6224

BOARD DIPLOMA EXAMINATIONS

OCT/NOV-2019

DCE – THIRD SEMESTER

HYDRAULICS

Time: 3 hours   Max. Marks: 80

PART – A   **3 X 10 = 30**

Instructions: 1. *Answer **all** questions.*
2. *Each question carries **Three** Marks.*
3. *Answer should be brief and straight to the point and should not exceed Five simple sentences.*

1. Calculate the density, specific weight and weight of one line of oil of specific gravity 0.8.
2. Define (a) Gauge pressure (b) Absolute pressure.
3. Write any two differences between uniform flow and non-uniform flow.
4. A rectangular tank 5 X 3 m contains water to a depth of 1.2m. This water is discharged through an orifice of area of 2000 cm^2 provided at the bottom of the tank. What will be the time taken to empty the tank completely.
   Take C_d =0.64.
5. Define the terms (a) Notch (b) Weir.
6. Explain the velocity of approach and its effect on the discharge over weirs.
7. Find the loss of head due to friction in a pipe of 1 meter diameter and 15 km long. The velocity of water in the pipe is 1 meter per second. Take coefficient of friction as 0.005.
8. Define (a) wetted perimeter.
   (b) Hydraulic mean depth.
9. Write any three differences between Impulse and Reaction turbines.
10. Explain water hammer effect in pen stocks.

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Instructions: 1. *Answer any **Five** questions*
2. *Each question carries **TEN** Marks.*
3. *Answer should be comprehensive and Criteria for Valuation is the content but not the length of the answer.*

11. An isosceles triangular plate has a base of 50 cm and height is 60 cm. It is immersed vertically such that its apex which is above the base is at a depth 60 cm from the water surface. Find the total pressure and the depth of Centre of pressure.

12. A horizontal venturimeter 300 mm X 150 mm is used to measure the flow of an oil of specific gravity 0.8. The rate of flow is 0.05 Cumec. Find the reading of oil-mercury differential manometer. Take the coefficient of discharge of venturimeter as 0.98.

13. Water flows through a sharp crested circular orifice of 7.5 mm diameter on the side of the tank. The head of water above the centre of orifice is 1.22m.The jet passes through a ring whose centre is 1.22m horizontally and 330 mm vertically from the centre of the vena contracta. The time required to discharge 66 lit of water was 500 sec. Find the hydraulic coefficients C_c, C_v and C_d.

14. A rectangular notch of crest width 0.4 m is used to measure the flow of water in a rectangular channel 0.6 m wide of 0.45 m deep. If the water level in the channel is 0.225 m above the weir crest, find the discharge in the channel. For the notch assume $C_d = 0.63$ and take velocity of approach into account.

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15. Calculate how much head would be saved in a pipe of 40 m length and 80 mm diameter, of the central 20 m length is replaced by 130 mm diameter pipe. The change of section being sudden. The quantity of water flowing is 12.5 lit/sec. assume f= 0.01 in each case and consider all losses of head. Take $C_c = 0.062$.

16. Two reservoirs each 500 m long are available for connecting to a reservoir from which a flow of 0.2 m³/sec is required. The diameters of two pipes are 0.4 m. Determine the ratio of head lost when the pipes are connected in series to the head lost when they are connected in parallel. Neglect minor losses.

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17. A rectangular channel 4 m wide and has depth of water 1.5 m. the slope of the bed of the channel is in 1000 and value of chezy's constant C = 55. It is desired to increase the discharge to a maximum by changing the dimensions of the section for constant area of cross section, slope of the bed and roughness of the channel. Find the new dimensions of the channel and also find increase in discharge.

18. Explain the component parts of a centrifugal pump with the help of a neat sketch.