



C14-C-303

4227

BOARD DIPLOMA EXAMINATION, (C-14)

OCT/NOV—2016

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) specific weight, (b) specific gravity and (c) surface tension.
2. Calculate the pressure at 5 m below free surface of oil with specific gravity 0.8.
3. Define (a) pressure energy and (b) piezometric head.
4. What is an orifice? State the classification of orifices according to size.
5. State any three types of notch according to shape of opening.
6. A weir 12 m long has a constant head of water 300 mm. Find the discharge over the weir. Take C_d as 0.62.
7. Define (a) Laminar flow and (b) Reynolds number.
8. What is meant by most economical section of the channel?

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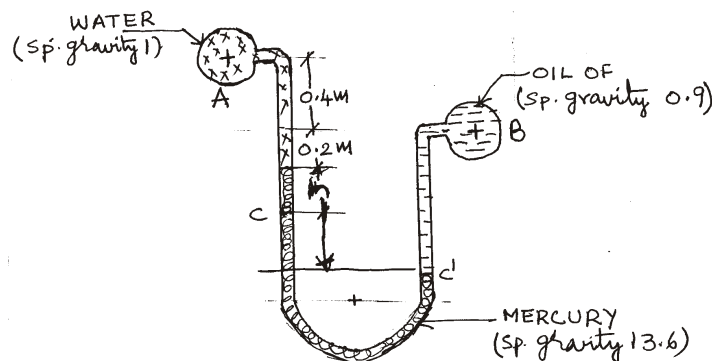
9. What is the difference between reciprocating pump and centrifugal pump? Write only three points.
10. State any six component parts of a hydroelectric power plant.

PART—B

10×5=50

- 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 U-tube differential manometer containing mercury is attached to two pipes A and B as shown in figure below. The pipe A is carrying water under a pressure of 0.12 N/mm^2 and pipe B is carrying oil of specific gravity 0.9 under a pressure of 0.23 N/mm^2 . Find the mercury level difference in the manometer.



12. A venturi meter is to be fitted to a pipe of 250 mm diameter where the pressure head is 7.5 m of flowing liquid. If the maximum flow through venturi meter is 9000 lit/min, find the least diameter of the throat to ensure that the pressure head does not become negative. Take $C_d = 0.97$.

13. (a) Define coefficient of discharge. 2
- (b) A circular tank of diameter 3 m contains water up to a height of 9 m. An orifice of diameter 400 mm is provided at the bottom of the tank. Calculate the time required to empty the tank, if C_d of orifice is 0.6. 8

14. (a) A rectangular notch of 2.5 m width has a constant head of 400 mm. Find the discharge over the notch, in liters per second, if coefficient of discharge for the notch is 0.62. 5
- (b) 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. Take C_d as 0.62. 5
15. Water flows through a pipe of 250 mm diameter and 60 m length with a velocity of 2.5 m/sec. Find the head loss due to friction using (a) Darcy's formula and (b) Chezy's formula. Take Chezy's constant as 55. 5+5
16. (a) Two pipes of lengths 2 km each and diameters 1 m and 0.8 m respectively are connected in parallel. The coefficient of friction for each pipe is 0.01. The total flow is equal to 300 liter/sec. Find the rate of flow in each pipe. 5
- (b) A rectangular channel has 50 m² area. If the channel section is to be the most economical, calculate the bed width and depth. 5
17. Water flows through a trapezoidal channel of base width 8 m; with depth of flow 6 m. The side slopes are 3 : 2 and bed slope of channel is 1/2200. Manning's constant 0.027. Find the discharge.
18. List any ten differences between impulse and reaction turbines.
