



C09-M-405

3505

BOARD DIPLOMA EXAMINATION, (C-09)

OCT/NOV—2017

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. State the purpose of lubrication in IC engine.
2. List the objectives of supercharging in IC engines.
3. Write the use of intercooler in air compressor.
4. State the fundamental difference between rocket propulsion and turbo-jet propulsion.
5. Write the functions of a propeller shaft.
6. Write the advantages of artificial draught system than natural draught system.
7. List various types of safety valve used in a boiler.

- * 8. Briefly explain what is meant by critical pressure ratio.
9. Briefly explain why a condensing turbine is more efficient than non-condensing turbine.
10. Write the necessity of compounding of steam turbines.

PART—B

10×5=50

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

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

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

11. Explain the working of Zenith carburettor with neat sketch.
12. (a) Define the following efficiencies with reference to an IC engine :
- (i) Brake-thermal efficiency
 - (ii) Indicated-thermal efficiency
 - (iii) Mechanical efficiency
 - (iv) Efficiency ratio
 - (v) Volumetric efficiency
- (b) Derive the condition of maximum blade efficiency in a single-stage impulse turbine.
13. (a) Describe with a neat sketch the working of a centrifugal compressor.
- (b) How does the pressure change take place in impeller and in diffuser of the centrifugal compressor?
- * 14. (a) Explain with a neat sketch the working of a constant volume combustion gas turbine.
- (b) State the merits of gas turbines over IC engines.

- * 15. What do you mean by weight transfer? How does it occur when the brakes are applied suddenly?
16. Describe Benson boiler with the help of neat line sketch and also mention its advantages.
17. A nozzle is to be supplied with steam at 10 bar and 200 °C and is to discharge 180 kg per hour into a turbine wheel chamber where the pressure is 1 bar. The efficiency of the nozzle may be taken as 85%. Calculate the throat and exit diameters of the nozzle for maximum discharge. Neglect the air initial velocity to the nozzle. Take, $R = 0.287$ kJ/kg-K and $C_p = 1.005$ kJ/kg-K.
18. Steam issues from the nozzle of a single-impulse turbine at 800 m/sec on to blades moving at 300 m/sec. The blade tip angles at inlet and outlet are 36° each. The steam is to enter the blades without shock and the flow over the blades is frictionless. Determine—
- (a) the angle at which the nozzles are inclined to the motion of the blades;
- (b) diagram efficiency.
