[Total No. of Questions - 9] [Total No. of Printed Pages - 2]
(2126)

16038(D) - 0 DEC 2016

B. Tech 3rd Semester Examination

Fluid Mechanics (NS)

ME-214

Time : 3 Hours **Max. Marks : 100**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt five questions in all, select one question from each sections A, B, C and D. Section E is compulsory.

SECTION - A

1. Distinguish between:
   (a) Dynamic and kinematic viscosity.
   (b) Cohesion and adhesion.
   (c) Surface tension and capillarity. (20)

2. A vertical square area 1m×1m is submerged in water with upper edges 0.5m below the water surface. Locate the horizontal line on the surface of the square such that the force on the upper portion equals the force on the lower portion. (20)

SECTION - B

3. Explain the terms:
   (a) Greenlines (b) Pathlines (c) Streaklines. (20)

4. The suction pipe of a pump rises at a slope of 2 vertical in 3 along the pipe which is 10cm in diameter. The pipe is 6m long; its lower end being just below the surface of water in the reservoir. For design reasons, it is undesirable that pressure at inlet to the pump shall fall to more that 75kN/m^2 below atmospheric pressure. Neglecting friction, make calculations for the maximum discharge that the pump may deliver. atm pressure=100 kN/m^2. (20)

SECTION - C

5. Explain Laminar Uni-directional flow between stationary parallel plates. (20)

6. Derive and explain Reynolds equations of turbulence. (20)

SECTION - D

7. Explain major and minor lead losses. (20)

8. Show by the use of Buckingham's Pi-theorem, that the velocity of an orifice is given by

$$V = \sqrt{2gh}\left(\frac{D}{H}, \frac{\mu}{\rho VH}, \frac{\sigma}{\rho V^2 H}\right)$$

   H–is head causing flow.

   ρ–mass density.

   D–diamter of the orifice.

   σ–surface tension.

   μ–coefficient of viscosity.

   g–acceleration due to gravity. (20)

SECTION - E

9. Explain the followings:
   (a) Dimensional homogeneity.
   (b) Turbulent flow.
   (c) Ideal and real flow.
   (d) Pascal's law.
   (e) Drag and lift.
   (f) Continum.
   (g) Compressible and incompressible fluids.
   (h) Bernouli's theorem.
   (i) Venturimeter.
   (j) Vortex flow. (2×10=20)