



Rao IIT Academy

Symbol of Excellence and Perfection

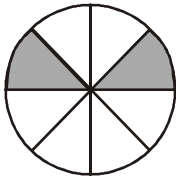
JEE | MEDICAL-UG | BOARDS | KVPY | NTSE | OLYMPIADS | MHT-CET

SOF - NSO - STAGE-1_10TH STD

ANSWER SHEET

- | | | | |
|---------|---------|-------------|---------|
| 1. (C) | 2. (C) | 3. (D) | 4. (B) |
| 5. (D) | 6. (D) | 7. (A) | 8. (D) |
| 9. (C) | 10. (C) | 11. (A,C,D) | 12. (D) |
| 13. (C) | 14. (D) | 15. (C) | 16. (B) |
| 17. (A) | 18. (D) | 19. (B) | 20. (B) |
| 21. (*) | 22. (B) | 23. (C) | 24. (C) |
| 25. (D) | 26. (B) | 27. (B) | 28. (A) |
| 29. (C) | 30. (A) | 31. (D) | 32. (C) |
| 33. (D) | 34. (C) | 35. (C) | 36. (A) |
| 37. (B) | 38. (D) | 39. (A) | 40. (D) |
| 41. (B) | 42. (C) | 43. (C) | 44. (D) |
| 45. (A) | 46. (A) | 47. (B) | 48. (A) |
| 49. (D) | 50. (B) | | |

1. (C)
In the given figure,



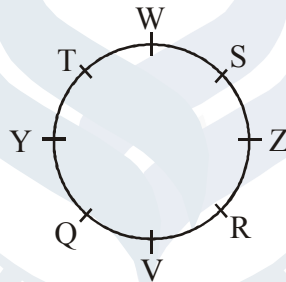
figured numbered 5 is incorrect

Explanation: The dark shaded and light shaded portions are rotating clockwise continuously.

2. (C)
 $\sqrt{20} + 25 \times 5 - 3 = ?$
 Acc to the question:
 $(20)^2 / 25 + 5 \times 3$
 $= 400 / 25 + 5 \times 3$
 $= 16 + 5 \times 3 = 16 + 15$
 $= 31$

3. (D)

Male	Female
V	Y (Hus-wife)
Z	W (Hus-wife)
T	S, Q, R



4. (B)
-

$$AC = 2AB$$

5. (D)



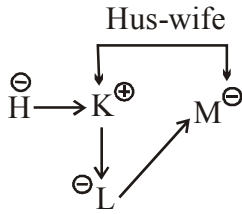
6. (D)

\overline{ESE}

949232595858543181747652126132462

Three.

7. (A)



$H \$ @ K L \neq M ?$
 H is sister of K
 K is father of L
 L is daughter of M

8. (D)

A is on opposite face of $\boxed{+}$

9. (C)

H Q A R D I N G S

2nd letter = O

7th letter = N

8th letter = G

9th letter = S

Words possible: SNOG, SONG

10. (C)

Scooter = 3, 6, 8, 9, 10

Bike = 3, 5, 7, 9

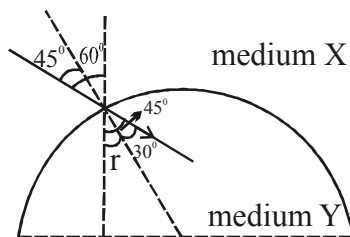
Car = 2, 3, 4, 6, 9, 10

Washing machine = 1, 2, 3, 6, 7

Now, the houses have scooter and car only.

= 10

11. (ACD)



$$\sin 45 = n \sin r$$

$$\sin 45 = n \sin 15$$

$$n = \frac{\sin 45}{\sin 30} = \frac{1 \times 2}{\sqrt{2} \times 1} = \sqrt{2}$$

Frequency is same irrespective of media optical density of medium y is $\sqrt{2}$ w.r.t to medium 'X', that means light travels from optically rarer medium 'X' to optically denser medium 'Y'

12.

(D)

Initial length = l

final length = l'

Initial area = A

Final area = A'

\therefore Resistivity is same

$$\frac{RA}{l} = \frac{R'A'}{l'} \Rightarrow \frac{R}{l} = \left(\frac{R'}{l'}\right)\left(\frac{A'}{A}\right) \quad \dots (1)$$

Initial volume = final volume

$$A'l' = Al$$

$$\Rightarrow \frac{A'}{A} = \frac{l}{l'} \quad \text{putting in (1)}$$

$$\frac{R}{l} = \frac{R'}{l'} \times \frac{l}{l'} \Rightarrow R' = \left(\frac{l'}{l}\right)^2$$

Given that, $\frac{l'}{l} = \frac{2}{5}$

$$\therefore R' = R \left(\frac{2}{5}\right)^2$$

13.

