

DIPLOMA IN MECHANICAL ENGINEERING

Term-End Examination 01379

June, 2012

BICE-028 : FLUID MECHANICS

Time : 2 Hours

Maximum Marks : 70

Note : *Attempt total five questions in all. Question no 1 is compulsory and four questions are to be attempted out of question no 2 to 8. All the questions are to be answered in English language only.*

1. Write the correct answer of the following : **2x7=14**

(a) Surface tension has the units of :

- (i) Force per unit area
- (ii) Force per unit length
- (iii) Force per unit volume
- (iv) None of the above.

(b) Gauge pressure at a point is equal to :

- (i) Absolute pressure plus atmospheric pressure.
- (ii) Vacuum pressure plus absolute pressure.
- (iii) Absolute pressure minus atmospheric pressure.
- (iv) None of the above.

- (c) Bernoulli's theorem deals with the law of conservation of :
- (i) Mass (ii) Momentum
 (iii) Energy (iv) None of these
- (d) Pitot tube is used for measurement of :
- (i) Pressure
 (ii) Flow
 (iii) Velocity at a point
 (iv) Discharge.
- (e) The range of coefficient of discharge for venturimeter is :
- (i) 0.6 to 0.7 (ii) 0.7 to 0.8
 (iii) 0.8 to 0.9 (iv) 0.95 to 0.99
- (f) The loss of head due to sudden expansion of a pipe is given by :

(i) $\frac{V_1^2 - V_2^2}{2g}$ (ii) $\frac{0.5V_1^2}{2g}$

(iii) $\left(\frac{V_1 - V_2}{2g}\right)^2$ (iv) None of these

- (g) When the pipes are connected in parallel, the total loss of head is ?
- (i) Equal to the sum of loss of head in each pipe.
 (ii) Is same in each pipe
 (iii) Equal to the reciprocal of the sum of loss of head in each pipe
 (iv) None of the above

2. (a) Define the terms : Density, specific weight, specific volume, specific gravity, bulk modulus and vacuum pressure. 7
- (b) Explain the terms : 7
- (i) Dynamic viscosity and
- (ii) Kinematic viscosity . Also give their dimensions.
3. (a) Distinguish between : 7
- (i) Steady flow and unsteady flow
- (ii) Uniform and non - uniform flow
- (iii) Compressible and incompressible flow
- (iv) Laminar and turbulent flow
- (b) A vertical pipe 2m long has 200mm diameter at the lower end and 400mm diameter at the upper end. It carries water of 200 litre per second. If loss in pipe is 1m of water, find pressure difference between two ends of pipe. Also find the velocities at upper and lower ends of the pipe. 7
4. (a) How will you obtain Bernouli's equation from Euler's equation of motion along a stream line ? Write assumptions of Bernouli's equation. 7
- (b) Discuss the relative merits and demerits of venturimeter with respect to orifice meter. 7

5. (a) A circular tank of diameter 4m contains water upto a height of 5m. The tank is provided with an orific of diameter 0.5m at the bottom . 7
 Find the time taken by water
 (i) To fall from 5m to 2m, and
 (ii) For completely emptying the tank, take coefficient of discharge as 0.6
- (b) Distinguish between 7
 (i) External mouthpiece and internal mouthpiece.
 (ii) Mouthpiece running free and mouthpiece running full.
6. (a) How will you determine the loss of head due to friction in pipes using ? 7
 (i) Darcy formula and
 (ii) Chezy's formula
- (b) What do you understand by the term major energy loss and minor energy loss ? 7
7. A pipe of diameter 0.4m and of length 2000m is connected to a reservoir at one end. The other end of the pipe is connected to a junction from which two pipes of lengths 1000m and diameter 300mm run in parallel. These parallel pipes are connected to another reservoir, which is having level of water 10m below the water level of the above reservoir. Determine the total discharge if $f = 0.015$ Neglect minor losses. 14

8. Write short notes on *any four* of the following :

- (a) Orifice meter **3.5x4=14**
 - (b) Impulse - momentum equation
 - (c) Concurrent and coplaner forces
 - (d) Syphons
 - (e) Darcy - Weisbach equation
 - (f) Chezy's formula.
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