6224

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.

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.

★ ★ ★