



C20-CHPP-CHPC-CHOT-304

7286

BOARD DIPLOMA EXAMINATION, (C-20)

OCTOBER/NOVEMBER—2023

DCHOT - THIRD SEMESTER EXAMINATION

UNIT OPERATIONS—I

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. Define compressible and incompressible fluids.
2. Explain the Newton's law of viscosity.
3. Write the effect of roughness on friction factor.
4. Write the applications of fluidization.
5. Draw a neat sketch of butterfly valve and label it.
6. Mention any three thermal insulation materials commonly employed in industry.
7. Define forced convection with an example.
8. What do you mean by black body?
9. Write the physical significance of the Prandtl number and Nusselt number.
10. Write the classification of evaporators and heat exchangers.

- 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. Explain the boundary layer separation and its effects on flow.

(OR)

A simple U-tube manometer is installed across an orificemeter. The manometer fluid is mercury (Sp.gravity=14.6) and flowing fluid through piping is CCl_4 (Sp.gravity = 2.6) the manometer reads 200 mm. What is the pressure difference over a manometer in N/m^2 ?

12. Explain in brief the relationship between friction factor, Reynolds number in Laminar flow and turbulent flow.

(OR)

Derive Hagen-Poiseuille equation.

13. Derive an expression for heat transfer through a furnace wall made up of three different materials in series. Assume k_1, k_2, k_3 to be the thermal conductivities of materials x_1, x_2, x_3 respectively and hot face and cold face temperatures to be T_1 and T_2 respectively.

(OR)

What do you mean by thermal conductivity? Write in brief its variation with temperature.

14. Write in brief on dirt factor/fouling factor with respect to heat transfer.

(OR)

Distinguish between conduction and convection with examples.

15. Explain plate type heat exchanger.

(OR)

Explain evaporator accessories with their functions.

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. Distinguish between centrifugal pumps and positive displacement pumps.

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