Seat Number

April 2015

खगोल - 035

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PHYSICS PAPER - I : PHY - 111
Mechanics & Properties of Matter
(11125)

P. Pages : 3

Time : Two Hours **Max. Marks : 40**

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Graph or diagram should be drawn with the black ink pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. All questions are compulsory and carry equal marks
5. Figures to the right indicate full marks.
6. Draw neat and labelled diagram wherever necessary.
7. Use of logarithmic table or standard electronic calculator is allowed.
8. Symbols have their usual meanings.

1. Attempt **any eight** of the following select correct option. **8**

i) A compound pendulum, Keter's pendulum, torsional pendulum and bifiter pendulum are some of the examples of.....

a) Linear SHM b) Angular SHM
c) Linear motion. d) Projectile motion.

ii) The periodic time of compound pendulum is minimum when the length of compound pendulum is ..... its radius of gyration about a horizontal axis passing through its C.G.

a) Equal to b) Less than
c) Greater then d) Nearly zero to.

iii) Using Keter's pendulum 'g' can be calculated by.....

a) $\frac{2\pi L^2}{T^2}$ b) $\frac{4\pi^2 L^2}{T^2}$

c) $\frac{2\pi^2 L}{T^2}$ d) $\frac{4\pi^2 L}{T^2}$

iv) During bending of the beam, the layer which remains unaltered is called.....
a) Principle axis b) Y- axis
c) Neutral axis d) X- axis.

v) The bodies which regains their original shape and size after removal of the deforming forces are called.....
a) Elastic bodies b) Plastic bodies
c) Elastic & plastic bodies d) Organic bodies.

vi) The angle of contact is..... for a liquid which does not wet the solid.
a) Acute b) Obtuse
c) 90° d) 0°

vii) The .....is the value of surface tension, greater is the tendency to form drops.
a) Larger b) Smaller
c) Equal d) Zero.

viii) S.I unit of surface tension is.....
a) N/m^2 b) Cm/s^2
c) N/m d) dyne $/m^2$

ix) In streamline flow the path of the particles during motion is.....
a) Zig-zag b) in a particular layer
c) Circular d) elliptical

x) Liquid in motion does not possesses.....
a) K.E. b) P.E.
c) Pressure energy d) Flow energy.

2. Attempt **any four** of the following. **8**

i) What is compound pendulum?

ii) Define point of suspension & point of oscillation.

iii) What is Keter's pendulum?

iv) Define bending moment of beam.

v) Define surface tension in terms of surface energy.

vi) Explain turbulent flow of liquid.

3. Attempt **any two** of the following. 8

i) A heavy uniform rod of length 90 cm swings in a vertical plane about a horizontal axis passing through its one end. Calculate the position at which a concentrated mass may be placed so that swing remains unaltered.

ii) Explain Poiseuille's experimental method for determination of co-efficient of viscosity of a liquid.

iii) Obtain an expression for excess pressure inside a soap bubble.

4. a) Attempt **any two** of the following. 6

i) An uniform bar of length 96 cm oscillates like a compound pendulum about horizontal axis passing through its end. Calculate the period of oscillations.

ii) State basic assumptions for theory of bending.

iii) Explain the factors affecting surface tension.

b) Draw a meat labeled diagram of conical pendulum. 2

5. Attempt **any one** of the following. 8

i) A thin uniform bar of rectangular cross-section is supported at its ends on two knief edges and loaded in the middle. Derive an expression for the depression of the mid point of the beam for a load W. Negtect mass of the beam.

ii) State and prove Bernoulli's theorem.

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