

DIPLOMA IN MECHANICAL ENGINEERING

Term-End Examination

December, 2013

BICE-028 : FLUID MECHANICS

Time : 2 Hours

Maximum Marks : 70

Note : *Question no.1 is compulsory. Answer four more questions, from remaining 2 to 8. Use of scientific calculator is permitted.*

1. Write **True or False** for the following : **7x2=14**
- (a) Chezy's constant is a dimensional constant.
 - (b) If velocity is doubled, the pressure drop will reduce to half the value.
 - (c) Viscosity of liquids increases with increase of temperature.
 - (d) Bernoulli's equation is applicable only for steady flow.
 - (e) Kinetic energy of a fluid element is due to its motion.
 - (f) Monometers are suitable for vertical pressure measurement.
 - (g) Higher the surface tension, higher will be the pressure inside the bubble.

2. (a) Derive the Bernoulli's equation for fluid flow, with the help of Euler's equation. 10
- (b) Define viscosity and Mass Density of liquid. 4
3. (a) Water flows through a horizontal venturimeter with diameters of 0.6 m and 0.2 m. The guage pressure at the entry is $1 \times 10^5 \text{N/m}^2$. Determine the flow rate when the throat pressure is $0.5 \times 10^5 \text{N/m}^2$ (vaccum) Barometric pressure is 1 bar. 7
- (b) Mention the different forms of energy encountered in Fluid flow and explain any two forms of energy. 7
4. Differentiate between :
- (a) Co-planar concurrent forces and co-plannar non-concurrent forces. 7
- (b) Laminar flow and Turbulent flow. 7
5. (a) Explain the significance of Reynold's number in pipe flow. 7
- (b) Explain the difference between the loss of head at entrance and exit of a pipe. 7
6. (a) In a hydroelectric plant, the head available is 450 m of water. 25 cm penstock pipe with friction factor of 0.014 is used. Determine the discharge (Flow rate). The length of the pipe line is 3600 m. 7
- (b) What is Darcy- Weisbach equation ? Explain its various parameters. 7

7. (a) Estimate the discharge of water in an open channel of trapezoidal section with bottom width of 1 m and side slope of 1 : 1 with a flow depth of 1 m. The bed slope is 1 in 2000. Use Manning formula with constant $N = 0.05$. 7
- (b) Explain the kutter's equation for Chezy's constant 'C'. 7
8. Write short note on *any four* of the followings :
- (a) Principle of conservation of energy $4 \times 3^{1/2} = 14$
- (b) Types of flow
- (c) Venturimeter
- (d) Co-efficient of Resistance
- (e) Convergent Mouth piece
- (f) Bell-mouthed orifice
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