(C)

$$a_1 = \frac{F_1}{m} \quad \dots (1)$$

$$a_2 = \frac{F_2}{2m} \quad \dots (2)$$

$$v_1^2 = 2a_1s_1$$

$$v^2 = 2a_1s_1$$

$$\Rightarrow s_1 = \frac{v^2 m}{2F_1} \quad \text{using equation (1)}$$

$$v_2^2 = 2a_2s_2$$

$$\Rightarrow s_2 = \frac{(2v)^2 \times 2m}{2F_2} = \frac{8v^2 m}{2F_2} \quad \text{using equation (2)}$$

$$= \frac{s_1}{s_2} = \frac{mv^2}{2F_2} \times \frac{2F_2}{8mv^2} = \frac{1}{8}$$

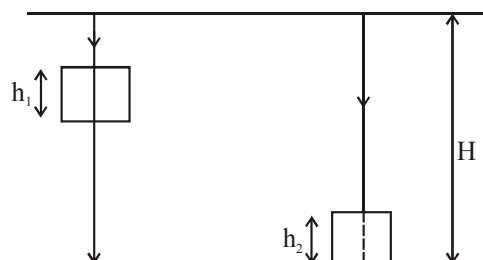
14.

(D)

Given $a^n w = \frac{4}{2}, a^n g = \frac{3}{2} \therefore w^n g = \frac{9}{8}$

$$v = \frac{c}{w^n g} \quad h_1 = vt_1$$

$$t_1 = \frac{h_1(w^n g)}{c}$$



$$t_{out1} = \frac{(H - h_1)}{c}$$

$$t_{1\ total} = t_1 + t_{out1} = \frac{h_1 w^n g}{c} + \frac{(H - h_1)}{c} = \frac{9h_1}{8c} + \frac{(H - h_1)}{c}$$

$$t_2 = \frac{h_2}{v} = \frac{h_2(w^n g)}{c} \quad \& \quad t_{out2} = \frac{(H - h_2)}{c}$$

$$\therefore t_{2\ total} = t_{total2} + t_2 = \frac{h_2(w^n g)}{c} + \frac{(H - h_2)}{c} = \frac{9h_2}{8c} + \frac{(H - h_2)}{c}$$

$$\therefore \Delta t_1 = t_{1\ total} - t_{2\ total}$$

$$\Delta t = \frac{9h_1}{8c} + \frac{(H - h_1)}{c} - \frac{9h_2}{8c} - \frac{(H - h_2)}{c}$$

$$\Delta t = \frac{h_1 - h_2}{8c}$$

15. (C)

Force on a current carrying conductor is given by $\vec{F} = I\vec{L} \times \vec{B}$

direction of \vec{L} on 'AB' is $(-\vec{Z})$

direction of \vec{B} is \hat{x}

$$\therefore \text{direction of force of } AB : F_{AB} = -\hat{Z} \times \hat{x} \\ = -\hat{y}$$

'AB' will move downwards

Now, direction of \vec{L} on $CD = \hat{Z}$

direction of \vec{B} is $= \hat{x}$

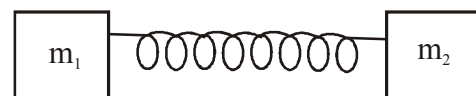
$$\therefore \text{direction of force on } CD : F_{CD} = -\hat{Z} \times \hat{x} \\ = -\hat{y}$$

'CD' will move upwards.

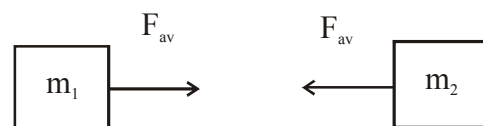
16. (B)

For the operation of the ocean thermal energy conversion plants, the temperature difference between the water at the surface and water at depth upto 2km should be 293K or more.

17. (A)



let, F_{av} be the average force and 't' be the time for which they act.



$$\text{then, } a_1 = \frac{F_{av}}{m_1}; \quad a_2 = \frac{F_{av}}{m_2}$$

$$\therefore v_1 = a_1 t \quad ; \quad v_2 = \frac{-F_{av} t}{m_2}$$

$$v_1 = \frac{F_{av} t}{m_1}$$

(‘.’ indicates opposite direction of a_2 to that of a_1)

18. (D)

Due to p, q, r, s, there would be only lateral displacement, but due to T, there would be same deviation that a single prism P would produce, so same deviation.

