

November 2022

*Time – Three hours*  
*(Maximum Marks: 75)*

- [N.B.]**
1. Q.No. 8 in PART – A and Q.No. 16 in PART – B are compulsory. Answer any FOUR questions from the remaining in each PART – A and PART – B.
  2. Answer division (a) or division (b) of each question in PART – C.
  3. Each question carries 2 marks in PART – A, 3 marks in Part – B and 10 marks in PART – C.]

**PART – A**

1. Differentiate cohesion and adhesion.
2. What is atmospheric pressure?
3. What is the total energy possessed by a fluid body?
4. What are the various losses in pipe flow?
5. What are the advantages of a V-notch over a rectangular notch?
6. What is meant by end contractions of a weir?
7. What is specific energy?
8. What is the significance of providing air vessels?

**PART – B**

9. What is total pressure? How it is calculated?
10. Differentiate between laminar and turbulent flow.
11. What is vena-contracta? State its significance.
12. What are the conditions for maximum discharge through a trapezoidal channel?
13. What are the various types of canal losses?
14. What is the yield of an open well? Mention the methods to find the yield of a well.
15. What is priming?
16. Write down the equation of discharge over a rectangular weir.

PART - C

17. (a) A simple manometer is connected to a pipeline carrying an oil of relative density 0.75 through its right limb. The centre of the pipe is 100 mm below the level of mercury in the right limb. Find the absolute pressure at the centre of the pipe when the mercury deflection between the limbs is 150 mm.

(Or)

- (b) A circular plate of 3m diameter is immersed in water such that its maximum and minimum depths are 4m and 2m respectively from the free water surface. Calculate the total pressure on the plate and its point of application on the plate.

18. (a) A horizontal venturimeter having an inlet diameter 200 mm and throat diameter 100 mm is fitted to a pipe line transmitting an oil of specific gravity 0.9. If the discharge through the pipe is 60lps, what will be the reading of oil-mercury differential manometer?

(Or)

- (b) Water is supplied to a factory from a hydro power station through a pipe of 250mm diameter and 12 km long. If the pressure supplied at the power station is  $45 \text{ MN/m}^2$ . What will be the maximum power transmitted by this pipe to the factory. Also find the efficiency of this transmission. Assume  $f=0.028$ .

19. (a) Water flows over a right angled triangular notch for a depth of 450 mm. The above discharge then passes over a rectangular notch having a crest of length 1.2m. What will be the head of water over the rectangular notch if the co-efficient of discharge of both the notches were same.

(Or)

- (b) A weir 10 m long is divided into four equal bays by three vertical posts each 250 mm wide. Taking  $C_d=0.060$  calculate the discharge over the weir if the head of water over the crest of the weir is 1.5m.

20. (a) A rectangular channel carries water at a rate of 500lps at a bed slope of 1 in 2500. Find the most economical dimensions of the channel if  $C=50$ .

(Or)

- (b) An economical trapezoidal channel discharges 18 cumecs of water at a velocity of 1.8 m/s. The side slopes are 1:1. Taking Chezy's constant as 60, find (i) Depth of flow (ii) Bed width and (iii) Bed fall.

21. (a) With neat sketches explain the construction and working principle of a single acting reciprocating pump.

(Or)

- (b) A centrifugal pump discharges 2000 lpm of water to a height of 12m. The suction pipe is 10m long and 100mm in diameter and the delivery pipe is 60m long and 80 mm in diameter. Taking  $f=0.04$  for all the pipe and the overall efficiency of pump 80% calculate the power required to drive the pump.

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