0119

C

Total No. of Questions - 26
Total No. of Printed Pages - 3

Regd. No. _____

Part - III

PHYSICS, Paper - I

(English Version)

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

SECTION - A

10 x 2 = 20

Note: (i) Answer **all** Questions

(ii) Each Question carries **two** marks

(iii) All are very short answer type questions.

1. What is Physics?
2. How can systematic errors be minimised or eliminated ?
3. $A = \vec{i} + \vec{j}$. What is the angle between the vector and x-axis?
4. Can the coefficient of friction be greater than one?
5. Why are drops and bubbles spherical?
6. Is it necessary that a mass should be present at the centre of mass of any system?
7. What is the principle behind the carburetor of an automobile?
8. Why are spokes provided in a bicycle wheel?
9. Define mean free path.
10. State Boyle's Law and Charles' Law.

Section - B

$6 \times 4 = 24$

Note: (i) Answer **six** questions.

(ii) Each question carries **four** marks.

(iii) All are of short answer type questions.

11. Can the velocity of an object be in a direction other than the direction of acceleration of the object ? If so , give an example.

12. 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.

13. Mention the methods used to decrease friction.

14. Distinguish between centre of mass and centre of gravity.

15. What is orbital velocity? Obtain an expression for it.

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

17. Describe the behaviour of a wire under gradually increasing load.

18. Pendulum clocks generally go fast in winter and slow in summer. Why?

19. State and explain first law of thermodynamics.

20. Compare isothermal and an adiabatic process.

21. Define unit vector, null vector and position vector.

22. If $|\vec{a}+\vec{b}| = |\vec{a}-\vec{b}|$ prove that the angle between $\vec{a}$ and $\vec{b}$ is 90°.

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.

23. Show that the motion of a simple pendulum is simple harmonic and hence derive an equation for its time period. What is seconds pendulum?

24. State and explain Newton's law of cooling. State the conditions under which Newton's law of cooling is applicable. A body cools down from 60°C to 50°C in 5 minutes and to 40°C in another 8 minutes. Find the temperature of the surroundings.

25. Develop the notions of work and kinetic energy and 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 gm, find the power of the machine gun.

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

A pump is required to lift 600 kg of water per minute from a well 25 m deep and to eject it with a speed of 50 ms^{-1}. Calculate the power required to perform the above task.