19. (B)

$$V = \frac{M}{\rho} = \frac{120}{800} \text{ m}^3$$

$$\text{mass of same volume of water} = \frac{120}{800} \times 1000 = 150 \text{ kg}$$

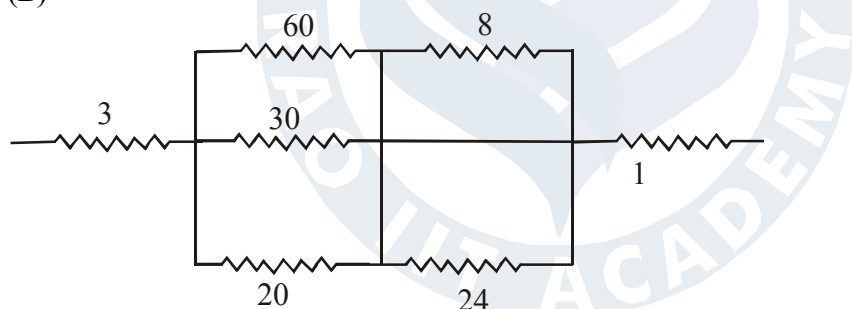
$$\begin{aligned} \text{extra mass that should be put} &= \text{mass of water} - \text{mass of wood} \\ &= 150 - 120 = 30 \text{ kg} \end{aligned}$$

20. (B)

Both statements are correct, but statement - 2 is not its correct explanation.

21. (*)

22. (B)



$$\frac{1}{R_1} = \frac{1}{60} + \frac{1}{30} + \frac{1}{20} = \frac{1+2+3}{60} = \frac{6}{60} = \frac{1}{10} \Rightarrow R = 10$$

$$\text{Total resistance} = 3 + 10 + 1 = 14 \Omega$$

23. (C)

CuSO_4 is a salt of weak base and strong acid. So, it will form an acidic solution.

24. (C)

Melting point of x is -40 which is very less than 0 but boiling point is 60 which means x is in liquid phase but for z both melting point and boiling point are less than zero so it is in gaseous phase.

25. (D)

Colour of green vitriol changes from green to brown in experiment 1.

26. (B)

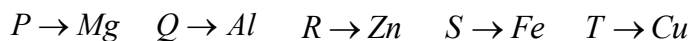
$$P \Rightarrow \text{no. of protons} = 11$$

$$\text{for neutral atom} = \text{no. of protons} = \text{no. of electrons} = 11$$

But given P has 10 electrons

\therefore it is cation

27. (B)



More reactive elements can only replace hydrogen from HCl according to reactivity series, the following trend is shown.

Mg, Al, Zn, Fe, Cu .

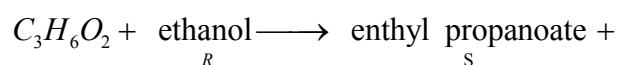
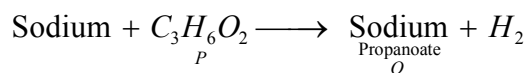
28. (A)

Boot polish exist in solid and liquid form

Smoke exist in solid and gas form

Mist exist in liquid and gas form.

29. (C)



30. (A)

$$0.5 \text{ mol of } MgSO_4 = \frac{\text{mass}}{(\text{m. wt})} \text{ of } MgSO_4$$

$$0.5 \text{ mol} = \frac{\text{mass}}{120 \text{ g}} \Rightarrow 120 \times 0.5 = \text{mass}$$

($MgSO_4$)

$$\boxed{60 \text{ g of } MgSO_4}$$

$$\text{Mass of Mg in 60 g of } MgSO_4 \Rightarrow \frac{24}{120} \times 60 = 12 \text{ g of Mg}$$

$$24 \text{ g of Mg} = 6.023 \times 10^{23} \text{ atoms.}$$

$$12 \text{ g of Mg} = \frac{6.023 \times 10^{23}}{24} \times 12 \text{ g}$$

$$= \boxed{3.01 \times 10^{23} \text{ atoms of Mg}}$$

$$\text{Similarly for sulphur} \Rightarrow 60 \text{ g of } MgSO_4 = \frac{32}{120} \times 60 = 16 \text{ g of S}$$

$$32 \text{ g of S} = \frac{6.023 \times 10^{23}}{32} \times 16$$

$$= 3.011 \times 10^{23} \text{ atoms of Sulphur.}$$

$$\text{for oxygen} \Rightarrow 60 \text{ g of } MgSO_4 = \frac{64}{120} \times 60 = 32 \text{ g of oxygen.}$$

