



# Rao IIT Academy

**Symbol of Excellence and Perfection**

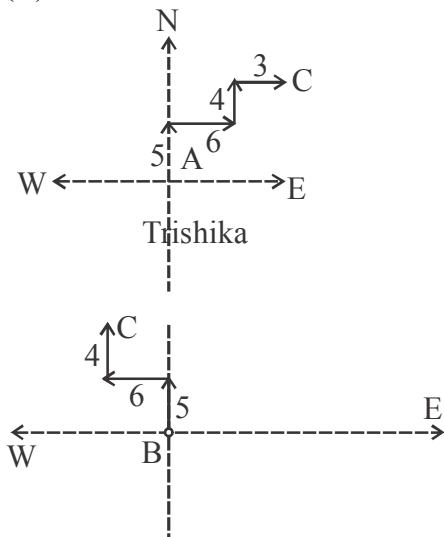
JEE | MEDICAL-UG | BOARDS | KVPY | NTSE | OLYMPIADS | MHT-CET

## SOF - NSO - STAGE-1\_9<sup>TH</sup> STD

### ANSWER SHEET

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

1. (A)

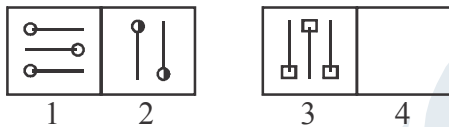


For 'C' point to be coincide 'B' must be in East from point A.

2. (D)

Count the number of triangles it will be greater than 40.

3. (D)

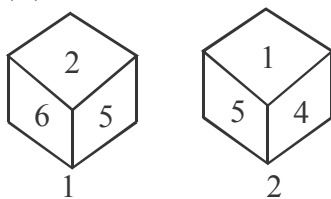


In figure 1 there are three horizontal line without bold colour circle while in figure 2 the number of lines is decreasing by 1 and orientation is just opposite and all the end circle is half bold. Similarly in figure 3 number of lines is 3 which is vertical, therefore in figure Y there will be two lines which will be horizontal and at the end rectangle will be half bold.

4. (D)

$L \rightarrow 8$        $H \rightarrow 7$   
 $A \rightarrow \&$        $I \rightarrow *$   
 $T \rightarrow 4$        $R \rightarrow 3$   
 $E \rightarrow \$$        $E \rightarrow \$$   
 then HAIL  $\rightarrow 7 \& *8$

5. (C)

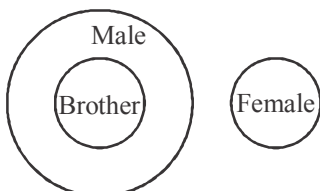


Flip the 2<sup>nd</sup> figure then position will be correct opposite to number 1 it will be 2. Opposite to 4 number 6 will be there.

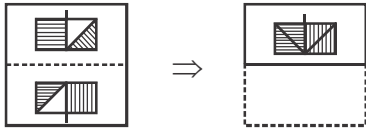
$\therefore$  Opposite to 3 number 5 will be there.

6. (C)

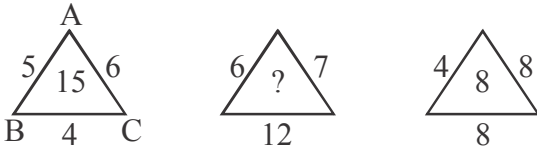
All brothers are male but male and female are different.



7. (A)



8. (C)



Logic : multiply AB and AC and then divide half of BC.

$$\text{Required answer} = \frac{6 \times 7}{6} = 7$$

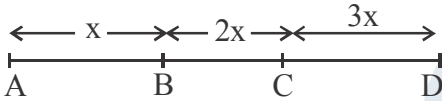
9. (A)

Follow the steps. If step 2 will be the given one then step 3 will be last one.

10. (A)

Only lateral inversion of the letters and the words will take place.

11. (D)



acceleration from  $A \rightarrow B$ ,  $\alpha$

$$v^2 = 2\alpha x$$

$$v = \sqrt{2\alpha x}$$

from  $C \rightarrow D$ , acceleration  $\beta \Rightarrow$

$$v = \sqrt{2\beta(3x)}$$

$$\text{So, } \alpha = 3\beta$$

$$\text{Average speed } t_2 = \frac{2x}{V} = \frac{2x}{\sqrt{2\alpha x}}$$

$$= \frac{s_1 + s_2 + s_3}{t_1 + t_2 + t_3}$$

$$= \frac{x + 2x + 3x}{t_1 + t_2 + t_3}$$

$$t_1 = \sqrt{\frac{2x}{\alpha}}$$

$$t_2 = \frac{2x}{v} = \frac{2x}{\sqrt{2\alpha x}}$$

$$t_3 = \sqrt{\frac{2(3x)}{\beta}} = \sqrt{\frac{18x}{\alpha}}$$

$$\langle \delta \rangle = \frac{6x}{\sqrt{\frac{2x}{\alpha}} + \sqrt{\frac{2x}{\alpha}} + \sqrt{\frac{18x}{\alpha}}} = \frac{6x\sqrt{\alpha}}{2\sqrt{2x} + \sqrt{18x}}$$

