



# JAIN COLLEGE

463/465, 18th Main Road, SS Royal, 80 Feet Road, Rajarajeshwari Nagar,  
Bangalore - 560 098

**Date: December 2017**

**SUBJECT: PHYSICS**

**I PUC  
Mock Examination**

**Timings Allowed: 3Hrs.**

**Total Marks: 70**

## General Instructions:

- All parts are compulsory.
- Answer without relevant diagram/figure wherever necessary will not carry any marks.
- Direct answers to numerical problems without detailed solutions will not carry any marks.

### PART-A

I Answer **ALL** the following questions:

**10x1=10**

1. Who discovered X-rays?
2. Give an example for positive work done.
3. Write the dimensional formula for torque.
4. How does the speed of earth change when it is near Sun?
5. State Hooke's law.
6. How is the viscosity of liquids related to temperature?
7. Give the principle of calorimetry.
8. Mention the number of degrees of freedom for a diatomic gas molecule.
9. What is the phase of an oscillating particle?
10. What are beats?

### PART-B

II Answer any **FIVE** of the following questions:

**5x2=10**

11. Mention the strongest and weakest fundamental force in nature.
12. What is a position-time graph? Draw x-t graph for an object at rest.
13. Distinguish between scalars and vectors with an example each.
14. Define impulsive force. Give one example.
15. Give the formula for moment of inertia of a solid cylinder about its axis and explain the symbols.
16. State and briefly explain Newton's law of Gravitation.
17. What is a Venturimeter? Which principle does it work on?
18. Mention the expression for the velocity of a particle executing SHM and explain the symbols.

### PART-C

III Answer any **FIVE** of the following questions:

**5x3=15**

19. Check the dimensional correctness of the equation:  $v^2 - v_0^2 = 2ax$
20. State and explain the triangle law of vector addition.
21. Derive  $F=ma$  with usual notations in vector form.
22. State and explain work-energy theorem for a constant force.
23. Give the equations of kinematics of rotational motion about a fixed axis.
24. Draw the typical stress-strain graph and give its important features.
25. Write any three properties of thermal radiation.
26. Give any three differences between stationary and progressive wave.

**PART-D**

IV Answer any **TWO** of the following questions:

**2x5=10**

- 27. Show that the trajectory of a projectile is a parabola.
- 28. State and prove the conservation of linear momentum in case of collision of two bodies.
- 29. Define Torque. Derive the relation between torque and angular momentum for a rotating body.

V Answer any **TWO** of the following questions:

**2x5=10**

- 30. Explain different stages of Carnot's cycle with neat P-V diagram.
- 31. Derive the relation between kinetic energy of a gas molecule and its absolute temperature.
- 32. Write Newton's formula for speed of sound in gas, discuss Laplace correction.

**PART-E**

VI Answer any **THREE** of the following questions:

**2x5=10**

- 33. A car moving along straight road with a speed of 126kmph is brought to rest within a distance of 200m. What is the retardation (assumed to be uniform) and also calculate the time taken for the car to stop.
- 34. Calculate the power of an engine in terms of hp which is needed to lift 1000kg of coal in 30minute from a coal mine 100m deep. (Given  $g=9.8ms^{-2}$ )
- 35. Calculate the acceleration due to gravity at a point:  
a) 64km above and b) 32km below the surface of the earth.  
Given: Radius of the Earth= 6400km; Acceleration due to gravity at the surface of earth=  $9.8ms^{-2}$ .
- 36. A metal cylinder 0.628m long and 0.04m in diameter has one end in boiling water at 100°C and the other end in melting ice. The co-efficient of thermal conductivity of the metal is  $378Wm^{-1}K^{-1}$ , Latent heat of ice is  $3.36 \times 10^5 Jkg^{-1}$ . Find the mass of ice that melts in 1 hour.
- 37. The transverse wave in a string is represented by  $y(x,t)=(12\pi t-0.005x)$   
where x is in cm and t is in second. Determine:  
a) Amplitude b) frequency c) wavelength d) velocity of the wave

\*\*\*\*\*

