

Section – A

Answer ANY TEN questions

10 x 2 = 20

1. What is the contribution of S Chendra Sekhar to Physics?
2. Why do we have different units for the same physical quantity?
3. If $P = 2\mathbf{i} + 4\mathbf{j} + 14\mathbf{k}$ and $Q = 4\mathbf{i} + 4\mathbf{j} + 10\mathbf{k}$, then find the magnitude of $P + Q$.
4. If a bomb at rest explodes into two pieces, the pieces must travel in opposite directions, Explain.
5. Give an expression for the excess pressure in an air bubble inside a liquid.
6. What are water proofing agents and water wetting agents? What do they do?
7. Does a body radiate at 0 K? Does it radiate at 0° C?
8. What is latent heat of vaporization?
9. Absolute temperature of a gas is increased 3 times. What will be the increase in rms velocity of the gas molecule?
10. When does a real gas behave as an ideal gas?

Section –B

Answer ANY SIX questions

6 x 4 = 24

11. A ball is dropped from the roof of a tall building and simultaneously another ball is thrown horizontally with some velocity from the same roof. Which ball lands first ? Explain your answer.
12. If $|\vec{a} + \vec{b}| = |\vec{a} - \vec{b}|$ prove that the angle between $\vec{a}$ and $\vec{b}$ is 90°.
13. Distinguish between centre of mass and centre of gravity.
14. Define vector product. Explain the properties of a vector product with two examples.
15. What is orbital velocity? Obtain an expression for it.
16. Describe the behaviour of a wire under gradually increasing load.
17. Explain conduction, convection and radiation with examples.
18. Mention the methods used to decrease friction.

Section –C

Answer ANY TWO questions

2 x 8 = 16

19. Develop the notions of work and kinetic energy. Show that it leads to work-energy theorem.
A machine gun fires 360 bullets per minute and each bullet travels with a velocity of 600 ms^{-1} . If the mass of each bullet is 5 grams then find the power of the gun.
20. Show that the motion of a simple pendulum is simple harmonic and hence derive an equation for its time period. What is seconds pendulum ?
21. Explain reversible and irreversible processes.
Describe the working of a Carnot's engine. Obtain an expression for the efficiency.

Note:

- The questions are obtained from internet and from the students from their interaction for paper discussion after the examination.
- The questions are given here only for ready reference for the students for preparation for upcoming examinations