SRI BHAGAWAN MAHAVEER JAIN COLLEGE Vishweshwarapuram, Bangalore. **MOCK QUESTION PAPER**	**Course:** I PUC **Subject:** **Physics** **Max. Marks:** 70 **Duration:** 3hrs 15min.

PART-A

I **Answer all the following questions:** **10 x 1 = 10**

1 What is the difference between science and technology?
2 Write the dimensions for coefficient of viscosity of a liquid.
3 What is the amount of work done by a force, when the body moves in a circular path?
4 Where does the centre of mass of two particle system lie, when one particle is heavier than the other?
5 Why 'G' is called universal constant of gravitation?
6 State Hooke's law.
7 What happens to surface tension of water, when detergent is added?
8 Calorimeters are made of metals not glass. Why?
9 Define mean free path.
10 Which quantity is conserved during the oscillation of a simple pendulum?

PART-B

II **Answer any five of the following questions:** **5 x 2 = 10**

11 Write two applications of dimensional analysis.
12 Draw x-t graphs for a particle moving with
a) Uniform velocity b) Uniform acceleration
13 Define uniform circular motion. Give an example.
14 Distinguish between conservative and non conservative forces.
15 Write the expression for kinetic energy of a rolling body and explain the terms.
16 Define escape velocity. Mention its expression.
17 Which is more elastic, steel or rubber? Why?
18 What are free and forced oscillations?

PART-C

III **Answer any five of the following questions:** **5 x 3 = 15**

19 Show that the trajectory of a projectile is parabola.
20 Define power. Hence show that $P = \vec{F}.\vec{v}$ with usual notations.
21 Show that $\tau = I\alpha$, where symbols have their usual meaning.
22 Derive the expression for orbital velocity of a satellite.
23 State Bernoulli's theorem and explain it with an application.
24 Explain the different modes of transmission of heat.
25 Derive an expression for work done during isothermal process.
26 State and explain the law of equipartion of energy. Mention the degrees of freedom for a diatomic molecule.

PART-D

IV **Answer any two of the following questions:** **2 x 5 = 10**

27 Show that $v^2 = u^2 + 2aS$ where symbols have their usual meaning.
28 Derive F=ma, from Newton's second law of motion and hence define unit force.
29 State and explain parallel and perpendicular axes theorem.

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

30 Discuss the Carnot cycle of operation and write the expression for its efficiency.

31 Derive an expression for time period of simple pendulum.

32 What is an open pipe? Explain the vibrations in an open pipe.

VI Answer any three of the following questions: 3 x 5 = 15

33 A bus moving on a straight road with a speed of 126km/hr is brought to rest after 200m. Calculate: i) acceleration of the bus ii) time taken by the bus to come to rest.

34 A stone of mass 0.25kg tied to the end of a string is whirled round in a circle of radius 1.5m with a speed of 40rev/min in a horizontal plane. What is the tension in the spring? What is the maximum speed with which the stone can be whirled around if the string can withstand a maximum tension of 200N?

35. A bullet of mass 0.012kg and horizontal speed 70m/s strikes a block of wood of mass 0.4kg and instantly comes to rest with respect to the block. The block is suspended from the ceiling by means of thin wires. Calculate the height to which the block rises. Also estimate the amount of heat produced in the block.

36 A brass wire 1.8m long at 27^0C is held taut with little tension between two rigid supports. If the wire is cooled to a temperature of -39^0C, what is the tension developed in the wire, if the diameter is 20mm? Coefficient of linear expansion of brass is $2.0\times10^{-5}\,^0C^{-1}$, and Young's modulus of brass is $0.91\times10^{11}N/m^2$.

37 A train blows a whistle of frequency 400Hz in air. i) What is the frequency of the whistle for the platform observer as thetrain, (a) approaches with the speed of 10m/s? (b) recedes with the speed of 10m/s? ii) What is the speed of sound in each case if velocity of sound is 340m/s?

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