$$= \frac{6x\sqrt{\alpha}}{5\sqrt{2x}}$$

Max. vel,  $V_B = \sqrt{2\alpha x}$

$$\frac{\langle V \rangle}{V_{\max}} = \frac{6x\sqrt{\alpha}}{5\sqrt{2x}\sqrt{2\alpha x}}$$

$$= \frac{6}{5} \times 2$$

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

12. (B)

$w = mg$

$w_1 > w_2 > w_3$

in air weight will be maximum because upthrust by air will be least in water upthrust will be more than air in saline water upthrust will be maximum.

13. (B)

Both statement 1 and 2 are true but statement two is not correct explanation spaceship likely to catch fire because of friction.

14. (A)

$v_A = 50 \text{ ms}^{-1}$

A  $\rightarrow$

B  $\rightarrow$

$v_B = 0$

$a_B = 10 \text{ ms}^{-2}$

$S_A = vt = 50t$

$S_B = \frac{1}{2}at^2 = \frac{1}{2}(10)t^2 = 5t^2$

$S_{A-B} = 50t - 5t^2$

$125 = 50t - 5t^2$

$t^2 - 10t + 25 = 0$

$t = \frac{10 \pm \sqrt{100 - 4(25)}}{2}$

$= 5$

$S_{B-a} = 5t^2 - 50t$

$125 = 5t^2 - 50t$

$5t^2 - 50t - 125 = 0$

$t^2 - 10t - 25 = 0$

$t = \frac{10 \pm \sqrt{100 + 100}}{2}$

$= 5 \pm 5\sqrt{2}$

$= 5(1 \pm \sqrt{2})$

So,  $t = 5 \text{ s}$  and  $5(1 + \sqrt{2}) \text{ s}$

15. (A)

Audible range for normal human is 20 Hz – 20 KHz

16. (B)

$$v^2 = u^2 - 2gh$$

$$\frac{PE}{KE} = \frac{2}{3}$$

$$\frac{mgh}{\frac{1}{2}m(u^2 - 2gh)} = \frac{2}{3}$$

$$\frac{2gh}{u^2 - 2gh} = \frac{2}{3}$$

$$u^2 - 2gh = 3gh$$

$$u^2 = 5gh$$

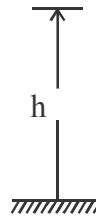
$$\frac{mgh_1}{\frac{1}{2}m(u^2 - 2gh_1)} = \frac{3}{2}$$

$$\frac{2gh_1}{(5gh - 2gh_1)} = \frac{3}{2}$$

$$4gh_1 = 15gh - 6gh_1$$

$$10gh_1 = 15gh$$

$$h_1 = \frac{15}{10}h = \frac{3}{2}h$$



17. (C)

Time for one echo

$$t = \frac{12}{50}$$

distance travelled in are echo =  $40 \times 2$

$$v = \frac{\text{distance}}{\text{time}}$$

$$= \frac{40 \times 2}{12 / 50}$$

$$v = \frac{40 \times 2 \times 50}{12}$$

18. (B)

As water will enter in vessel P then  $W_P < W_Q$ .

19. (B)



$$g_1 = \frac{GM_1}{R_1^2}$$

$$g_2 = \frac{GM_2}{R_2^2}$$

$$\begin{aligned}\frac{g_1}{g_2} &= \frac{GM_1 R_2^2}{R_1^2 G M_2^2} \\ &= \frac{v_1 \rho_1 R_2^2}{v_2 \rho_2 R_1^2} \\ &= \frac{\frac{4}{3} \pi R_1^3 \rho_1 R_2^2}{\frac{4}{3} \pi R_2^3 \rho_2 R_1^2}\end{aligned}$$

$$\frac{1}{9} = \frac{R_1 \rho_1}{R_2 \rho_2} \quad \left\{ \frac{\rho_1}{\rho_2} = 3 \right\}$$

$$\frac{1}{9} = 3 \left( \frac{R_1}{R_2} \right)$$

$$\frac{1}{27} = \frac{R_1}{R_2}$$

$$\frac{R_2}{27} = R_1$$

20.

