SUBJECT: PHYSICS

I PUC
MOCK - I

Timings Allowed: 3 Hrs15Minutes   *Total Marks: 70*

General Instructions:
a) All parts are compulsory.
b) Answers without relevant diagram/figure/circuit wherever necessary will not carry any marks.
c) Direct answers to the Numerical problems without detailed solutions will not carry any marks.

PART-A

I. Answer the following: -   **1x10=10**
1. Name the Physicist who achieved the unification of electricity and magnetism.
2. Define Astronomical unit.
3. At what angle a stone should be thrown to get maximum horizontal range?
4. State Hooke's of elasticity.
5. Is moment of inertia a scalar or a vector quantity?
6. What is mean free path?
7. Define viscosity.
8. What is the ratio of $\alpha : \beta : \gamma$?
9. Can the temperature of an isolated system change?
10. Does a vibrating body always produce sound?

PART-B

II. Answer any five of the following: -   **5x2=10**
11. Give the S.I unit and dimension of surface tension.
12. A bullet moving with a velocity of 100 ms^{-1} strikes a wooden plank. It penetrates the plank to a depth of 20 cm before coming to a stop. Calculate deceleration or retardation of the bullet while passing throw the plank?
13. When a body is projected with uniform velocity what are horizontal and vertical components of acceleration of a body?
14. Mention two methods of reducing the friction.
15. Define angular momentum. What is its relation with torque?
16. State Bernoulli's theorem. Mention one application of it.
17. Which is more elastic steel or rubber? Why?
18. Give the Laplace correction equation for speed of sound and explain the terms.

PART-C

III. Answer any five of the following:-   **5x3=15**
19. Define average acceleration and instantaneous acceleration. Give its SI unit?
20. Define centripetal acceleration. What is its direction? How is it related to angular velocity?
21. State and explain Newton's laws of motion.
22. Define work. Show that W=F. S
23. What is equilibrium of a rigid body? Mention its conditions.
24. What is a geostationary satellite? What is its period of revolution? Give any one use of it.

25. (i) What are degrees of freedom?

   (ii) State and explain law of equipartition of energy.
26. Discuss the modes of vibration in a closed pipe.

PART-D

IV. Answer any two of the following:-   **5X2=10**
27. Show that path traced by the projectile is a parabola.
28. Prove the law of conservation of energy in case of freely falling body.
29. State and explain parallel and perpendicular axis theorem for rigid bodies.

V. Answer any two of the following:-   **5X2=10**
30. State Newton's Law of cooling and derive the relation $T=T_0+e^{-KT}+C$.
31. What is isothermal process? Derive the expression for the work done in an isothermal process.
32. Arrive at an expression for the time period of a simple pendulum.

VI. Answer any Three of the following:-   **5X3=15**

33. A ball is thrown vertically upward with an initial velocity of 19.6 ms^{-1} neglecting air resistance.

   Find   a) Maximum height reached.

   b) The time of ascent.

   c) Time of descent before it reaches the ground .(g=9.8ms^{-1})
34. The planet Saturn has a mass 95 times that of earth and its radius is 9.5 times the earth radius. Calculate the escape speed of a body from Saturn's surface, if the escape speed from the earth's surface is 11.2kms^{-1}
35. A railway engine of mass 5000kg travels along a level track at 75kmph and collides with a wagon of mass 15000kg travelling in the opposite direction with a velocity of 20kmph. After impact, the engine is found to travel in the same direction as before with a speed of 3kmph.Find the speed of the wagon.
36. How much heat is needed to convert 0.5kg of ice at -10^{0}C to water at 30^{0}C? Given: Specific heat of water is 4200Jkg^{-1} k^{-1}, specific heat of ice is 2100Jkg^{-1}k^{-1} and latent heat fusion of ice 3.33X10^{5}Jkg^{-1}k^{-1}.
37. A police man blows a whistle of frequency 300Hz as a car speeds past him with a velocity of 300kmph.Find the change in frequency as heard by the driver of the car just as he passes the police man (velocity of sound is 345ms^{-1}).

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