



C20-PET-303/CH-304

7274

BOARD DIPLOMA EXAMINATION, (C-20)

OCTOBER/NOVEMBER—2023

DCHE – THIRD SEMESTER EXAMINATION

FLUID MECHANICS

Time : 3 hours]

[Total Marks : 80

PART—A

3×10=30

Instructions : (1) Answer **all** questions.

(2) Each question carries **three** marks.

(3) Answers should be brief and straight to the point and shall not exceed five simple sentences.

1. List any three physical properties of fluids and mention their SI units.
2. States Newton's law of viscosity.
3. Write about the kinetic energy correction factor.
4. Water is flowing through a pipe of 50 mm diameter with an average velocity of 5 m/s, find the mass of flow rate of water in kg/s.
5. What are the various types of pipe fittings?
6. Explain briefly about the concept of laminar flow in pipes.
7. What are the causes for energy loss due to friction?
8. Write the equation for frictional head loss due to sudden contraction in circular pipe.
9. Differentiate between free and hindered settling.
10. What is vena contracta?

PART—B

8×5=40

Instructions : (1) Answer *any five* questions.

(2) Each question carries **eight** marks.

(3) Answers should be comprehensive and criterion for valuation is the content but not the length of the answer.

11. (a) Explain the working of inclined manometer with neat diagram.

(OR)

(b) Explain in details about the Newtonian and Non-Newtonian fluids with examples.

12. (a) Write modified Bernoulli's equation for friction flow and mention its applications.

(OR)

(b) Derive equation of continuity for fluid flow.

13. (a) Discuss about the friction losses in a pipeline with sudden expansion with neat diagram.

(OR)

(b) Calculate pressure drop due to friction in a 300 m long pipe of 150 mm diameter through which water is flowing at a rate of $0.05 \text{ m}^3/\text{s}$
Data : ρ of water = 1000 kg/m^3 , μ of water = $1.0 \times 10^{-3} \text{ (N.s)/m}^2$.

14. (a) Explain the process of fluidization with a neat sketch and mention its applications.

(OR)

(b) Explain the relation between Drag coefficient and Reynolds number.

15. (a) Describe the construction and working of a reciprocating pump with neat diagram.

(OR)

- (b) Calculate the Net Positive Suction Head (NPSH) of a centrifugal pump using the following data :
- (i) Vapour pressure of the fluid = 26.66 KN/m^2
 - (ii) Density between the level of liquid in the reservoir and suction line = 1.2 m
 - (iii) Density of the liquid = 865 kg/m^3
 - (iv) Friction in the suction line = 3.5 J/Kg
 - (v) Reservoir is open to atmosphere.

PART—C

10×1=10

- Instructions :** (1) Answer the following question.
- (2) Each question carries **ten** marks.
- (3) Answers should be brief and straight to the point and shall not exceed five simple sentences.

16. Explain about the working of centrifugal pumps and their applications.

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