F.Y.B.SC. SEM – I (2014 COURSE) : WINTER - 2017

SUBJECT: PHYSICS: MECHANICS AND PROPERTIES OF MATTER

Day : Friday
Date : 27/10/2017

W-2017-0585

Time : 12.00 NOON TO 02.00 PM
Max. Marks : 40

N.B.:

1) All questions are **COMPULSORY.**
2) Figures to the **RIGHT** indicate full marks.
3) Use of electronic calculator/ log table is allowed

Q.1 Attempt any **TWO** of the following: **(10)**

a) Obtain an expression for the velocity of a particle under constant and resistive force.

b) Poisson's ratio cannot be greater than 0.5 for incompressible body. Explain.

c) Assuming that the earth is a homogenous sphere of radius 6.4×10^6 m and density 5.4×10^3 Kg/m^3. Calculate moment of inertia about its axis of rotation.

Q.2 Attempt any **TWO** of the following: **(10)**

a) 'Ostwald's viscometer is used to compare coefficient of viscosity of two viscous liquids' Explain.

b) Describe laboratory method to determine for the modulus of rigidity of materials in the form of a thin wire.

c) Explain in detail how surface tension related to surface energy. Obtain necessary formula.

Q.3 Attempt any **TWO** of the following: **(10)**

a) Calculate the moment of inertia of hollow cylinder about an axis perpendicular to its own axis and passing through its centre.

b) Describe an experiment of determining the M.I. of a fly wheel about axis of rotation.

c) What is the force required to move a flat glass plate of area 10 cm^2, with velocity of 1cm/s over a surface of glycerin 1mm thick, if the viscous coefficient of the glycerin is 20 poise?

Q.4 Attempt any **FIVE** of the following: **(10)**

a) Why does a rain drop falling freely under gravity attain a terminal velocity?

b) State the SI and CGS units of coefficient of viscosity. Find the relation between them.

c) Explain why only solid possess all the three constants of elasticity.

d) Young's modulus for steel is 20×10^{10} N/m^2 and its rigidity modulus is 8×10^{10} N/m^2. Calculate Poisson's ratio for steel.

e) State some every day observations to illustrate the phenomenon of surface tension.

f) Define angle of contact. State under what condition it is zero. Draw necessary diagram.

g) A bullet of 20 gm fired from gun attains a velocity 500 cm/s in 10 sec. Calculates force required to fire it.

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