Q. P. Code: 21035

30 MAY 2019

/CIVIL/SEM III/FM I/ CBCS

(3 hours) Max. Marks: 80

N.B.:

1. **Q.1** is **compulsory**
2. Attempt any **three** question out of remaining **five**
3. Assume **suitable** data if **required**

1. Attempt the following

a) Write a short note on capillarity and surface tension 5

b) Experimental methods of determining hydraulic coefficients 5

c) Differentiate between langrangian and eularian methods 5

d) Explain circulation and vorticity 5

2. a) A triangular plate of 1 meter base and 1.5 meter altitude is immersed in water .The plane of the plate is inclined at 30° with free water surface and the b/s parallel to and at a depth of 2 m from water surface. Find the total pressure on the plate and the position of centre of pressure. 10

b) A venturimeter of size 200 mm × 100 mm is used to measure the flow of liquid of sp.gr. 0.85. If the mercury differential manometer head is 250 mm, find the discharge through the venturimeter. Also find the absolute pressure at the throat if the pressure of the inlet is 49 KPa. Assume Cd = 0.98 10

3. a) Derive the expression for metacentric height with neat sketch also explain experimental procedure for determination of metacentric height. 10

b) A tank has two identical orifices in one of its vertical sides. The upper orifice is 4m below the water surface and lower one 6m below water surface. If the value for C_v for each orifice is 0.98. Find the point of intersection of two jets. 10

4. a) An internal mouthpiece of 75mm diameter is discharging water at a constant head of 8m. find the discharge through the mouthpiece when (i) the mouthpiece is running free (ii) the mouthpiece is running full 10

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b) Derive expression for discharge through a rectangular notch also, find the discharge of water flowing over a rectangular notch of 2m length when the constant head over the notch is 280mm. Take Cd = 0.60 10

5. a) Water flows over a rectangular sharp crested weir 1m long, the head over the sill of the weir being 0.66 m. The approach channel is 1.4 wide and depth of flow in the channel is 1.2 m. starting from first principles, determine the rate of discharge over the weir. Consider also the velocity of approach and the effect of end contractions. Take coefficient of discharge for the weir as 0.6. 10

b) Derive Bernoulli's equation of motion also states assumptions made with its applications. 10

6. Write short note on

a) Types of fluids 5

b) Stability conditions for floating and submerged bodies 5

c) Classification of orifice 5

d) Total pressure and centre of pressure 5

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