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C16-M-403**6448**

BOARD DIPLOMA EXAMINATION, (C-16)
OCTOBER/NOVEMBER—2023
DME – FOURTH SEMESTER EXAMINATION

THERMAL ENGINEERING—II

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. Find the mass of 1 m³ of steam at 20 bar and 250 °C.
2. What are the boiler mountings and accessories?
3. Steam at a pressure of 8·2 bar and 0·95 dry is expanded to a pressure of 1·6 bar. Find the final condition of steam if it is expanded adiabatically.
4. Draw the T-S and h-S diagrams for throttling process.
5. Mention different types of nozzles.
6. What is compounding of steam turbines? Name any two types of compounding.
7. Write any three differences between the throttle governing and nozzle control governing.
8. What are the applications of Gas Turbines?
9. What are the advantages and disadvantages of Ramjet engine?
10. Write the function of a propeller shaft.

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PART—B

10×5=50

- Instructions :** (1) Answer *any five* questions.
(2) Each question carries **ten** marks.
(3) Answers should be comprehensive and criterion for valuation is the content but not the length of the answer.

- 11.** (a) State the advantages of super-heated steam. 4
(b) One kg of steam enters an engine at a pressure of 12.5 bar with 70 °C superheat and exhaust at 0.15 bar and 0.95 dry. Estimate the change of internal energy between admissions and exhaust conditions. 6
- 12.** Describe with a neat sketch the construction and working principle of Babcock and Wilcox Boiler. 10
- 13.** If 5 kg of steam with a dryness fraction of 0.9 expands adiabatically according to the law $pv^{1.3} = C$, from a pressure of 8 bar to 1.5 bar. Determine (a) final dryness fraction, (b) heat transferred, (c) work done and (d) change in internal energy. 10
- 14.** Wet steam at 10 bar and dryness fraction of 0.9 is discharges through a convergent and divergent nozzle to a back pressure of 0.1 bar. If the mass flow rate is 0.5 kg/s, determine the throat pressure and throat diameter using Mollier diagram. 10
- 15.** (a) What are the differences between Impulse turbine and Reaction turbine? 5
(b) Explain the velocity diagrams for impulse turbine with reactions. 5
- 16.** Explain the working principle of constant volume gas turbine with a neat sketch. 10
- 17.** Explain the working principle of Ramjet Engine unit with a neat sketch. 10
- 18.** Explain the construction and working of multi-plate clutch with a neat sketch. 10

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