, D–IV (4) A–III, B–I, C–II, D–IV

Ans. (4)

Sol. given option only matches correctly

82. Which one of the following island is closest to the equator?

(1) Minicoy (2) Car Nicobar (3) Little Nicobar (4) Great Nicobar

Ans. (4)

Sol. Great Nicobar lies closest to the equator

83. Which of the following characteristics are true about plantation agriculture?

I. Generally plantation agriculture is considered as an example of subsistence farming.

II. Generally single crop is grown on a large area in plantation agriculture.

III. It has an interface of agriculture and industry.

IV. It uses capital intensive inputs.

(1) I and IV (2) III and IV (3) I, II and III (4) II, III and IV

Ans. (4)

Sol. Plantation is not an example of subsistence farming but an example of commercial farming

84. Match List I (Vegetation zones) with List II (Mean Annual Temperature Range) and select the correct anwer using the code given below :

	List I (Vegetation Zones)		**List II (Mean Annual Temperature Range)**
(A)	Alpine	(I)	Above 24°C
(B)	Temperate	(II)	17° to 24°C
(C)	Tropical	(III)	Below 7°C
(D)	Sub-tropical	(IV)	7°C to 17°C

(1) A–III, B–I, C–II, D–IV (2) A–III, B–I, C–IV, D–II

(3) A–III, B–IV, C–I, D–II (4) A–I, B–II, C–III, D–IV

Ans. (3)

Sol. given option only matches correctly

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85. 'In a democracy, the will of the people is supreme.' Which of the following statement concerning democracy in India best reflects this?
(1) The President appoints the Prime Minister who is the leader of the political party possessing a majority in the Lok Sabha.
(2) An assembly of elected representatives excercises political authority on behalf of the people.
(3) In case of a difference between the two Houses of Parliament, the final decision is taken in a joint session of the two Houses.
(4) The permanent executive has more powers than the political executive.

Ans. (2)

Sol. Out of the given options only option 2 relates to ' In a ademocracy the will of people is supreme'

86. Which of the following statements about the Panchayati Raj Institutions after the Constitutional Amendment in 1992 are false?
I. Seats are reserved for the Scheduled Castes, Scheduled Tribes, and Other Backward Classes in the elected bodies of the Panchayati Raj Institutions.
II. Elections to the Panchayati Raj Institutions are supervised by the Election Commission of India.
III. Elections to the Panchayati Raj Institutions are held regularly after every five years.
IV. Half of the seats in all the States are reserved for women.
(1) I and III (2) I and II (3) III and IV (4) II and IV

Ans. (4)

Sol. Supervision is done by State Election Commission and Women reservation is one third

87. Match List I (Political Systems) with List II (Nations) and select the correct anwer using the code given below :

	List I (Political Systems)		**List II (Nations)**
(A)	Federal, Presidential, Republic	(I)	India
(B)	Federal, Parliamentary, Republic	(II)	United Kingdom
(C)	Unitary, Parliamentary, Monarchy	(III)	Germany
(D)	Presidential cum Parliamentary, Republic	(IV)	United States of America
		(V)	France

(1) A–IV, B–I, C–II, D–V (2) A–IV, B–I, C–II, D–III (3) A–V, B–IV, C–II, D–III (4) A–V, B–II, C–III, D–IV

Ans. (1)

Sol. given option only matches correctly

88. Which of the following statements about the federal system in India are true?
I. The Constitution of India provides for a three-fold distribution of legislative powers between the Union and the State Government.
II. Both the Union and the State Governments can legislate on residuary subjects.
III. The Parliament cannot on its own change the power-sharing arrangement between the Union and the State Governments.
IV. the High Courts have no role in resolving disputes about the division of powers between the Union and the State Governments.
(1) I and III (2) II, III and IV (3) I, III and Iv (4) I, II and IV

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Ans. (3)

Sol. State govt. has no power on residuary subjects

89. Which of the following group of States/Union Territories have only one Lok Sabha constituency?
(1) Arunachal Pradesh, Sikkim, Lakshadweep
(2) Goa, Meghalaya, Andaman and Nicobar Islands
(3) Chandigarh, Sikkim, Mizoram
(4) Manipur, Dadra and Nagar Haveli, Puducherry

Ans. (3)

Sol. Chandigarh, Sikkim , Mizoram have one Lok Sabha Constituency

90. Which of the following statements best reflects the 'socialist' feature of the Preamble to the Constitution of India?
(1) There are no unreasonable restrictions on how the citizens express their thoughts
(2) The traditional social inequalities have to be abolished
(3) Government should regulate the ownership of land and industry to reduce socio-economic inequalities
(4) No one should treat a fellow citizen as inferior

