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C20-CHST–305

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BOARD DIPLOMA EXAMINATION, (C-20)

OCTOBER/NOVEMBER—2023

DCHST – THIRD SEMESTER EXAMINATION

FLUID MECHANICS AND HEAT TRANSFER

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 out the various physical properties of a fluid.

2. Differentiate between laminar and turbulent.

3. Define roughness.

4. State Hagen-Poiseuille equation.

5. List out the various valves and write the function of valves.

6. Differentiate between fan and blower.

7. Define heat transfer and write the modes of heat transfer.

8. Define fouling factor.

9. Define black body radiation.

10. Write the characteristics of a solvent present in evaporator.

PART—B

8×5=40

Instructions : (1) Answer **all** 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 construction and working of a U-tube manometer with a neat diagram.

(OR)

(b) A pipe 300 m long has a slope of 1 in 100 and tapers from 1·2 m diameter at high end to 0·6 m diameter at the low end. Quantity of water flowing is 90 l/s. If the pressure at the high end is 68·67 Kpa, find the pressure at the lower end. Neglect the losses.

12. *(a)* Explain the working principle involved in rotameter with a neat sketch.

(OR)

(b) With a neat sketch explain the principle involved in the fluidization process.

13. *(a)* Derive the expression for heat transfer through furnace wall made of three different materials in series. Assume K_1, K_2 and K_3 be the thermal conductivities of materials and X_1, X_2 and X_3 be the respective thicknesses. Assume hot face and cold face temperatures are T1 and T2 respectively.

(OR)

(b) Explain the significance of lagging and economic lagging thickness.

14. *(a)* Derive the equation for log mean temperature difference.

(OR)

(b) Differentiate between drop wise condensation and film wise condensation.

15. *(a)* Explain the construction and working of a double pipe heat exchanger.

(OR)

(b) Explain the working principle of multiple effect evaporator system with a neat sketch.

PART—C

10×1=10

Instructions : (1) Answer the following question.

(2) The question carries **ten** marks.

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

16. *(a)* How to recommend a pump for given duty in fluid handling? 5

(b) Assume if NPSH is not maintained in pump, what will happen? 5

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