

FIRST PUC ANNUAL EXAMINATION - JANUARY-FEBRUARY-2019

Time:- 3.15 Hours

Subject - Physics (33)

Marks:- 70

General Instructions to the Candidates.

1. Answer all parts compulsory
2. Numerical problems solved without relevant formula carry no marks
3. Answer without relevant figure/diagram/circuit wherever necessary will not be carry any marks.

Part -A

I Answer the following questions

1x10=10

1. Write the dimensional formula for force.
2. Write SI unit of power.
3. What is Projectile motion?
4. Write relation between angular velocity and linear velocity.
5. Write expression for acceleration due to gravity at a height h from the surface of earth.
6. Define stress.
7. Define angle of contact.
8. Write ideal gas equation for one mole of gas.
9. State zeroth law of thermodynamics
10. State law of equipartition of energy.

Part -B

II Answer any FIVE of the following questions

5x2=10

11. Name any two fundamental forces in nature.
12. Write any two applications of dimensional analysis.
13. A body gets displacement of 5m in 2s. What is the average velocity?
14. Define scalar product of two vectors.
15. What is kinetic friction? Write the expression.
16. Define specific heat capacity of a substance.
17. Write any two difference between isothermal process and adiabatic process
18. Define frequency and period of oscillation.

Part -C

III Answer any FIVE of the following questions

5x3=15

19. A body moving in uniform circular motion, Derive centripetal acceleration $a_c = \frac{v^2}{r}$
20. State Newton's second law of motion. Hence derive $F=ma$
21. State work energy theorem with proof.
22. Show that kinetic energy of rotating body is $\frac{1}{2} I \omega^2$
23. State Kepler's laws of planetary motion.
24. Calculate $\frac{C_p}{C_v}$ for monatomic gas.
25. Write stress-strain curve for a metal. What is proportional limit and yield point.
26. State Bernoulli's relation and write the equation.

Part -D

IV Answer any TWO of the following questions

2x5=10

27. Derive the equation $x = v_0 t + \frac{1}{2} a t^2$ using V-T graph.
28. State and explain law of conservation of momentum with proof.
29. State and explain parallel axis and perpendicular axis theorem.

V Answer any TWO of the following questions

2x5=10

30. Explain working of carnot's heat engine.
31. Derive an expression for energy of a body which is in S.H.M.
32. What is Doppler effect of sound? Derive expression for apparent frequency of sound when source is moving away from stationary listener.

VI Answer any three of the following questions

3x5=15

33. A body is projected by making an angle 30° with horizontal with a velocity of 39.2 ms^{-1} . Find
 - A. Time of flight (T)
 - B. Range (R)
 - C. Maximum height (H)
34. A body of mass 5 kg moving with a velocity of 6 m s^{-1} collide with another body of mass 2 kg which is at rest. After wards they move in the same direction as before. If the velocity of the body of mass 2kg is 10 m s^{-1} , find the velocity and kinetic energy of the body of mass 5kg.
35. Find the potential energy of a system of four particles each of mass 5 kg placed at the vertices of a square of side 2m.
36. Two identical bars each of length $l=0.1\text{m}$ and area $A=0.02 \text{ m}^2$. One is iron of thermal conductivity $K_1=79\text{W m}^{-1} \text{ K}^{-1}$ and another of brass of thermal conductivity $K_2=109 \text{ W m}^{-1} \text{ K}^{-1}$ are soldered end to end. Free end of iron bar is at 373K and of brass bar is at 273K . Find the temperature at junction of two bars.
37. A wave travelling in a string is described by an equation $y(x,t) = 0.005 \sin(80x-3t)$ all are in SI unit. Find
 - a) amplitude (A)
 - b) Wave length (λ)
 - c) Period (T)

