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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech II Year II Semester Supplementary Examinations /Dec 2019
FLUID MECHANICS & HYDRAULIC MACHINERY
(Electrical & Electronics Engineering)

Time: 3 hours

Max. Marks: 60

(Answer all Five Units 5 x 12 = 60 Marks)

UNIT-I

- 1 a Define Hydro static law and derive the condition for pressure head. 6M
b How does viscosity of a fluid vary with temperature? 6M

OR

- 2 a Define centre of pressure and derive an expression for centre of pressure for a vertically submerged surface. 6M
b What are different types of Mechanical Pressure Gauges? Explain briefly about Bourdon's Pressure Gauge? 6M

UNIT-II

- 3 a A stream function is given by $\psi = 5x - 6y$. Calculate the velocity components and also magnitude and direction of the resultant velocity at any point. 6M
b What is Euler's equation of motion? How do you obtain Bernoulli's equation from it? Name the different forces present in a fluid flow. 6M

OR

- 4 a What is the relation between stream function and velocity potential function? 6M
b Explain briefly the analysis of free liquid jets. 6M

UNIT-III

- 5 a Derive the expression for flow through parallel pipes. 6M
b In a 100mm diameter horizontal pipe a venture meter of 0.5 contraction ratio has been fixed. The head of water on the meter when there is no flow in 3m (gauge). Find the rate of flow for which the throat pressure will be 2m of water is 0.97 take atmospheric pressure head = 10.3m of water. 6M

OR

- 6 An external cylindrical mouth piece of diameter 150 mm is discharging water under a constant head of 6 m. Determine the discharge and absolute pressure head of water at vena – contracta. Take $C_d=0.855$ and C_c for vena contracta = 0.62 and atmospheric pressure head = 10.3 of water. 12M

UNIT-IV

- 7 a Write a short note on model laws. 6M
b A pipe of diameter 1.5 m is required to transport an oil of sp.gr 0.90 and viscosity 3×10^{-2} poise at the rate of 3000 liters /s . Tests were conducted on a 15 cm diameter pipe using water at 20° C. Find the velocity and the rate of flow in the model .Viscosity of water at 20° C is equal to 0.01 poise. 6M

OR

- 8 Describe Froude model law and scale ratios briefly. 12M

UNIT-V

- 9 a Derive the expression for velocity triangles and work done for pelton wheel. 6M
b Describe briefly definition of heads and efficiencies of a centrifugal pump. 6M

OR

- 10 Describe briefly the following a) pumps in series b) pumps in parallel. 12M

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