119
(TS)

A

Total No. of Questions - **21**
Total No. of Printed Pages - **2**

Regd. No.

Part - III
PHYSICS, Paper - I
(English Version)

Time : 3 hours ***Max. Marks : 60***

SECTION A
10 × 2 = 20

Note : i) Answer **all** questions.
ii) Each question carries **two** marks.
iii) All are **very short answer** type questions.

1. What is the contribution of S. Chandrasekhar to Physics?
2. Distinguish between accuracy and precision.
3. If $\vec{P}=2\hat{i}+4\hat{j}+14\hat{k}$ and $\vec{Q}=4\hat{i}+4\hat{j}+10\hat{k}$, find the magnitude of $\vec{P}+\vec{Q}$.
4. If a bomb at rest explodes into two pieces, the pieces must travel in opposite directions. Explain.
5. Why water droplets wet the glass surface and does not wet lotus leaf?
6. Mention any two applications of Bernoulli's theorem.
7. Distinguish between heat and temperature.
8. The roof of buildings are often painted white during summer. Why?
9. Define mean free path.
10. State Boyle's law and Charles' law.

SECTION B

$6 \times 4 = 24$

Note : i) Answer **any six** questions.
ii) Each question carries **four** marks.
iii) All are **short answer** type questions.

11. When a ball is thrown vertically upwards with a velocity of 20 ms^{-1} from the top of a multistorey building, the height of the point from where the ball is thrown is 25.0 m from the ground. Take $g = 10 m/s^2$
a) How high will the ball rise? and
b) How long will it be before the ball hits the ground?

12. Show that the trajectory of an object thrown at certain angle with the horizontal is a parabola.

13. Explain the advantages and disadvantages of friction.

14. Distinguish between the center of mass and the center of gravity.

15. Define vector product. Give an example. Write two properties of vector product.

16. What is a geostationary satellite? State its uses.

17. Explain the behavior of a wire under gradually increasing load.

18. Explain conduction, convection and radiation with examples.

SECTION C

$2 \times 8 = 16$

Note : i) Answer **any two** questions.
ii) Each question carries **eight** marks.
iii) All are **long answer** type questions.

19. Develop the notions of work and kinetic energy and show that it leads to the work-energy theorem. State the conditions under which a force does no work.

20. Show that the motion of a simple pendulum is simple harmonic and hence derive an equation for its time period. What is a seconds pendulum? What is the length of a simple pendulum which ticks seconds? ($g = 9.8\ ms^{-2}$).

21. Explain reversible and irreversible processes. Describe the working of a Carnot engine. Obtain an expression for the efficiency.