



C16-M-403

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**BOARD DIPLOMA EXAMINATION, (C-16)
AUGUST/SEPTEMBER—2021
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. Explain superheat and sub-cooling on T-S chart.
2. Briefly explain fire tube boiler.
3. Explain constant pressure process on P-V and T-S charts.
4. In a throttling calorimeter, the pressure of steam before throttling is 14 bar. If the pressure of the steam after throttling is 1.1 bar, what is the limiting value of dryness fraction of steam which can be determined by this calorimeter?
5. Derive an expression for exit velocity of steam through a nozzle.
6. Explain De-Laval impulse turbine with the help of diagram.
7. Explain the working principle of impulse turbine.
8. Compare gas turbines with steam turbines.
9. State advantages and disadvantages of jet engines over reciprocating engines.
10. What are the functions of gear box?

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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.** Explain enthalpy at salient points (a) sensible heat, (b) wet steam, (c) dry saturated steam and (d) superheated steam.
- 12.** Explain with neat sketch the construction and working of Babcock and Wilcox boiler.
- 13.** One kg of steam having a pressure of 9.2 bar and dryness fraction 0.85 is expanded to a pressure at 0.45 bar. If the expansion is hyperbolic, determine the quantity of heat which passes through the cylinder walls in to the steam.
- 14.** Dry saturated steam at a pressure of 10 bar enters a convergent divergent nozzle and leaves at a pressure of 1 bar. If the flow is isentropic and the corresponding expansion index is 1.135. Find the ratio of cross-sectional area at exit and throat for maximum discharge.
- 15.** A De-Laval steam turbine is supplied with 1.2 kg steam per sec from a set of nozzles whose pressure range is 12 bar to 0.2 bar. The nozzle angle is 22° and blade exit angle is 30° . The mean blade speed is 260 m/sec. If the nozzle efficiency is 82%, find (a) power developed, (b) blade efficiency and (c) inlet angle of blade.
- 16.** Explain the working of closed cycle gas turbine with a neat sketch.
- 17.** Explain working of Turbo jet unit with neat sketch.
- 18.** Explain the working principle of differential in an automobile with a neat sketch.

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