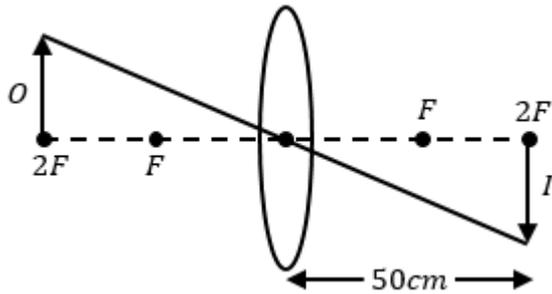


**SECTION – I : PHYSICS**

1. (C)



$$\frac{h_I}{h_O} = m = \frac{v}{u}$$

$$h_I = -h_O \text{ (given)}$$

$$\therefore u = -v = -50 \text{ cm} = 0.50 \text{ meter}$$

$$\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$$

$$\left(\frac{1}{0.50}\right) - \left(\frac{1}{-0.50}\right) = \frac{1}{f} = \text{Power [to get power in diopetre we need focal length in meter]}$$

$$P = \frac{1}{0.25} = 4 \text{ Diopetre}$$

2. (C)

For the person to clearly see far away objects lens must form image at far point

Object distance ( $u$ ) =  $\infty$

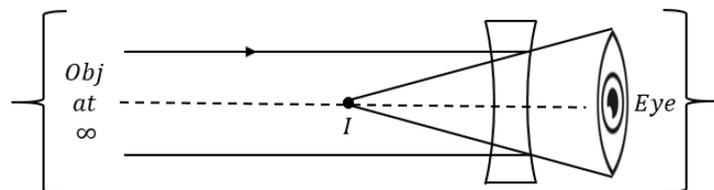
Image distance ( $v$ ) =  $-80$

$$\therefore \frac{1}{v} - \frac{1}{u} = \frac{1}{f}$$

$$\frac{1}{-80} - 0 = \frac{1}{f}$$

$$\Rightarrow f = -80 \text{ cm}$$

$$P = \frac{1}{f} = \frac{1}{-0.8} = -1.25\text{D} \text{ {lens is concave, implied by negative focal length}}$$



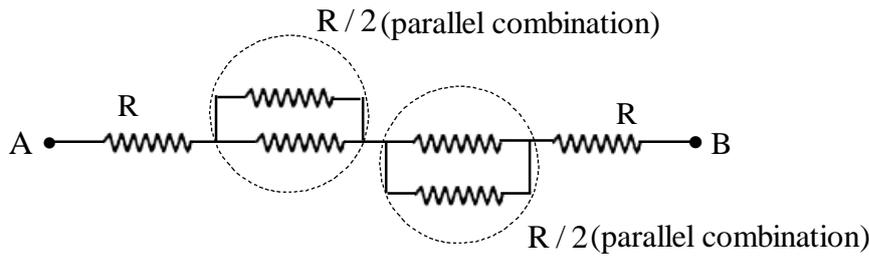
3. (B)

Field lines inside a solenoid are equally spaced which implies magnetic field must be same at all points.

4. (B)

$$\begin{aligned} W &= \Delta V \cdot Q \\ &= 10\text{V} \times 2.5\text{C} \\ &= 25 \text{ Joule} \end{aligned}$$

5. (B)



$$R_{AB} = 3R = 9 \Omega$$

6. (D)

$$v^2 - u^2 = 2aS$$

$$0 - (u_1)^2 = 2(-a)S_1 \quad \dots(1)$$

$$\text{Also, } 0 - (u_2)^2 = 2(-a)S_2 \quad \dots(2)$$

Divide (2) by (1)

$$\left(\frac{u_2}{u_1}\right)^2 = \frac{S_2}{S_1}$$

$$\Rightarrow S_2 = \left(\frac{54}{90}\right)^2 \times 2 = 0.72 \text{ meter}$$

7. (B)

Given,  $V = 60V, I = 4A$

$$\text{By Ohm's law } R = \frac{V}{I} = \frac{60}{4} = 15 \Omega$$

When p.d. is increased to 180V the current is given by

$$\frac{V}{R} = \frac{180}{15} = 12A$$

8. (B)

$$\vec{F} = q(\vec{V} \times \vec{B})$$

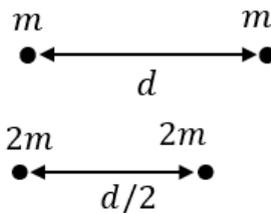
$\therefore$  charge is negative,  $\vec{F}$  is directed opposite to  $\vec{V} \times \vec{B}$  direction

9. (C)

$$F = \frac{G m^2}{d^2}$$

$$F' = \frac{G(2m)^2}{(d/2)^2}$$

$$F' = 16F$$



10. (B)

Distance covered = Area under speed – time graph

$$= \frac{1}{2} \times 20 \times 5 = 50 \text{ meter}$$

**SECTION – II : CHEMISTRY**

- 11. (B)
- 12. (B)
- 13. (A)
- 14. (A)
- 15. (C)
- 16. (A)
- 17. (D)
- 18. (D)
- 19. (C)
- 20. (D)

**SECTION – III : BIOLOGY**

- 21. (B)  
Mendel studied pea plant and discovered genetics. He studied 7 traits of pea plant and grouped them as dominant or recessive traits.
- 22. (A)  
Taxonomic hierarchy of higher organisms is Kingdom-phylum-Class-Order-Family-genus-Species.
- 23. (B)  
Bees are pollinators for various flowering plants.
- 24. (A)  
Sense organs receive different stimuli or changes in external environment and the message is relayed to CNS. Brain sees the World through sense organs and hence they are called windows for the brain.
- 25. (B)  
Cardiac cycle shows rhythmic contraction (systole) and relaxation (diastole) of heart muscles. The number of heart beats per minute is heart rate.
- 26. (C)  
Rough endoplasmic reticulum has ribosomes on its surface and hence is involved in protein synthesis.
- 27. (C)  
Lamarck proposed theory of inheritance of acquired characters. Ancestral giraffes with slightly longer necks than others got more food and left more surviving offspring was the idea given by Darwin.
- 28. (B)  
Each glucose molecule on aerobic respiration produces 38 ATP molecules.
- 29. (D)  
During metaphase the chromatin network dissolves and homologous chromosomes with sister chromatids are visible at equator of cell.
- 30. (B)  
DNA has deoxyribose sugar and RNA has ribose sugar.
- 31. (C)  
Lysosomes are cell organelles of animal cells formed by ER and golgi complex.

32. (A)  
If a large number of people are enclosed in a room, then oxygen decreases and carbon dioxide increases due to respiration.
33. (C)  
Homologous organ have same structure, different function ,whereas analogous organs have different structure, same function
34. (A)  
Bile secreted by liver causes Emulsification of fat in duodenum.
35. (B)  
Light sensitive cells i.e rods and cones in the eyes are present in retina to form image.
36. (C)  
Monera and protists are unicellular. Animal cell lacks cell wall.
37. (D)  
The epithelium lining oviduct and trachea is Ciliated epithelium.
38. (A)  
Chromosomes are genetic material of organisms made mostly of DNA.
39. (B)  
Deficiency of Vit C causes gum problems called scurvy.
40. (D)  
Heart initiates its own heart beat as it has SA node, the pacemaker of the heart.