

# MODEL QUESTION PAPER-I FOR 2020-21

(according to reduced syllabus)

**Time: 3 Hours 15 min.**

**I PUC**

**PHYSICS (33)**

**Max.Marks:70**

## General Instructions:

- (i) *All parts are compulsory.*
- (ii) *Answers without relevant diagram/figure/circuit wherever necessary will not carry any marks.*
- (iii) *Direct answers to Numerical problems without detailed solutions will not carry any marks.*

### PART-A

#### I. Answer ALL the following questions.

**10 × 1 = 10**

1. Name any one fundamental force in nature.
2. What is limiting friction?
3. How many watts are in 1 HP?
4. Where does the centre of mass of uniform triangular lamina lie?
5. State Hooke's law.
6. Name the SI unit of surface tension.
7. Define absolute zero temperature.
8. Mention the significance of zeroth law of thermodynamics.
9. How does an average kinetic energy of a gas molecule depend on the absolute temperature?
10. What are beats?

### PART-B

#### II. Answer any FIVE of the following questions.

**5 × 2 = 10**

11. Mention any two sources of systematic errors.
12. Distinguish between path length and displacement.
13. Define relative velocity. Write the expression for relative velocity between two objects moving in same direction.
14. State and explain the law of parallelogram of vector addition.
15. Mention any two advantages of friction.
16. Mention the general conditions for equilibrium of a rigid body.
17. Distinguish between streamline and turbulent flow of liquid.
18. Define degrees of freedom of a gas molecule. How many degrees of freedom does a monoatomic gas have?

### PART-C

#### III. Answer any FIVE of the following questions.

**5 × 3 = 15**

19. Obtain the expression for the period of oscillation of a pendulum assuming that it may depends on mass of the bob, length of the pendulum and acceleration due to gravity at the place using dimensional analysis.
20. Derive the equation  $x = v_0t + \frac{1}{2}at^2$  using  $v-t$  graph.
21. Derive the expression for the magnitude of the resultant of two concurrent vectors.
22. Prove the law of conservation of linear momentum.
23. State and prove work-energy theorem for a constant force.
24. Draw stress-strain graph for metal. Mention yield point and fracture point.
25. State and explain Bernoulli's theorem. Mention any one application of Bernoulli's theorem.
26. Mention any three assumptions of kinetic theory of gases.

#### PART-D

#### IV. Answer any TWO of the following questions.

**2 × 5 = 10**

27. Show that the trajectory of a projectile is a parabola.
28. State the principle of conservation of mechanical energy and illustrate in case of freely falling body.
29. Define torque and obtain the relation between torque and angular momentum.

#### V. Answer any TWO of the following questions.

**2 × 5 = 10**

30. Explain Carnot's cycle for heat engine with  $P-V$  diagram.
31. Derive the expression for total energy of a particle executing simple harmonic motion.
32. (a) What are mechanical waves? Give example.  
(b) Distinguish between longitudinal and transverse waves.

#### VI. Answer any THREE of the following questions.

**3 × 5=15**

33. A stone is tied to one end of a string and whirled in a horizontal circle of radius 1 m at 20 revolutions per minute. Calculate the angular velocity and linear speed of the stone. Also find the centripetal acceleration.
34. A force of 10 N acts for 20 second on a body of mass 2 kg initially at rest. Calculate the energy required by the body and the work done by the applied force.
35. If the earth has a mass 9 times and radius twice of the planet mars, calculate the minimum speed required by a rocket to pull out of the gravitational force of Mars. Escape speed for an object on the surface of the earth is  $11.2 \text{ kms}^{-1}$ .
36. Calculate the change in volume of an iron block  $10 \text{ cm} \times 20 \text{ cm} \times 5 \text{ cm}$  if its temperature is raised from  $10^\circ\text{C}$  to  $40^\circ\text{C}$ . Given, coefficient of linear expansion of iron  $= 1.2 \times 10^{-5} \text{ }^\circ\text{C}^{-1}$ .
37. A body of 0.25 kg executes SHM given by  $y = 0.4 \sin 0.5\pi t$  m. Calculate the amplitude, angular frequency, maximum velocity and maximum acceleration.