

SHARADA P.U COLLEGE, MANGALURU

I PUC – PHYSICS

(II - Preparatory Examination)

MAX. MARKS: 70

Time: 3 Hr

PART - A

I. Answer ALL of the following:

1 x 10 = 10

1. Who discovered neutron?
2. What do you mean by null vector?
3. How many watts are there in 1 H.P?
4. Define moment of inertia
5. State Hook's law
6. Pressure is a scalar or vector quantity
7. Write the equation of continuity for the flow of incompressible fluid.
8. Define conduction of heat.
9. State Zeroth law of thermodynamics.
10. How many degrees of freedom in diatomic gas molecules.

PART - B

II. Answer any FIVE of the following:

2 x 5 = 10

11. Name any two fundamental force of nature.
12. Mention two uses of dimensional analysis.
13. Show that the impulse of force is equal to the change in momentum produced.
14. Define scalar quantity give one example.
15. Mention two methods of reducing friction.
16. Define couple. Give one example.
17. What is surface tension? Mention its S.I unit.
18. What is periodic motion? Give an example.

PART - C

III. Answer any FIVE of the following:

3 x 5 = 15

19. State and explain parallelogram law of vector addition.
20. Derive $F = ma$ with usual notations.
21. State the law of conservation of angular momentum. Explain how it works in the case of diver.
22. State and explain the parallel axis theorem.
23. What is artificial satellite and write any two applications.
24. Draw a typical stress-strain curve for a metal mention yield point and fracture point.
25. Mention three properties of thermal Radiation.
26. Mention the assumptions of kinetic theory of ideal gas.

PART - D

IV. Answer any TWO of the following:

5 x 2 = 10

27. What is vt-graph? Derive $s = ut + \frac{1}{2}at^2$ using vt-graph.
28. State law of conservation of mechanical energy and prove the same for a body falling freely under gravity.
29. Derive an expression for acceleration due to gravity above the surface of the earth.

V. Answer any TWO of the following:

5 x 2 = 10

30. Explain the working of carnot's engine with the help of carnot's cycle.

31. Arrive an expression for the time period of a simple pendulum.
32. Explain the velocity of sound in a gas according to newton and discuss Laplace's correction.

VI. Answer any THREE of the following:

3 x 5 = 15

33. A cricket ball is thrown at a speed of 56 ms^{-1} in a direction making an angle of 30° with the horizontal calculate
 - a) Maximum height and
 - b) Total time taken by the ball to return to earth (Given $g = 9.8 \text{ ms}^{-2}$)
34. A bullet of mass 0.03 kg enters a block of wood with a velocity of 600 ms^{-1} and penetrates to a depth of 0.2 m . Calculate the average force of the wood to the penetration of the bullet.
35. A Rocket is fired vertically upwards with a speed of 5 kms^{-1} from the earth's surface. How far the earth does the rocket go before returning to earth.
Mass of earth = $6 \times 10^{24} \text{ kg}$
Mean radius of the earth = $6.4 \times 10^6 \text{ m}$
 $G = 6.67 \times 10^{-11} \text{ Nm}^2\text{kg}^{-2}$
36. The lower surface of a cubical slab of stone of side 0.1 m is exposed to steam at 373 k and thick layer of ice covers the upper surface and the other faces are covered by non-conducting material in 40 minutes 0.15 kg of ice melts. Find the thermal conductivity for the stone.
(Give latent heat of ice = $336 \times 10^3 \text{ Jkg}^{-1}$)
37. A train producing a siren with a frequency of 1500 Hz approaches a stationary observer with a speed of 72 kmph what is apparent frequency of sound heard by him. When it is crossing him.
Given velocity of sound (v) in air = 340 ms^{-1}
