0119

B

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

Regd. No. | 1 | 8 | 6 | 0 | 1 | 2 | 3 | 5 | 8 | 8 |

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

Time : 3 Hours *Max. Marks : 60*

SECTION A

$10 \times 2 = 20$

Notes : i) Answer **all** questions.
ii) Each question carries **two** marks.
iii) All are **Very Short Answer Type Questions.**

1. What is the Raman effect?

2. What are significant numbers? Write the number of significant digits in the measurement of 0.002308.

3. If $|\bar{a} + \bar{b}| = |\bar{a} - \bar{b}|$, what is the angle between $\bar{a}$ and $\bar{b}$?

4. Can the coefficient of friction be greater than one?

5. What is the principle behind the carburetor of an automobile?

6. If the diameter of a soap bubble is 10 mm and its surface tension is 0.04 N/m, find the excess pressure inside the bubble.

7. State Newton's law of cooling.

8. Why utensils are coated black? Why the bottom of the utensils are made of copper?

9. State Dalton's law of partial pressures.

10. What is the law of equipartition of energy?

SECTION B

$6 \times 4 = 24$

Notes : i) Answer **any six** questions.

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

iii) All are **Short Answer Type Questions.**

11. A man runs across the roof of a tall building and jumps horizontally on to the (lower) roof of an adjacent building. If his speed is 9 m/s and the horizontal distance between the building is 10 m and the height difference between the roofs is 9 m, will he be able to land on the next building? (Take $g = 10$ m/s^2)

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

13. State Newton's second law of motion. Hence derive the equation of motion $F = ma$ from it.

14. Find the centre of mass of three particles, 100 gm, 150 gm and 200 gm placed at the vertices of an equilateral triangle of each side 0.5 m long. (Take 100 gm at orgin and 150 gm along X–axis).

15. Define angular acceleration and torque. Obtain the relation between them.

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

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

18. Explain conduction, convection and radiation with examples.

SECTION C

$2 \times 8 = 16$

Notes : i) Answer **any two** questions.

ii) Each question carries **eight** marks.

iii) All are **Long Answer Type Questions.**

19. What are collisions? Explain the types of collisions. Show that in the case of one dimensional elastic collision, the relative velocity of approach of two colliding bodies before collision is equal to the relative velocity of separation after collision. A body freely falling from a certain height 'h' after striking a smooth floor rebounds to a height $h/2$. What is coefficient of restitution between the floor and the body?

20. Show that the motion of a simple pendulum is simple harmonic and hence derive an equation for its time period. Calculate the change in the length of a simple pendulum of length 1 m, when its period of oscillation changes from 2 sec to 1.5 sec.

21. State second law of thermodynamics. How is heat engine different from a refrigerator?