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(Following Paper ID and Roll No. to be filled in your Answer Book)

Paper ID : 154302 Roll No. | | | | | | | | | | |

B.Tech.

(SEM. III) THEORY EXAMINATION, 2015-16

FLUID FLOW AND SOLID HANDLING

[Time : 3 hours] [Total Marks : 100]

Section-A

1. Attempt **all** sections. All sections carry equal marks. Write answer to each section in short. (10×2=20)

(a) Differentiate between Newtonian & Non-Newtonian fluids.

(b) What is Peizometer?

(c) Define specific gravity and specific weight.

(d) Explain the variation of viscosity with temperature in case of liquids.

(e) Describe hydrostatic law.

(f) What is the function of delivery pipe in pump?

(g) What is the difference between laminar & turbulent flow?

(h) What is the difference between kinematic & dynamic viscosity?

(i) What are rotational & irrotational flow?

(j) What is the difference in significance of Mach number & Weber number?

Section-B

Attempt **any five** questions from this section. (10×5=50)

2. Find the head lost due to friction in a pipe of diameter 300 mm & length 50 m, through which water is flowing at a velocity of 3 m/s using Darcy's formula and Chezy's formula for which C=60 (Take V_{water} = 0.01 stokes).

3. A liquid of specific gravity 1.3 is flowing through a pipe of 100 mm diameter under a pressure of 19.62 N/cm² (gauge) & with mean velocity of 3m/s. Find the total head of the water at cross section which is about 8 m above datum line.

4. With the help of diagram explain the types of casing in Centrifugal pump.

5. With the help of diagram explain fluidization & its types.

6. With the help of diagram describe the types of differential manometers & also mention its uses.

7. Explain Bernoulli's theorem. Derive Bernoulli's Equation from Euler's Equation & also mention the assumptions. What are the applications of Bernoulli's theorem?

8. Derive an expression for discharge through nozzles & power transmitted through it.

9. Woth the help of diagram describe any two types of conveyors & also mention its applications.

Section-C

Attempt **any two** of the following from this section. (2×15=30)

10. The rate of flow of water through a horizontal pipe is 0.25m³/s. The diameter of pipe which is 200 mm is suddenly enlarged to 400 mm. The pressure intensity in smaller pipe is 11.72 N/cm². Determine:-

(i) The loss of head due to sudden enlargement.

(ii) Pressure intensity in the large pipe.

(iii) Power lost due to enlargement.

11. Derive an expression for discharge of fluid through an orificemeter and apply it in case of an orificemeter with orifice diameter 15 cm, inserted in a pipe of 30 cm. The pressure difference measured by a mercury oil differential manometer on two sides of the orificemeter gives a reading of 50 cm of mercury. Find the rate of flow of specific gravity 0.9 when coefficient of discharge of orificeneter is 0.64.

12. Explain the method of selecting repeating variables in Buckingham' s-π theorem and hence derive on the basis of dimensional analysis suitable parameters to present the thrust developed by a propeller. Assume that the thrust P depends upon the angular velocity (ω), speed of advance V, diameter D,dynamic viscosity (μ), mass density (ρ), elasticity of the fluid medium which can be denoted by the speed of sound in the medium C.

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