



JAIN COLLEGE, JAYANAGAR

I PUC MOCK PAPER 2016

Subject: PHYSICS (33)

Duration: 3 hrs 15 minutes

Max.Marks: 70

PART – A

I. Answer the following questions

(10x1 = 10)

1. Write the SI units for surface tension.
2. What does the slope of a position-time graph give?
3. Define unit vector.
4. What is the nature of work done by frictional force?
5. What is quasi-static process?
6. Define streamline flow.
7. What are matter waves?
8. Define phase of a vibrating particle.
9. Give the relation between frequency and angular frequency.
10. The time period of simple pendulum is T, what is the time period when mass of the bob is doubled.

PART – B

II. Answer any FIVE of the following questions:

(5x2 = 10)

11. Mention the fundamental forces in nature.
12. Find out the vector product of 2 vectors, $\vec{A} = 8$ and $\vec{B} = 4$, when they are perpendicular to each.
13. Check the correctness of the equation $v = \sqrt{\frac{\gamma P}{\rho}}$ where the symbols have their usual notations.
14. Write the expression for thermal conductivity and explain the terms.
15. Justify the statement, “a gas in a given state has a certain amount of heat”.
16. At what temperature will the velocity of sound become 1.25 times that at 27⁰c
17. Can sound waves of wavelength 33mm be heard in air? Justify
18. Sketch the graphs for displacement and velocity of a particle executing SHM.

PART – C

III. Answer any FIVE of the following questions:

(5x3 = 15)

19. What are errors? Explain the different types of errors.
20. Define power show that $\vec{P} = \vec{F} \cdot \vec{v}$
21. Write the equations of rotational motion.
22. State and explain the law of conservation of angular momentum. Give an example.
23. State Boyle’s law and Charle’s law and arrive at ideal gas equation.
24. Why does a ship made of iron float in water although a needle sinks?

25. What is Doppler Effect? Write the expression for the apparent frequency for the source moving towards the stationary observer and away from the stationary observer.
26. Derive an expression for the energy of a particle executing SHM.

PART – D

IV. Answer any Two of the following questions: (2x5 = 10)

27. State the parallelogram law of vector addition. Derive the expression for the resultant.
28. State and explain the parallel and perpendicular axes theorem.
29. Derive an expression for acceleration due to gravity at a point below the surface of the earth.

V. Answer any two of the following questions (2x5 = 10)

30. What are overtones? Compare the first three harmonics produced in an open pipe.
31. Derive expression for the pressure exerted by a gas molecule on the walls of the container.
32. Show that $\alpha : \beta : \gamma = 1:2:3$

PART – D

VI. Answer any THREE of the following questions (3x5 = 15)

33. Two parallel rail tracks run north to south. Train A moves north with speed 54kmh^{-1} . Train B moves south with a speed of 90kmh^{-1} . What is the
- Velocity of B with respect to A
 - Velocity of ground with respect to B
 - Velocity of a monkey running on the roof of A against its motion with a velocity 18 kmh^{-1} with respect to A as observed by a man standing on the ground
34. A cricket ball is thrown at a speed of 56ms^{-1} in a direction, making an angle 30° with the horizontal calculate: a) Maximum height b) total time taken by the ball to return to the earth
- c) the distance from the thrower to the point where the ball returns to the earth.
35. A pump on the ground floor of a building can pump up water to fill tank of volume 30m^3 in 15 minutes. If the tank is 40m above the ground and the efficiency of the pump is 30% how much electric power is consumed by the pump?
36. A Cubical ice box of thermocole has each side = 30cm and a thickness of 5 cm. 4 kg of ice is put in the box. If outside temperature is 45°C and co-efficient of thermal conductivity = $0.01\text{ Js}^{-1}\text{m}^{-1}\text{ }^\circ\text{C}^{-1}$, calculate the mass of ice left after 6 hrs. Take latent heat of fusion of ice = $335 \times 10^3\text{ J/kg}$.
37. The transverse wave in a string is represented by $y(x,t) = 7.5 \sin(12\pi t - 0.005x)$ where 'x' and 'y' in cm and 't' in second. Determine: a) Amplitude b) frequency c) wavelength and
- d) Velocity of the wave.
