



7. The discharge over a rectangular notch is CO4- R  
 (a) Inversely proportional to  $H^{3/2}$  (b) Directly proportional to  $H^{3/2}$   
 (c) Inversely proportional to  $H^{5/2}$  (d) Directly proportional to  $H^{5/2}$
8. The sheet of water flowing through a notch or over a weir is called CO4-R  
 (a) Crest (b) Sill (c) Nappe (d) Nacelle
9. Pump is a device which convert CO5- R  
 (a) Hydraulic energy into electrical energy.  
 (b) Hydraulic energy into Mechanical energy  
 (c) Mechanical energy into hydraulic energy.  
 (d) Mechanical energy into electrical energy.
10. Which of the following is / are the components of centrifugal pump CO5- R  
 (a) Impeller (b) Casing (c) Suction pipe (d) All of above

PART – B (5 x 2= 10 Marks)

11. Define capillarity CO1- R
12. Write continuity equation based on principle of conservation of mass CO2- R
13. State the applications of Bernoulli's equation CO3- R
14. Classify notches CO4- R
15. Define Reynolds number CO5- R

PART – C (5 x 16= 80 Marks)

16. (a) A U tube manometer is used to measure the pressure of water in a pipe line, which is in excess of atmospheric pressure. The right limb of the manometer contains mercury and is open to atmosphere. The contact between water and mercury is in the left limb. Determine the pressure of water in the main line, if the difference in level of mercury in the limbs of U-tube is 10 cm and the free surface of mercury is in level with the centre of the pipe. If the pressure of water in pipe line is reduced to  $9810 \text{ N/m}^2$ , calculate the new difference in the level of mercury. Sketch the arrangements in both cases. CO1- App (16)

Or

- (b) An oil of viscosity 5 poise is used for lubrication between a shaft and sleeve. The diameter of the shaft is 0.5 m and it rotates at 200 r.p.m. Calculate the power lost in oil for a sleeve length of 100 mm. The thickness of oil film is 1.0 mm. CO1- App (16)
17. (a) Derive acceleration of a Fluid Particle in Cartesian coordinates CO2- App (16)  
Or
- (b) Water flows through a pipe AB 1.2 m diameter at 3 m/s and then passes through a pipe BC 1.5 m diameter. At C, the pipe branches. Branch CD is 0.8 m in diameter and carries one-third of the flow in AB. The flow velocity in branch CE is 2.5 m/s. Find the volume rate of flow in AB, the velocity in BC, the velocity in CD and the diameter of CE. CO2- Ana (16)
18. (a) Discuss in detail water hammer in pipes with neat sketch. CO3- Ana (16)  
Or
- (b) An oil of sp. Gr. 0.8 is flowing through a venturimeter having inlet diameter 20 cm and throat diameter 10 cm. The oil-mercury differential manometer shows a reading of 25 cm. Calculate the discharge of oil through the horizontal venturimeter. Take  $C_d=0.98$ . CO3- Ana (16)
19. (a) Determine the height of a rectangular weir of length 6 m to be built across a rectangular channel. The maximum depth of water on the upstream side of the weir is 1.8 m and discharge is 2000 liters/s. Take  $C_d = 0.6$  and neglect end contractions. CO4-U (16)  
Or
- (b) Explain how current meter and float is used for measuring the flow in a channel CO4- Ana (16)
20. (a) Discuss in detail sludge pump and vacuum pump CO5- U (16)  
Or
- (b) A centrifugal pump is to discharge  $0.118 \text{ m}^3/\text{s}$  at a speed of 1450 r.p.m. against a head of 25 m. The impeller diameter is 250 mm, its width at outlet is 50 mm and manometric efficiency is 75 %. Determine the vane angle at the outer periphery of the impeller. CO5-U (16)

