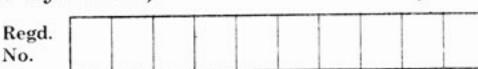


# 119

# (New Syllabus)



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

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

Time: 3 hours

Max. Marks: 60

10 ×

### SECTION A

·Note: i) Answer all questions.

- Each question carries two marks.
- iii) All are very short answer type questions.
- 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?
- 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.
- 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<sup>-1</sup> 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<sup>-1</sup>. 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<sup>-1</sup>. 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?