



C14-M-405

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BOARD DIPLOMA EXAMINATION, (C-14)  
OCT / NOV-2017  
DME-FOURTH SEMESTER EXAMINATION  
FLUID MACHANICS AND HYDRALUIC MACHINERY

Time : 3 Hours ]

[ Total Marks : 80

**PART - A**

3 x 10 = 30

- Instructions :* (1) Answer all questions.  
(2) Each question carries three marks.  
(3) Answers should be brief and straight to the point and shall not exceed five simple sentences.

1. Define the following fluid properties  
a) Specific Gravity b) Specific Weight
2. Define Viscosity. Write the relation between Dynamic Viscosity and Kinematic Viscosity.
3. Define the following terms a) Steady flow b) Turbulent flow.
4. State Bernoulli's theorem.
5. What is syphon? And State its function.
6. Water flows through a pipe of 400mm diameter and 1400m long with a velocity of 1m / s find the head lost due to friction by using Darcy's formula. Take  $f = 0.006$ .
7. A jet of water 75mm diameter strikes normally on a fixed flat vertical plate. Determine the force exerted by the jet, when the jet strikes the plate with a velocity of 20m / s.
8. Write any three differences between Impulse turbine and Reaction turbine.
9. Draw the layout of Hydro electric power plant and indicate elements of the plant.
10. Write any three differences between Centrifugal pump and Reciprocating pump.

**PART - B**

10 x 5 = 50

- Instructions :* (1) Answer any **five** questions.  
(2) Each question carries **ten** marks.

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- (3) Assume suitable data, missing if any.  
(4) \*Answers should be comprehensive and the criteria for valuation is the content but not the length of the answer.

11. The right limb of a simple U-tube manometer containing mercury is open to the atmosphere and left limb is connected to a pipe in which a fluid of specific gravity 0.85 is flowing. The center of pipe is 10cm below the level of mercury in the right limb. Find the pressure of fluid in the pipe if the difference in the mercury level is 18cm.
12. The diameter of pipe changes gradually from 150mm at point A to 100mm at point B which are situated at 20m and 16m respectively above the datum. The pressure at A is  $0.2\text{N} / \text{mm}^2$  and velocity of the flow at A is  $1.1\text{m} / \text{s}$ , neglecting losses between A and B determine the pressure at B.
13. In a water power scheme the water is available at a head of 200m and is carried through a pipe of length 800m. Determine the minimum diameter of the pipe that will convey water for an output of 1000KW at 80% efficiency. Take  $f=0.008$ .
14. A jet of water of diameter 10cm strikes a flat plate normally with a velocity of  $15\text{m} / \text{s}$ . The plate is moving with a velocity of  $6\text{m} / \text{s}$  in the direction of the jet on the plate. Find (a) Work done by the jet on the plate / sec. (b) Efficiency of the jet.
15. a) Derive an expression to find the normal force developed when a jet impact on a curved fixed plate.  
b) Write any five differences between Francis turbine and Kaplan turbine.
16. A Pelton wheel having a mean bucket diameter of 1.2m is running at 600rpm the net head on the Pelton wheel is 400m. If the bucket deflects the jet by  $165^\circ$  and discharge through the nozzle is 150 liters / sec find (a) Power available at the nozzle (b) Hydraulic efficiency. Take  $C_v = 0.98$ .
- \* 17. A Single acting reciprocating pump as its piston diameter 200mm and its stroke 300mm and speed of crank 60rpm. The suction and delivery heads of 5m and 16m respectively. Determine the power required to drive the pump if its efficiency is 70%.
18. Explain the working of a centrifugal pump with neat sketch.

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