Ans. (3)

Sol. Options 3 reflects Socialist feature

91. Which of the following statements about the Indian judiciary is true?
(1) India has an integrated judiciary
(2) The Judiciary in India is subordinate to the Executive
(3) The Supreme Court is more powerful than Parliament
(4) The Chief Justice of India appointed by the Prime Minister

Ans. (1)

Sol. India has an integrated judiciary is true

92. Which of the following Fundamental Rights includes the Right to Education?
(1) Right to Equality (2) Right to Freedom
(3) Cultural and Educational Rights (4) Right to Constitutional Remedies

Ans. (2)

Sol. Right to education is a part of Right ot Freedom (Article 21A)

93. Which of the following is NOT an indicator of economic development?
(1) Increased per capita income (2) Decreased infant mortality
(3) Increased life expectancy at birth (4) Decreased women participation in job market

Ans. (4)

Sol. Women Participation in job market is not a criteria to indicate economic development

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94. The poverty line in Dinanagar is set at Rs. 100 per capita per day. Five Hundred people live in Dinanagar of whom 50 earn Rs. 30 per capita per day and another 25 earn Rs. 80 per capita per day each. Everybody else earn more than Rs. 100 per day per capita. What is the minimum amount that the government of Dinanagar will have to spend to completely eradicate poverty?

(1) Rs. 3000 (2) Rs. 3500 (3) Rs. 4000 (4) Rs. 4500

Ans. (3)

Sol. 50 people are earning 30 rs. In which govt. has to add 70 rs to reach the set per capita target of 100 rs , whereas 25 people need 20 rs more to reach the target , hence the total money to be spent by State govt. will be 4000 rs

95. The local telephone company sells me a landline connection only if I purchase a handset from them as well. Which of the following rights does this practice violate under the Consumer Protection Act 1986?

(1) Right to represent (2) Right to information (3) Right to choose (4) Right to seek redressal

Ans. (3)

Sol. Compulsion denies right to choose

96. Match List-I (Type of Unemployment) with List-II (Characteristics) and select the correct answer using the codes given below

List-I (Type of Unemployment		***List-II (Characteristics)***	
A	Seasonal	I	Occurs during boom or recession in the economy
B	Frictional	II	An absence of demand for a certain type of workers
C	Disguised	III	Occurs when moving from one job to another
D	Structural	IV	Actual contribution by the additional labour is nil
E	Cyclical	V	Job opportunities during certain months in the year

(1) A-V, B-III, C-IV, D-II, E-I (2) A-IV, B-V, C-III, D-I, E-II

(3) A-I, B-II, C-III, D-IV, E-V (4) A-V, B-IV, C-III, D-II, E-I

Ans. (1)

Sol. given option only matches correctly

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97. Suppose Indian Farmers sell wheat at Rs. 50 per kg and the international price of wheat is Rs.40 per kg. What is the minimum rate of import duty Government of India must impose on imported wheat so that it does not adversely affect Indian farmers in the domestic market?
(1) 10% (2) 20% (3) 25% (4) 30%

Ans. (3)

Sol. Rs 10 per kg is to be increased so as to compete with international market . Rs 10 as per percentage leads 25%

98. The wage rate of a worker in a country is Rs. 300 per day. Which of these person(s) would you consider unemployed?
(1) Ramu is willing to work at Rs. 300 a day, but cannot find work.
(2) Suresh is willing to work only at Rs. 400 a day or more, and cannot find work.
(3) Shanti stays at home because she has young children to look after.
(1) Ramu (2) Suresh (3) Ramu and Suresh (4) Ramu and Shanti

Ans. (1)

Sol. Ramu is unemployed in this case as he is not getting work at the going wages

99. Which of the following can be used as collateral in Indian banks to borrow money?
(1) Bank Passbook (2) Credit Card (3) Own House (4) Passport

Ans. (3)

Sol. Own house mortgage is used as collateral in India

100. The total agricultural land in a village is 1200 hectares. This is distributed among 320 families who form four groups in the following pattern. It is assumed that the land is distributed equally within each group. Identify the group of small farmers.

Group	***Number of Families***	***Total amount of land owned and operated by each group (in hectares)***
A	100	300
B	180	300
C	30	300
D	10	300

(1) A (2) B (3) C (4) D

Ans. (2)

Sol. B is the group of small farmers as (300/180) would be min land available to each