

21

119



(New Syllabus)

Total No. of Questions - 21

Total No. of Printed Pages - 2

Regd.
No.

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Part - III

PHYSICS, Paper - I

(English Version)

Time : 3 hours

Max. Marks : 60

SECTION A

Note : i) Answer all questions.

ii) Each question carries two marks.

iii) All are very short answer type questions.

10 × 2 = 20

1. What is the contribution of S. Chandra Sekhar to Physics?
2. Distinguish between accuracy and precision.
3. $\vec{A} = \vec{i} + \vec{j}$. What is the angle between a vector and the X-axis?
4. Why does a car with a flattened tyre stop sooner than the one with inflated tyres?
5. Why are spokes provided in a bicycle wheel?
6. Find the torque of a force $7\vec{i} + 3\vec{j} - 5\vec{k}$ about the origin. The force acts on a particle whose position vector is $\vec{i} - \vec{j} + \vec{k}$.
7. Define viscosity. What is the C.G.S. unit for coefficient of viscosity?
8. Why are drops and bubbles spherical?
9. State the Zeroth law of thermodynamics.
10. Define molar specific heat capacity.

SECTION B

Note : i) Answer any six questions.

$6 \times 4 = 24$

ii) Each question carries four marks.

iii) All are short answer type questions.

11. State Newton's second law of motion. Hence derive the equation of motion $F = ma$ from it.
12. Show that the trajectory of an object thrown at certain angle with the horizontal is a parabola.
13. A bullet moving with a speed of 150 ms^{-1} strikes a tree and penetrates 3.5 cm before stopping. What is the magnitude of its retardation in the tree, and the time taken for it to stop after striking the tree?
14. Distinguish between center of mass and center of gravity.
15. What is a geostationary satellite? State its uses.
16. Describe the behavior of a wire under a gradually increasing load.
17. Explain qualitatively, the working of a heat engine.
18. Four molecules of a gas have speeds 1, 2, 3 and 4 kms^{-1} . Find the rms speed of the gas.

SECTION C

Note : i) Answer any two of the following questions.

$2 \times 8 = 16$

ii) Each question carries eight marks.

iii) All are long answer type questions.

19. State and prove the law of conservation of energy in case of a freely falling body.

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 gm, find the power of the machine gun.

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?

21. State and explain Newton's law of cooling. State the conditions under which Newton's law of cooling is applicable.

A body cools from 60°C to 40°C in 7 minutes. What will be its temperature after the next 7 minutes, if the temperature of its surroundings is 10°C ?