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C14-M-405

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**BOARD DIPLOMA EXAMINATION, (C-14)  
OCTOBER/NOVEMBER-2018  
DME – FOURTH SEMESTER EXAMINATION**

**FLUID MECHANICS AND HYDRAULIC MACHINERY**

*Time : 3 Hours ]*

[ Total Marks: 80

**PART-A**

3X10=30

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

1. Define (a) Viscosity (b) Surface tension of fluids.
2. Calculate the intensity of pressure at a depth of 5km in the Indian Ocean, if the specific gravity of sea water is 1.025
3. Write the applications of Bernoulli's theorem.
4. Distinguish between steady uniform flow and unsteady uniform flow.
5. Write the expression for loss of head due to friction in a pipe flow and explain each term
6. State Chezy's formula. What is meant by Hydraulic mean depth?
7. Find the force of jet impinging on a flat plate moving with a velocity of 10 m/s, the jet velocity is 25 m/s and diameter of jet is 20mm. Take mass density of water as 1000 kg/m<sup>3</sup>
8. Write the classification of water turbines.
9. Write the differences between impulse and reaction turbines.
10. What is pump and give its classification?

## PART-B

10X5=50

**Instructions** :

1. Answer any **Five** questions.
2. Each question carries **ten** marks.
3. Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer

11. How the difference of pressure at two points is determined using manometer? Explain with neat sketch.
12. (a) Draw a neat sketch of Venturimeter and state its working principle.  
(b) A Venturimeter 200mm x 100mm is used for measuring the flow of oil (sp.gr 0.8) , the oil mercury differential gauge shows a deflection of 250mm. Find the discharge of oil if the coefficient of meter is 0.98. Take specific gravity of mercury as 13.6
13. A 15m long pipe is inclined at an angle of  $30^{\circ}$  with the horizontal. The smaller section of the pipe is at lower level and is of 100mm diameter and the larger section of the pipe is 300mm diameter. Determine the difference of pressure between the two sections in  $\text{N/m}^2$ , if the pipe is uniformly tapering and the velocity of water at the smaller section is 2 m/s
14. A jet of water moving with a velocity of 25 m/s strikes on a single vane. The vane is moving with a velocity of 6 m/s in the direction of jet and transmits power  $P_1$ . If the same jet strikes a series of similar vanes mounted on a wheel under the same conditions, transmits power  $P_2$ . Find the ratio between  $P_1$  and  $P_2$  and efficiency of jet.
15. A pelton wheel operates under a head of 600m, out of which one third head is lost in friction in the penstock. Mean diameter of wheel is 3.5m and runs at 200 rpm. Find the power developed and hydraulic efficiency if nozzle discharge is 100 lit/s. Assume coefficient of velocity  $C_v$  as 0.98, bucket angle at outlet is  $15^{\circ}$
16. Draw a sketch showing installation of centrifugal pump and explain function of each component.
17. A double acting reciprocating pump delivers oil of sp.gr. 0.82 through a height of 8m from the pump. The suction head is 5m and piston speed is 4m/s, the diameter of the cylinder is 10cm. Taking the efficiency of the pump as 60%, find the power required to drive the pump.
18. (a) What is draft tube and state its uses?  
(b) Prove that maximum efficiency for a series of moving blades struck by a jet is 50%

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