JAIN COLLEGE

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

Date: ***SUBJECT: PHYSICS***

I PUC

Mock Examination

Timings Allowed: 3Hrs 15 Minutes. ***Total Marks: 70***

General instructions:

1) All parts are compulsory.
2) Answers without relevant diagram/figure/circuit wherever necessary will not carry any marks.
3) Direct answers to Numerical problems without detailed solutions will not carry any marks.

PART-A

I. Answer the following. **10 X 1 = 10**

1. Mention the SI unit of linear momentum.
2. Define instantaneous velocity.
3. What is potential energy?
4. Give the expression for centre of mass of a uniform rod.
5. What is the weight of a body at the centre of earth?
6. State Hooke's law.
7. Mention one application of capillarity.
8. Give one example of greenhouse gas.
9. Mention the number of degrees of freedom for a diatomic molecule.
10. What are forced oscillations?

PART-B

II. Answer any FIVE of the following questions: **5 X 2 = 10**

11. Name the fundamental forces in nature.
12. Mention two uses of dimensional analysis.
13. Draw position-time graph of two bodies with equal velocities and unequal velocities in the same direction.
14. State and explain parallelogram law of vector addition.
15. Give any two methods of reducing friction.
16. Derive the relation between g and G.
17. State Clausius and Kelvin Plank's statement of II law of thermodynamics.
18. In case of simple harmonic motion, at what position is the velocity maximum and minimum?

PART-C

III. Answer any FIVE of the following questions: **5 X 3 = 15**

19. Obtain the expression for maximum height reached by a projectile.
20. State Newton's laws of motion.
21. Prove work energy theorem for a constant force.
22. State and explain perpendicular axis theorem.
23. State and explain Bernoulli's theorem.
24. Draw the schematic representation of a refrigerator. Define its co-efficient of performance.
25. State any three assumptions of kinetic theory.
26. Give the Newton's formula for speed of sound in air and hence explain Laplace's correction.

PART-D

IV. Answer any TWO of the following questions: 2 X 5 = 10

27. What is uniform circular motion? Derive an expression for centripetal acceleration.
28. Derive an expression for the variation of acceleration due to gravity with altitude.
29. Distinguish between linear motion and rotational motion.

V. Answer any Two of the following questions: 2 x 5 = 10

30. State newton's law of cooling. Deduce $T_2 = T_1 + e^{-kT+c}$ using the same.
31. Explain the different stages of Carnot's cycle with a neat P-V diagram.
32. What is a closed pipe? Discuss the modes of vibration of air column in a closed pipe.

VI. Answer any THREE of the following questions: 3 X 5 = 15

33. A car is moving along a straight highway with a speed of 126kmph is brought to rest within a distance of 200m. What is the retardation of the car and how long does it take for the car to stop?
34. A pump on the ground floor of a building can pump up water to fill a tank of volume $30m^3$ in 15 minutes. If the tank is 40m above the ground and efficiency of the pump is 30%, how much electric power is consumed by the pump?
35. The moment of inertia of a grindstone about its axis of rotation is $25kgm^2$ starting from rest. It acquires a speed of 120rpm in 10s. Find the torque acting on it.
36. Temperature inside a room is 298K and outside it is 283K. How much heat will leave the room in 10 minutes through the glass window 2m long, 1m wide and 0.004m thick?
    Given: Thermal conductivity of glass, $k=1Js^{-1}m^{-1}K^{-1}$.
37. A train is moving at a speed of 72kmph towards a station , is sounding a whistle of frequency 600Hz. What are the apparent frequencies of the whistle as heard by a man on the platform when the train a) approaches him
    b) recedes him?
    Given: speed of sound in air = 340 ms^{-1}.

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