(B)

Velocity attained is 5 m of  $d$  to  $p$

$$\begin{aligned}&= \sqrt{2gH} \\ &= 10 \text{ ms}^{-1}\end{aligned}$$

On getting struck from the bat, ball reached height of 20 m, so velocity with which it left the bat.

$$\begin{aligned}&= \sqrt{2g \cdot 20} \\ &= 20 \text{ ms}^{-1}\end{aligned}$$

$$\text{Change in momentum} = m_1 \vec{u}_1 - m_1 \vec{v}_1$$

$$\begin{aligned}&= \left( \frac{400}{1000} \right) \text{kg} (10 - (-20)) \\ &= (.4)(30) \\ &= 12 \text{ kg ms}^{-1}\end{aligned}$$

$$\text{Average force} = \frac{\text{change in momentum}}{\text{time taken}}$$

$$100 = \frac{12}{\Delta t}$$

$$\Delta t = \frac{12}{100} = 0.12 \text{ s}$$

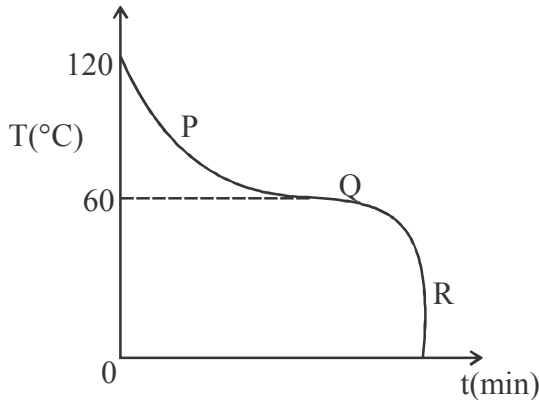
21.

(B)

Protons do not flow during transfer of charges only electrons flow. If object is positively charged, its lacking electrons. To neutralize it electrons flow on to the object.

22. (C)  
 (i), (ii), (iv), (v) are correct.  
 Statement (iii) is wrong as tools are the cells which detect low intensity light. Ions are responsible for colour and clarity of images.

23. (C)



In region Q, temperature is not changing with time to region Q must represent phase change of material i.e., 60th solid and liquid co-exist.

P = {liquid state} {higher temperature}

Q = {solid + liquid} {melting point}

R = {solid state} {lower temperature}

24. (C)

(W) → reactive

'Na'

↓

Stored is 'Kerosene'

(1)

(X) → sulphur

↓

forms 'Acidic' oxide

(2)

(Y) → Phosphorous → reactive nonmetal

↓

Stored in water ← Catches fire

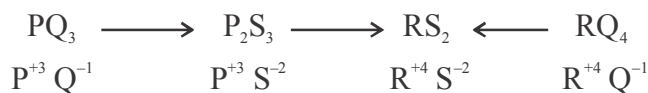
(3)

(Z) → 'Cu' does not react with dilute HCl.

↓

exposed in air → Green coating

25. (D)



all inert  $\left\{ \begin{array}{l} P^{+3} \rightarrow P \rightarrow 2, 8(3) \\ Q^{-1} \rightarrow Q \rightarrow 2, 8(7) \\ R^{+4} \rightarrow R \rightarrow 2, 8(4) \\ S^{-2} \rightarrow S \rightarrow 2, 8(6) \end{array} \right.$

26. (A)  
 Fractional distillation  
 Temperature → increases from bottom to top.  
 Thus, fraction with lower point condenses first.
27. (A)  
 Due to different solibilities in different solvents. This is due to partition solvent.
28. (C)  
 Cooton → Fact
29. (C)  
 Atoms →  $p=e$   
 ⇒ Atom →  $P, Q, S$   
 Ions →  $e \neq P$   
 ⇒  $R, T$   
 Isotopes →  $Q$  and  $R$   
 $p=13, 13$   
 $n=13, 14$
30. (A)  
 Fact
31. (D)
- (a) 4.25 g  $NH_3$   
 ⇒  $\frac{1}{4}$  moles = 0.25 (ii)  
 = 5.6 L at STP (p)
- (b) 4 g  $H_2$   
 $\frac{4}{2} = 2$  moles (i)  
 = 44.8 l =  $2 \times N_A$  (s)
- (c) 10 moles of  $H_2SO_4$   
 = 980 g (v)  
 =  $7 \times 10 \times N_A$  (t)
- (d) 12 g  $O_2$   
 $= \frac{12}{32} = 0.375$  moles (iv)  
 =  $2 \times 0.375 \times N_A$  (q)
- (e) 1 mole  $N$   
 =  $6.022 \times 10^{23}$  (iii)  
 = 14 g (r)
32. (B)  
 Isobars → Same atomic mass but different atomic numbers  
 $\begin{matrix} 42 & 40 & 40 & 38 & 36 & 40 \\ 20 & 18 & 20 & 18 & 18 & 19 \end{matrix}$   
 (1) (2) (3) (4) (5) (6)  
 → 2, 3, 6
33. (B)  
 Tissue Q. provides mechanical support, elasticity and tensile strength to the plants part where it is present.



