Oct-2013

Seat No. | | | | | | |

क्रय - 038

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

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.
5. Figure to the right indicate full marks.
6. Draw neat diagram wherever necessary.
7. Use of logarithmic table or electronic calculator is allowed.
8. Symbols have their usual meaning.

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

i) The moment of momentum is called.
   a) Couple b) Torque
   c) Impulse d) Angular momentum

ii) A liquid does not wet the surface of a solid if the angle of contact is.
   a) Zero b) An acute one
   c) 45^o d) An obtuse one.

iii) Above critical velocity the flow becomes.
   a) Streamlined b) Turbulent
   c) Turbulent as well as streamlined d) Cannot be predicted

iv) The S.I. unit of Young's modulus (Y) is.
   a) N/M b) N/M^2
   c) N^2/M d) N^2/M^2

v) The curved surface on which the neutral axis lies is known as.
   a) Parallel surface b) Perpendicular surface
   c) Neutral surface d) Plain surface.

vi) Insects are able to run on the surface of water while we can not because.
   a) Of buoyancy force b) Due to surface tension
   c) Insects have less weight d) Insects swim on water.

vii) Equation of continuity is.

a) $S_1 V_1 \rho_1 = S_2 V_2 \rho_2$ b) $S_1 S_2 \rho_1 = V_1 V_2 \rho_2$

c) $S_1 V_2 \rho_2 = S_2 V_1 \rho_1$ d) $S_1 V_1 \rho_2 = S_2 V_2 \rho_1$.

viii) Bernoulli's theorem is valid in the case of

a) Incompressible & non - viscous fluid
b) Turbulent motion & non viscous fluid
c) Steady flow & compressible fluid
d) Turbulent flow & incompressible fluid.

ix) The value of acceleration due to gravity (g) is.

a) 9.80 cm/sec^2 b) 980 cm/sec^2
c) 98 cm/sec^2 d) 980 m/sec^2

x) Soap helps in cleaning the clothes because.

a) It reduces the surface tension of solution
b) It gives strength to solution
c) It absorbs the dirt
d) Chemical of soap change.

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

a) What is compound pendulum ? Write the expression for its period.

b) Explain streamline flow.

c) Define angle of contact. When is it acute ?

d) What is cantilever ? State the expression for the depression of free loaded end neglecting weight of cantilever.

e) What is Bifilar pendulum.

f) Draw neat - labeled diagram of venturimeter.

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

a) Derive an expression for rigidity modulus by torsional oscillation.

b) Derive the relation $P = 2T\left(\frac{1}{r_1} + \frac{1}{r_2}\right)$ for surface tension, excess pressure & redius of curvature.

c) In an experiment with Poiseuille's apparatus the following figures are obtained.
Volume of water issuing per second = 0.118 cm^3
Head of water = 34.1 cm, Length of tube = 56.5 cm,
Radius of the tube = 0.0514 cm.
find the coefficient of Viscosity.

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

i) Write a short note on application of surface tension.

ii) Describe Pitot tube.

iii) A bar of length 1m and square cross - section of side 5×10^{-3} m is supported horizontally on two parallel knife edges at its ends & loaded in the middle by mass of 0.1 kg. If the depression at the centre is 1.96×10^{-3} m. Calculate Youngs modulus of material.

b) State Bernoulli's theorem. 2

5. What is Kater's pendulum ? Obtain an expression for acceleration due to gravity in terms of two nearly equal periods of oscillation about the two parallel knife edges. 8

OR

Derive an expression for bending moment of beam. Explain its different cases.

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