



c09-c-304

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BOARD DIPLOMA EXAMINATION, (C-09)

MARCH/APRIL—2018

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. The specific gravity of a liquid is 2.5. What are its specific weight, mass density and specific volume?
2. Convert the following into absolute pressure :
 - (a) Vacuum pressure of 4.5 m of water
 - (b) Vacuum pressure of 58 kN/m²
3. A Pitot static tube having a coefficient of 0.98 is placed at the centre of a pipeline in which Benzene is flowing. The Pitot tube shows a reading of 10 cm. Calculate the velocity at the centre line of the pipe.
4. An internal mouthpiece of dia. 50 mm is discharging water under a constant head of 8 m. Find the discharge in m³/sec, if the mouth-piece is—
 - (a) running free;
 - (b) running full.
5. State various classifications of notche.

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6. A weir 12 m long has a constant head of water 300 mm. Taking the coefficient of discharge as 0.62, determine the discharge over the weir in lit/sec.
7. Find the loss of head due to friction in a pipe of diameter 200 mm and length 60 m, when the velocity of water in the pipe is 2.5 m/s. Use Chezy's formula. Assume $C=35$.
8. What do you understand by the term 'most economical section' of a channel?
9. What are the main components of Francis turbine?
10. Explain with neat sketches anchor blocks and tail race.

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 sluice gate of breadth 2 m depth 1.2 m contains a liquid of specific gravity 1.45 on the u/s of it up to a height of 1.5 m above the top edge of the gate. There is water on the d/s up to the top edge of the gate. Find the resultant pressure and centre of pressure.
12. The diameter of pipe changes gradually from 150 mm at a point A to 100 mm at point B which are situated at 20 m and 16 m respectively above the datum. The pressure at A is 0.2 N/mm^2 and velocity of flow at A is 1.1 m/sec. Neglecting losses between A and B, determine the pressure at B.
13. Explain the experimental method of finding hydraulic coefficients of a small orifice.
14. A broad crested weir 50 m long has 50 cm height of water above the crest. Calculate the max. discharge over the weir, if the velocity of approach is 1.25 m/s. Assume coefficient of discharge as 0.65. Neglect the end contractions, if any.

15. Two reservoirs, whose surface levels differ by 30 m, are connected by a pipe of 600 mm dia and 3 km long. The pipeline crosses a ridge, whose summit is 9 m above the higher reservoir. Find the minimum depth below the ridge at which the pipe must be laid, if the absolute pressure in the pipe is not to fall below 8 m of water. Also calculate the discharge through the pipe. Take, $f = 0.0075$. The length of inlet leg is 300 m.
16. Design the most economical earthen trapezoidal channel with velocity of 1 m/sec and to discharge $3 \text{ m}^3/\text{sec}$ having side slopes 1V : 2H. Take, $C = 45$. Bed slope of channel is 1 in 1200.
17. With the help of a sketch, briefly explain the working of a centrifugal pump.
18. (a) What is compound pipe? How do you determine equivalent size of a compound pipe?
- (b) An earthen channel with 3 m wide base and side slopes 1:1 carries water with a depth of 1 m. The bed slope is 1 in 1600 and Manning's $N = 0.04$. Calculate the discharge.
