ODD SEMESTER EXAMINATION 2019(BACK PAPER)

Subject code: TCE 301 **Total no. printed pages: 2**

Roll No. | | | | | | | | | | |

B.Tech. (Semester-III)
Fluid mechanics

Time: 3:00 Hours **Total Marks: 100**

1. Attempt any 4 of the following: **[5x4=20]**

a) What are different types of fluids?

b) What do you mean by velocity potential function and stream function?

c) Define the terms (i) source (ii) sink (iii) Doublet

d) What do you mean by velocity of approach? What will be discharge through rectangular notch if velocity of approach is considered?

e) Calculate the pressure intensity due to depth of 0.5 m of (i) water (ii) mercury (iii) an oil of specific gravity 0.85

2. Attempt any 2 of the following: **[10x2=20]**

a) For having a blood sample, a fine glass of capillary of diameter 2 mm was held on freshly punctured fingertip. Estimate in ml the volume of blood sample so drawn. Take surface tension as 5×10^{-2} N/m and its contact angle with glass as zero degree. Take density of blood as 1060 kg/m3.

b) A 2cm wide gap between two vertical plane surfaces is filled with an oil of specific gravity 0.85 and of dynamic viscosity 2.5 N-s/m^2. A metal plate 1.25 m x 1.25 m x 0.2 cm thick and weighing 30 N is placed midway in the gap. Find the force required if plate is to be lifted with a constant velocity of 0.12 m/s.

c) State and prove the Pascal's Law.

3. Attempt any 2 of the following: **[10x2=20]**

a) Prove that an error of 1 % in the measurement of head will produce an error of 2.5 % in the measurement of discharge over a triangular notch.

b) A tank 1 m x 1m in area has a 20 mm diameter orifice at its bottom. Initially the depth of water is 4 m. Find time taken for the water surface to drop by 1 m.

c) The maximum flow through a rectangular channel is 2.2m deep and 3m wide is $1.8m^3$, Find the maximum height at which the crest of the weir may be installed so that water will not overflow the side of the channel. Take Cd = 0.62

4. Attempt any 4 of the following: **[5x4=20]**

a) Explain the experimental determination of hydraulic coefficients.

b) Explain the growth of boundary layer over long thin plate.

c) Differentiate between Absolute pressure and gauge pressure

d) Differentiate between Simple manometer and differential manometer.

e) What are different types of fluid flows?

5. Attempt any 2 of the following: **[10x2=20]**

a) Derive Bernoulli's energy equation from principle and state the assumptions made in the derivation

b) An oil of viscosity 10 poise flows between two parallel fixed plates which are kept at a distance of 50mm apart. Find the rate of flow of oil between the plates if the drop of pressure in a length of 1.2m be 0.3 N/m^2. The width of the plate is 200mm.

c) A horizontal pipe of diameter 500 mm is suddenly contracted to a diameter of 250 mm. The pressure intensities in the large and smaller pipe is given as 13.734 N/cm^2 and 11.772 N/cm^2 respectively. Find the loss of head due to contraction if C = 0.62. Also determine the rate of flow of water.