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C09–C–304

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BOARD DIPLOMA EXAMINATION, (C–09)

OCT/NOV—2017

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) Answer should be brief and straight to the point and shall not exceed *five* simple sentences.

1. Define the following : 1+1+1

(a) Specific volume

(b) Viscosity

(c) Vapour pressure

2. List different devices used for measuring liquid pressure. 3

3. Define the following : 1+1+1=3

(a) Irrotational flow

(b) Non-uniform flow

(c) Unsteady flow

4. *(a)* What is vena-contracta?

(b) List different mouthpieces based on their shape. 1½+1½=3

5. *(a)* What is velocity of approach?

(b) List different weirs based on their shape and discharge conditions. 1½+1½=3

6. A rectangular notch 2·5 m wide has a constant head of 40 cm. Find the discharge over the notch, in liters per second, if coefficient of discharge for the notch is 0·65. 3

7. Give the equation for the following condition sin a pipe flow : 3

(a) Loss of head at the entrance of pipe

(b) Loss of head due to sudden enlargement

(c) Loss of head due to gradual contraction or enlargement

8. Define the following terms : 1½+1½=3

(a) Wetted perimeter

(b) Hydraulic mean depth

9. What are air vessels? State any two functions of air vessels in pumps. 1+2

10. List any six component parts of hydro-electric power plant. 3

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 circular plate 2·2 m in diameter is immersed in water so that its plane makes an angle of 30° to the water surface and the highest point of the plate is 1·6 m below the surface. Calculate the total pressure and center of pressure.

12. A venturimeter is fitted to a 15 cm dia pipe line which is horizontal, where the pressure head is 10 m of water. The maximum flow through the venturimeter is 8500 lit/min. Find the diameter of the throat, so that the pressure head does not become negative. Assume coefficient of venturimenter as 1·0.

13. *(a)* A square tank of 1·5 m × 1·5 m cross-sectional area contains water to a depth of 5 m, an orifice of 50 mm dia is provided at the bottom of the tank. Find the fall of water level, when the orifice is opened in 5 min. Take C_d 0 65. 5

(b) An internal mount piece of dia 60 mm is discharging water under a constant head of 9 m. Find the discharge in lit/sec, if the mouth piece is

(i) running free

(ii) running full 2½+2½

14. A rectangular channel 1·2 m wide has a submerged weir 1 m high. If the depth on upstream of the weir is 1·6 m and the water surface drops by 0·25 m is passing over the weir. Estimate the discharge assuming C_d 0 67.

15. A main pipe divides into two parallel pipes of 0·8 m and 0·5 m diameter with equal lengths. Parallel pipes meet again at the lower end. Find the discharge in each parallel pipe, if the discharge in the main pipe is 2·2 m^3/sec. The coefficient of friction for each parallel pipe is same.

16. *(a)* What is compound pipe? Give its equation. 3+2=5

(b) Define the following : 1+2+2=5

(i) Depth of flow

(ii) Steady flow

(iii) Unsteady flow

17. A trapezoidal channel has side slopes 1 : 1 and is discharging 20 m^3/sec with a bed slope of 0·5 m per 1000 m. Manning's n 0 01. Determine the section of the channel.

18. Explain the working of a Pelton wheel turbine with a neat sketch.

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