119 (I)

Total No. of Questions - 21

Total No. of Printed Pages - 3

Regd.
No.

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

Time : 3 Hours]　　　　　　　　　　　　　　　　　[Max. Marks : 60

SECTION – A　　　　　　　　　　　$10 \times 2 = 20$

Note : (i)　Answer **all** the questions.

(ii)　Each question carries **2** marks.

(iii)　All are very short answer type questions.

1. Which physical quantity has negative dimensions in mass ?

2. $\vec{A} = \vec{i} - \vec{j}$. What is the angle between the vector and x-axis ?

3. Is it necessary that any mass should be present at the centre of mass of a system ?

4. What happens to the frictional force if the surface is moderately polished and heavily polished ?

5. State the practical limits of Poisson's ratio.

6. Define surface tension and give its dimensional formula.

7. What is SI unit of viscosity ? What is its CGS unit ?

8. State Zeroth law of thermodynamics. What is its significance ?

9. State Prevost's theory of heat exchanges.

10. State Newton's law of cooling.

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SECTION – B   6 × 4 = 24

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

(ii)   Each question carries **4** marks.

(iii)   All are short answer type questions.

11. State parallelogram law of vectors. Derive an expression for the magnitude and direction of the resultant vector.

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

13. Show that two spheres of equal masses moving along a (x-axis) straight line exchange their velocities after a head-on-elastic collision.

14. Why pulling the lawn roller is preferred than pushing the lawn roller ?

15. State and prove perpendicular axes theorem.

16. Deduce the relation between 'g' at the surface of a planet and 'G'.

17. The mass of a litre of gas is 1.562 gm at 0 °C under a pressure of 76 cm of mercury. The temperature is increased to 250 °C and the pressure to 78 cm of mercury. What is the mass of one litre of the gas under new conditions ?

18. Show that $C_p - C_v = R$ in the case of one mole of ideal gas.

SECTION – C   2 × 8 = 16

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

(ii)   Each question carries **8** marks.

(iii)   All are long answer type questions.

19. State the law of conservation of energy and verify it in case of a body projected vertically upwards.

A ball is projected vertically upwards from ground with an initial velocity of 9.8 ms^{-1}. Find the maximum height reached by it using the law of conservation of energy.

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

21. Define the coefficients of expansions of solids and deduce the relation between them.

An aluminium rod of length 50 cm is heated so that its temperature increases from 20 °C to 80 °C. If the linear coefficient of expansion of aluminium is $24 \times 10^{-6}/°C$ find the increase in the length of the aluminium rod.

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