3220

BOARD DIPLOMA EXAMINATION, (C–09)
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. Calculate the specific mass, specific weight and specific gravity if one liter of liquid weights 12 N.

   2. Define *(a)* atmospheric pressure, *(b)* gauge pressure and *(c)* absolute pressure.

   3. State Bernoulli's theorem and express it in the equation form.

   4. What is an orifice? State the classification of the orifices according to the size and shape.

   5. What are the advantages of V-notch over a rectangular notch?

   6. What is cipolletti weir? What is the discharge through a Cipolletti weir using Francis formula?

   7. State the minor losses in pipes giving the formula for each.

   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. State the use of a foot valve and a strainer in a centrifugal pump.

   10. State the component parts of hydro-electric power plant.

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 3·2 m and depth 2·6 m is provided under a wall. The height of water on the u/s above the top of gate is 3 m and on d/s it coincides with top of gate. Calculate the total pressure and centre of pressure.

12. A pipe 300 m long has a slope 1 in 100 and tapers from 1·25 m diameter at the higher end to 625 mm diameter at the lower end. Determine the pressure at the lower end, if the pressure at the higher end is 0·1 N/mm^2 and the discharge through the pipe is 100 lit/sec of water.

13. Water flows through a circular orifice of 25 mm diameter provided in the side of a tank discharging water under a constant head of 800 mm. The coordinates at a certain point of the jet are 320 mm from the venacontracta horizontally and 32 mm vertically below the centerline of the orifice. The water is collected in a tank of size 600 mm × 600 mm and collected water rises by 30 mm in 10 seconds. Find C_c, C_v and C_d.

14. A rectangular notch of crest width 0·4 m is used to measure the flow of water in a rectangular channel 0·6 m wide of 0·45 m deep. If the water level in the channel is 0·225 m above the weir crest, find the discharge in the channel. For the notch, assume C_d 0 63 and take velocity of approach into account.

15. 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 lit/sec. Find the rate of flow in each pipe.

16. *(a)* A 2 km long water main has to carry a discharge of $0·5$ m^3/sec. If the maximum allowable loss head due to friction is 25 m , find the minimum diameter required. Use Darcy's equation. Assume f 0 008, neglect minor losses. 5

(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 float is 0·84 m/sec, find the values of Chezy's and Bazin's constant. 5

17. A rectangular channel carries water at the rate of 400 lit/sec when bed slope is 1 in 2000. Find the most economical dimensions of the channel if Manning's constant n = 0·012.

18. Briefly explain the working of an air lift pump with the help of a neat sketch.

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