C14-C-**303**

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BOARD DIPLOMA EXAMINATION, (C–14)
OCT/NOV—2017
DCE—THIRD SEMESTER EXAMINATION

HYDRAULICS

Time : 3 hours]　　　　　　　　　　　　　　[*Total Marks* : 80

PART—A　　　　　3×10=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. List out different properties of fluid.

2. What is manometer? Write the different types.

3. Define hydrostatics, hydrokinematics and hydrodynamics.

4. Define vena-contracta and coefficient of resistance.

5. Water is passing over a rectangular notch 200 mm wide under a constant head of 100 mm. Find the coefficient of discharge, if the water is being collected in the tank at the rate of 11·2 lit/sec.

6. List the classifications of weirs.

7. State Darcy's formula for loss of head due to friction in pipes and state Chezy's formula.

8. A rectangular channel has 50 m^2 area, if the channel section is to be most economical. Calculate the bed width and depth.

9. List out the classification of turbine according to the direction of flow of water through runner.

10. State the component parts of a hydroelectric power plant.

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PART—B   10×5=50

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Instructions : (1) Answer *any* **five** questions.

(2) Each question carries **ten** marks.

(3) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. A rectangular plate 3 m long and 1·5 m wide is immersed vertically in water in such a way that its 3 m side is parallel to water surface and its top edge is 2·5 m below the free surface. Find the total pressure and depth of centre of pressure on one side of the plate.

12. A vertical tapering pipe has top dia 0·7 m and bottom dia 0·9 m. The water is flowing down in full. The pipe is 6 m long. The frictional loss between top and bottom points may be taken as 0·15 × velocity head at inlet. The velocity at the inlet is 6 m/sec, determine the pressure at top in N/mm^2. When the pressure head at the bottom is 8·8 m of water.

13. Water flows through a sharp edged circular orifice 7·5 m dia in the side of a tank. The head of water above the centre of the orifice is 1·22 m. The jet passes through a ring whose centre is 1·22 m horizontally and 330 mm vertically from the centre of venacontract. The time required to discharge 66 lit of water was 500 sec. Find the hydraulic coefficient C_c, C_v and C_d.

14. A rectangular channel 2 m wide has a submerged weir 1 m high. If the depth upstream of the weir is 1·6 m and the water surface drops by 0·35 m passing over the weir. Estimate the discharge assuming C_d as 0·6.

15. A horizontal pipe 150 mm in diameter is suddenly reduced to 75 mm diameter. Water is flowing through the largest to smaller pipe at the rate of 10 lit/sec. What is the loss of energy at the sudden contraction in N-m per minute? Take the coefficient of contraction as 0·64.

16. *(a)* A compound piping system consists of three pipes of lengths 1500 m, 1200 m and 1000 m and of diameters 0·5 m, 0·4 m and 0·3 m respectively are connected, in series convert the system to *(i)* an equivalent length of 0·4 m dia pipe and *(ii)* an equivalent size pipe 3700 m long.

   (b) The bed slope of a river was found to be 0·000146. If the hydraulic mean depth was 2·1 m and the velocity as determined by vertical floats is 0·84 m/s. Find the values of Chezy's and basins constant.

17. A rectangular channel has a cross sectional area of 32 m^2 and a bed slope of one in 1200.

   (a) Find the dimensions of most economical section.

   (b) Find Chezy's constant for the above section, given kutters constant N as 0·015.

18. Compare the impulse turbine with reaction turbine on ten different aspects.

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