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C16-C-303

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BOARD DIPLOMA EXAMINATION, (C-16)

AUGUST/SEPTEMBER—2021

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. Define (a) mass density, (b) specific weight and (c) specific gravity.
2. State the relation among atmospheric pressure, gauge pressure and absolute pressure.
3. Define uniform and non-uniform flow.
4. What is an orifice? List the classification of orifice according to size and shape.
5. Write any three advantages of triangular notch over a rectangular notch.
6. A rectangular notch 3 m wide has a constant head 40 cm, assume  $C_d = 0.62$ . Find the discharge over the notch.
7. Write Darcy-Weisbach equation for head loss due to friction in pipes and name the terms.
8. Define (a) wetted perimeter and (b) hydraulic mean depth.
9. Write the functions of draft tube.
10. Write any three functions of a surge tank.

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PART—B

10×5=50

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

(2) Each question carries ten marks.

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

11. A rectangular plate 2.8 m long and 1.4 m wide is immersed vertically in water in such a way that its 2.8 m side is parallel to water surface and its top edge is 2.2 m below the free surface. Find the total pressure and depth of center of pressure on one side of the plate.
12. A venturimeter 30 cm × 10 cm is used for measuring the discharge of an oil flowing through pipe. The difference of pressures measured by a differential mercury manometer is 150 mm. The specific gravity of oil is 0.8 and the venturi coefficient is 0.97. Calculate the discharge of oil in liters/sec.
13. A sharp edged orifice of 25 mm diameter, has coefficient of velocity and coefficient of contraction as 0.98 and 0.62 respectively. The jet drops 1 m in horizontal distance of 2.65 m. Determine the head of water in meters and the discharge in liters/sec.
14. A right angled V-notch was used to measure the discharge of a centrifugal pump. If the depth of water at V-notch is 200 mm, calculate the discharge over the notch in liters per minute. Take  $C_d$  as 0.62.
15. A rectangular notch has a discharge of 21.5 cubic meters per minute when the head of water is half the length of notch. Find the length of notch. Assume  $C_d = 0.6$ .
16. Calculate the discharge through a pipe of diameter 20 cm when the difference of pressure head between the two ends of the pipes 600 m apart is 4.5 m of water. Assume  $f = 0.007$ .
17. A rectangular channel carries water at the rate of 400 lit/sec when the bed slope is 1 in 2000. Find the most economical dimension of the channel, if manning's constant  $n$  as 0.012.
18. Compare centrifugal pump with reciprocating pump in any eight aspects.

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