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Question Paper Code:95904

B.E./B.Tech. DEGREE EXAMINATION, AUGUST 2021

Fifth Semester

Chemical Engineering

19UCH304- FLUID FLOW OPERATIONS

(Regulation 2015)

Duration: 1:45 hour

Maximum: 50 Marks

PART A - (10 x 2 = 20 Marks)

(Answer any ten of the following questions)

1. Calculate the specific weight, and specific gravity of one litre of liquid which weights 7 N. CO1 R
2. An open tank contains water up to a depth of 2m and above it an oil of specific gravity 0.9 for a depth of 1m. Find the pressure intensity at interface and bottom of tank. CO1 R
3. State Newton's law of viscosity. CO1 R
4. A pipe of diameter 400 mm carries water at a velocity of 25 m/s. The pressures at the points A and B are given as 29.43 N/cm^2 and 22.563 N/cm^2 respectively while the datum head at A and B are 28 m and 30 m. Find the loss of head between A and B. CO2 R
5. The water is flowing through a pipe having diameters 20 cm and 10 cm at sections 1 and 2 respectively. The rate of flow through pipe is 35 litres/s. The section 1 is 6 m above datum and section 2 is 4 m above datum. If the pressure at section 1 is 39.24 N/cm^2 , find the intensity of pressure at section 2. CO2 R
6. A pipe, through which water is flowing, is having diameters, 20 cm and 10 cm at the cross-sections 1 and 2 respectively. The velocity of water at section 1 is given 4.0 m/s. Find the velocity head at sections 1 and 2 and also rate of discharge. CO3 R
7. What are major and minor losses in the pipes? CO3 R
8. Three pipes of lengths 800m, 500m and 400m and diameter 500 mm, 400mm and 300 mm respectively are connected in series. Three pipes are replaced by single pipe of length 1700. Find the diameter of the pipe. CO4R
9. Derive the dimension for dynamic viscosity. CO5 U
10. What are the uses of multistage pumps? CO3 U
11. What is priming? CO1 R
12. Define slip in a reciprocating pump. CO1 R

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| 13 | Define the minimum fluidization velocity. | CO1 R |
| 14 | Schematically represent the relationship between pressure drop and U_{mf} | CO2 R |
| 15 | What is meant by slugging? | CO1 R |

PART – B (3 x 10= 30 Marks)

(Answer any three of the following questions)

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| 16. | Determine Mass density, Specific volume, and Specific weight of liquid whose specific gravity is 0.85. | CO1- U | (10) |
| 17. | Derive the equation of continuity in cartesian coordinates assuming the fluid is under steady state and incompressible. | CO2- U | (10) |
| 18. | The resisting force (R) of a supersonic flight can be considered as dependent upon length of aircraft (l), velocity (V), air viscosity ' μ ', air density ' ρ ', and bulk modulus of air ' k '. Express the functional relationship between these variables and the resisting force. | CO5- E | (10) |
| 19. | Explain in detail about the principle and working of reciprocating pump with neat diagram and equation for discharge, work done and power required for reciprocating pump | CO6- U | (10) |
| 20. | Discuss Geldart's classification of powders. | CO4- U | (10) |