

PHYSICS (FIRST YEAR)

PAPER – I (MAY – 2009)

Time : 3 Hours

Max.Marks : 60

SECTION – A

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

10×2=20

- ii) Every correct answer carries 2 marks.
- iii) All are Very short answer type questions.

1. It units of mass, length and time are doubled, what happens to unit of energy?
2. The mass of a body is 5 kg and its velocity is $4\hat{i} + 2\hat{j} - \hat{k} \text{ ms}^{-1}$. What is the momentum of the body?
3. What is Elastic and Inelastic collisions?
4. Mention any two methods, which are used to decrease Friction.
5. Define Hook's Law of Elasticity.
6. Explain why rain drops are spherical in nature.
7. Explain Turbulent flow.
8. Pendulum clocks generally go fast in winter. Why?
9. Explain importance of Anomalous expansion of water in nature.
10. Define "Heat capacity" and "specific heat".

SECTION – B

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

6×4=24

- ii) Every correct answer carries 4 marks.
- iii) All are Short answer type questions.

11. Write parallelogram law of vectors. Derive an equation for the magnitude of resultant of two vectors and also draw the diagram.
12. Show that time of ascent of a vertically projected body is equal to time of descent.
13. Mention any four characteristics of centre of mass.
14. Define Angle of Friction. Write an equation of co-efficient of friction in terms of angle of friction.

15. If the centripetal force acting on a body revolving along a circular path of radius 25 m is 200 N, find its Kinetic energy.
16. What is Escape velocity? Obtain an expression for it.
17. Show that $C_p - C_v = R$ in the case of one mole of Ideal gas.
18. Explain Kirchoff's law of Radiation. Write its equation. Give any two applications of the law.

SECTION – C

Note : i) Answer any **two** of the following questions. $2 \times 8 = 16$

ii) Every correct answer 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 freely falling body.

A ball is projected vertically upwards from ground with an initial velocity of 9.8ms^{-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 second's pendulum?
21. State Boyle's law and Charles law. Hence derive Ideal gas equation.

The pressure of a gas of volume 1 litre is 76 cm of Hg. If the pressure is increased to 114 cm of Hg at constant temperature. Find its volume.