

First PUC Annual Examination - February - 2020

Time:- 3.15 Hours

Subject - Physics (33)

Marks:- 70

General Instructions to the Candidates.

1. All parts are compulsory
2. Draw relevant diagram/figure wherever necessary
3. Numerical problems should be Solved with relevant formulae.

Part -A

1x10=10

I Answer ALL the questions

1. State principle of homogeneity.
2. What is unit Vector?.
3. Give example for zero work done.
4. Define rigid body.
5. State Hooke's law.
6. Define angle of contact.
7. What is viscosity?
8. What is anomalous expansion of water?
9. What is the Significance of Zeroth law of thermodynamics?
10. How does an average Kinetic energy of gas molecules depend on the absolute temperature.

Part -B

II Answer any FIVE of the following questions

5x2=10

11. Name any two fundamental forces of nature.
12. Mention two supplementary units in SI system
13. What is relative velocity? Give its SI unit.
14. Write the expression for time of flight of projectile motion. Explain the terms.
15. What is inertia of a body? Give one example.
16. Write difference between centre of gravity and centre of mass.
17. Give any two applications of pascal's law.
18. State and Explain force law for simple harmonic motion.

Part -C

III Answer any FIVE of the following questions

5x3=15

19. Derive the expression for centripetal acceleration.
20. What are the methods of reducing friction?
21. Prove work-energy theorem for a constant force.
22. State and explain parallel axes theorem.
23. Derive the expression for acceleration due to gravity at a point above the surface of the earth.
24. Draw stress-strain curve for a metal wire. Mention yield point and breaking point.
25. State and explain Newton's law of cooling.
26. Write any three assumptions of Kinetic theory of gases.

Part -D

IV Answer any TWO of the following questions

2x5=10

27. What is v-t graph? Derive $v^2 + v_0^2 + 2ax$ using v-t graph.
28. State Newton's II law of motion and hence derive $F=ma$.
29. Derive the relation between torque and angular momentum of particles.

V Answer any TWO of the following questions

2x5=10

30. Prove that $\eta = \left(1 - \frac{T_2}{T_1}\right)$ in the case of cannot engine working in a cornot's cycle.
31. Derive an expression for frequency and time period of oscillating bob of simple pendulum.
32. Discuss the modes of vibrations of air column in closed pipe.

VI Answer any THREE of the following questions

3x5=15

33. A ball is thrown into air with a speed of 62 ms^{-1} at angle of 45° with the horizontal. Calculate.
 - i) Maximum height attained.
 - ii) Horizontal range.
34. A labourer weighing 70 kg climbs 11 step of staircase each 0.21 m height in 1.4 second. Find the power in watt and horse power ($g=9.8 \text{ ms}^{-2}$)
35. The size of the planet is same as that of the earth. Its mass is 4 times that of earth. Find the potential energy of the mass 2 kg at a height of 2 m on the planet ($g=10 \text{ ms}^{-2}$)
36. Calculate the rate at which heat is lost through a glass window of area 0.1 m^2 thickness 4mm when the temperature inside is at 40°C and outside is -5°C . coefficient of thermal conductivity of a glass is $1.1 \text{ Wm}^{-1}\text{K}^{-1}$
37. A train is moving at a speed of 72kmph towards a station sounding a whistle of frequency 640Hz. What is apparent frequency of the whistle as heard by a man on the platform when the train.
 - i) Approaches him
 - ii) Recedes from him?(Given speed of sound = 340 ms^{-1})