34. (\*)
35. (A)  
When a potato strips is placed in lower molarity of sucrose solution, the length of the potato cell increased.  
When a potato strips is placed in higher molarity of suppose solution, the length of the potato strips will decreased.  
And when it is kept in isotomic solution, there is no change in the length.
36. (D)  
R – triploblastic Organism  
So R could be an annelid / echinodenmata.
37. (D)  
Cholera spreads through contaminated food and water so R could be cholera and s = sleeping sickness as it is caused by vectors.
38. (B)  
(a) PM → Air pollution  
 $PM_{2.5}, PM_{10}$   
(b) Detergent → Water pollutants  
(c) Plastics → Non - degradable  
(d) Vegetable peels → Degradable
39. (B)  
Red sindhi and sahiwal are indian breed whereas Brownswiss and jersey are exotic breeds.
40. (C)  
Y – Drip irrigation.
41. (C)  
Y – Testers produces male sex hormone i.e. Testosterone.  
X– Prostate gland which does not produce any hormone but secrets prostatic fluid.
42. (C)  
P – Pseudomonas                      Q – Physarum  
R – Rhizobium                         S – Glomus  
T – Spectrococccous                 U – Penicillium
43. (\*)
44. (A)  
Specious R could be an alien species which may become invasive and drive away species P in near future.
45. (C)  
To dispose off radioactive waste – It should not be burned in open area, instead it should be buried deep underground.  
To get rid of human faeces it should not be passed in river directly, instead should be treated in STP (Sewage treatment plant).
46. (A)  
Raj's immune system developed its own antibodies when ancountered the pathogen or antigen however, Rohan has received preformed antibodies from his mother.
47. (A)  
The vaccine given to Raj contained live attennated pathogens which triggered production of antibodies and memory cells that will recognise any subsequent pathogenic attack and present the infection.
48. (A)  
Area under force-time graph shows change in momentum.  
 $\Delta P =$  area of trapezium

$$= \frac{1}{2}(b_1 + b_2)h$$

$$= \frac{1}{2}(4 + 10)10$$

$$=7(10)$$

$$\Delta P = 70 \times 10^{-3} \text{ Nz}$$

$$m(\vec{v} - \vec{u}) = 70 \times 10^{-3} \text{ Nz}$$

$$v = 150 \text{ cms}$$

$$m[v - (-u)] = 70 \times 10^{-3} \text{ kgms}^{-1}$$

$$v + u = \frac{70 \times 10^{-3} \text{ kg ms}^{-1}}{70 \times 10^{-3} \text{ kg}}$$

$$= 1 \text{ ms}^{-1}$$

$$v + 50 \text{ cms}^{-1} = 100 \text{ cms}^{-1}$$

$$v = 50 \text{ cms}^{-1}$$

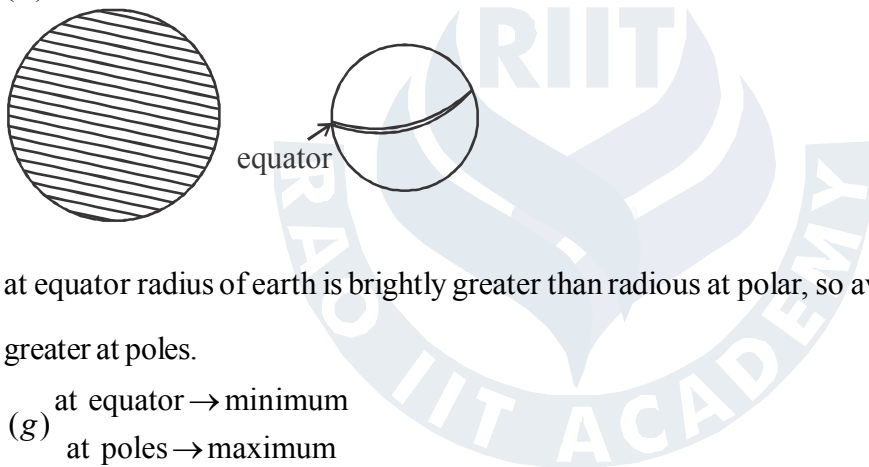
Since force is actions opposite to initial direction of motion, final velocity will be in reverse direction.

50 cms<sup>-1</sup> in reverse direction.

49. (C)

(Acc. to principle of Fractional Distillation).

50. (D)



at equator radius of earth is brightly greater than radius at polar, so average due to gravity  $\left(\frac{GM}{R^2}\right)$  is greater at poles.

(g) at equator → minimum  
at poles → maximum

→ Also of at height 'h' above earth is given as  $= \frac{GM}{(R+h)^2}$

So, g decreases with height

→ at depth d, g is given by  $= g_0 \left(1 - \frac{h}{R}\right)$

So g decreases with depth.

Maximum (poles), Minimum (equator), decreases, decreases