Jain College, Jayanagar
I PUC Mock Paper 2017-18
Subject: Physics

Duration: 3 Hrs 15 mins **Max.Marks: 70**

PART-A

I. Answer all of the following. **1×10=10**

1. Who unified optics and electromagnetism?
2. Write the dimensions of power.
3. Define instantaneous velocity.
4. Give an example for inelastic collision.
5. How does escape speed depend on the mass of a body?
6. What is a seconds pendulum?
7. Define a node in a stationary wave.
8. Which substance has highest specific heat?
9. State Pascal's law.
10. How does the kinetic energy of a gas molecule vary with temperature?

PART-B

II. Answer any five of the following. **2×5=10**

11. Express 1 light year and 1 astronomical unit in metres.
12. Distinguish between path length and displacement.
13. What is centripetal acceleration? write the expression for it.
14. What is banking of roads? why is it necessary to bank the curved roads?
15. Mention any two uses of Stoke's law
16. Write any two applications of thermal expansion.
17. The whistle of an approaching engine appears to be shriller than that of a receding engine. Explain.
18. Marching troops are asked to break their steps while crossing the bridge. Why?

PART-C

III. Answer any five of the following. **3×5=15**

19. What is free fall? Write any two equations for a freely falling body.
20. State parallelogram law of vector addition. When is the resultant of two vectors maximum and minimum?
21. Find the magnitude and direction of the reaction force acting on a coin of 10 grams lying on the surface of the floor. Take $g=10m/s^2$
22. Friction is necessary evil. Justify.
23. Derive an expression for the energy of a particle executing simple harmonic motion.
24. Give the Newton's formula for the speed of sound in air and hence explain Laplace's correction.
25. Explain the anomalous behaviour of water. How is it advantages to aquatic animals?
26. What is capillarity? Mention any two applications of capillarity.

Part-D

IV. Answer any two of the following. 2×5=10

27. What is v-t graph? Derive $x = ut + \frac{1}{2} at^2$ using v- t graph for an uniformly accelerated body.
28. State the principle of conservation of mechanical energy. Illustrate it in the case of freely falling body.
29. Define torque. Derive the relation between angular momentum and torque.

V. Answer any two of the following. 2×5=10

30. State and derive Newton's law of cooling.
31. Discuss the formation of standing waves in closed pipe. Hence show that the ratio of frequency is 1:3:5.
32. State Bernoulli's principle and obtain an expression for it.

Part-E

VI. Answer any three of the following. 3×5=15

33. A pump on the ground floor of a building can pump up water to fill a tank of volume $30m^3$ in 15mins. 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? ($g=10m/s^2$, density of water = $1000kg/m^3$)
34. Jet airplane travelling at the speed of 500 km/hr ejects its product of combustion at the speed of 1500km/hr relative to the jet plane. What is the speed of the ejection with respect to an observer on the ground.
35. Obtain an expression for centripetal acceleration of a body of mass ‘m’ moving with velocity ‘v’ taking a circular path of radius ‘r’ by dimensional analysis.
36. The efficiency of carnot heat engine working between two temperatures is 60%. If the temperature of the source alone decreased by 100K, efficiency becomes 40%. Calculate the temperatures of the source and sink.
37. The acceleration due to gravity on the surface of the Moon is $1.7m/s^2$. What is the time period of a simple pendulum on the surface of the Moon if its time period on the surface of earth is 3.5s? (Given ‘g’ on the surface of the earth is $9.8\ m/s^2$).

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