April 2014

Seat No. | | | | | | |

कड - 031

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. Answersheet should be written with blue ink only. Graph or diagram should be drawn with the same 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) In case of compound pendulum the point of suspension and oscillation are ----------

a) Irreversible b) interchangeable
c) some times reversible d) fixed

ii) A rigid body, capable of oscillating freely about a horizontal axis passing through it, is called ----------

a) conical pendulum b) torsional pendulum
c) simple pendulum d) compound pendulum

iii) The modulus of rigidity of material wire can be experimentally determined with the help of ----------

a) torsional pendulum b) bifilar pendulum
c) simple pendulum d) kater's pendulum

iv) The change in length of any filament during bending of beam is proportional to the distance of the filament from ----------

a) natural axis b) centre of beam
c) two ends of the beam d) vertical line

v) Using bending of beam experiment, ---------- modulus of elasticity is determined.

a) bulk b) young's
c) rigidity d) poissions ratio

vi) The dimensions of surface tension are ----------

a) $[M^1 L^1 T^{-2}]$ b) $[M^0 L^1 T^{-1}]$
c) $[M^1 L^0 T^{-2}]$ d) $[M^1 L^2 T^{-2}]$

vii) The angle of contact is nearly ---------- for a liquid which completely wets the solid.

a) 0° b) 45°
c) 90° d) 135°

viii) Addition of detergents or soap to the water ------- surface tension of water.

a) reduces b) increases
c) does not change d) unaffected

ix) The S. I unit of coefficient of viscosity is ----------

a) N/SM^2 b) N^2S/m^2
c) $\text{dyne-second}/cm^2$ d) Ns/m^2

x) In turbulent flow the path of the particles during their motion is ----------

a) in a particular layer b) constant
c) zig-zag d) circular

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

i) What is torsional pendulum ?

ii) What do you mean by equivalent simple pendulum ?

iii) What is conical pendulum.

iv) Define axis of bending and neutral axis.

v) Define the term angle of contact.

vi) State Bernoulli's theorem.

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

i) Find the work done in blowing a soap bubble of radius 0.02m. surface tension of soap solution is $25 \times 10^{-3} N/m$.

ii) Write short note on venturi meter.

iii) Obtain an expression for modulus of rigidity of a wire by torsional oscillations.

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

i) In case of compound pendulum, show that centres of suspension and oscillation are inter changeable.

ii) A rectangular bar 20mm in breath and 10mm in depth and 1mm in length is suspended at its end and load of 2kg is applied at its midpoint. Calculate the depression if young's modulus of material bar is $2 \times 10^{11} N/m^2$.

iii) State applications of surface tension.

b) What is kater's pendulum. **2**

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

i) Describe an experiment to determine 'Y" by bending of a beam.

ii) Obtain poiseuille's formula for the rate of flow of a liquid through a capillary tube.

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