$$16 \text{ g of oxygen} = 6.023 \times 10^{23} \text{ atoms}$$

$$32 \text{ g of oxygen} = \frac{6.023 \times 10^{23}}{16} \times 32$$

$$= \boxed{12.04 \times 10^{23} \text{ atoms of oxygen}}$$

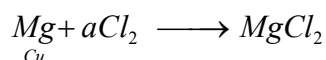
31. (D)
Y, Z, X
Metals form basic oxide and they are mainly present in 1st and 2nd period.
Non metals form acidic oxide and they are mainly present in later groups.
Amphoteric elements come in between both metals and non metals.
32. (C)
Four dyes were used to make these five inks different dyes have different adsorption capability. At four different point, different inks can be seen from baseline. Least adsorbed ink is desorbed first followed by others. Most adsorbed is seen at the end.
33. (D)
Reaction required activation. So, the rise in temperature is required. Neutralization is an exothermic process so, the temperature decreases.
34. (C)
Lead is above copper and copper is above silver in reactivity. Therefore lead can displace copper and silver can not displace copper from its copper nitrate solution.
35. (C)
Contraceptive pills methods is reversible as stopping the pills can help in conceiving. Tubal ligation is also reversible but reversibility is poor.
36. (A)
i, ii, iii and v only
iv statement is not true as more than one species can occupy ecological niche but no two species can have all the ecological niche (temporal, spatial, multidimensional) same.
37. (B)
Both P (petiole) and Q (stipule) are axillary growth they are analogous organ their structure and origin is same.
38. (D)
Low of competitive exclusion for x cannot be overlooked also it can be predated by y.
39. (A)
Oxytocin is only hormone released option as rest like insulin, adrenalin and Glucagon are not released by pituitary
40. (D)
E is sensory neuron, G is motor neuron and F is relay neuron.
41. (B)
P = voluntary muscles attached to the limbs and wall of heart
Q = are smooth muscles which may be branched or unbranched
R = cardiac muscle and smooth muscles do not undergo fatigue.
42. (C) if males are long haired they are heterozygous and females are short haired so they are homozygous. hence the progeny born to them will be 50% long haired and 50% short haired.
43. (C)
V = cryptogams W = gymnosperms X = monocot Y = non leguminous Z = leguminous

44. (D)
experiment depict exosmosis in the solution Y and endosmosis in the solution Z

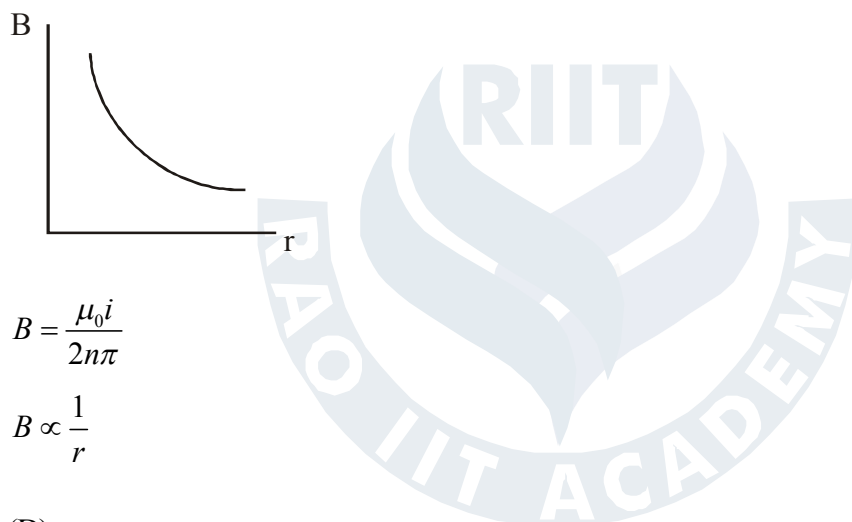
45. (A)
Gonorrhoea is communicable and sexually transmitted disease, measles is communicable and can be fomite transmitted malaria is vector borne, cholera is transmitted by contaminated food and water. cancer is uncontrolled growth and hay fever is allergic.

46. (A)
Ionic bond will be formed between T and R because T is group - I element and R is halogen.

47. (B)



48. (A)



$$B = \frac{\mu_0 i}{2n\pi r}$$

$$B \propto \frac{1}{r}$$

49. (D)
X is seminal vesicles whose fluid nourishes the sperms and give the mobility.

50. (B)
schematic representation of clotting mechanism is given where injured tissue releases thromboplastin which activates protrombokinase in presence of Calcium ion and proteiuns. prothrombase converts protrombin to thrombin which eventually forms clots.