



C09-M-405

**3505**

**BOARD DIPLOMA EXAMINATION, (C-09)**

**MARCH/APRIL—2014**

**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. What is supercharging of an IC engine?
2. Write any three advantages of SI engines over CI engines.
3. Write any three differences between centrifugal compressor and axial flow compressor.
4. What are different fuels used in jet propulsions?
5. Write the functions of propeller shaft.
6. Write the advantages of artificial draught system over natural draught system.
7. List out any six mountings used in a steam boiler.
8. A steam nozzle is supplied with steam having an initial velocity of 50 m/s. The initial and exit enthalpies are  $H_1 = 3000$  kJ/kg and  $H_2 = 2600$  kJ/kg. Neglecting friction, find the exit velocity of steam.
9. A De Laval turbine is running with a blade speed of 150 m/s and the nozzles are provided with an angle of  $22^\circ$ . Find the maximum work done and maximum efficiency of the turbine.
10. Write the factors on which the blade height of turbine depends.

**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 the working of battery-coil ignition system with the help of a line diagram.
12. Find the percentage saving in work by compressing air in two stages from 1 bar pressure and 3 m<sup>3</sup> of volume to 8 bar instead of one stage. Assume compression index 1.35 in both the cases, optimum pressure and complete intercooling in two-stage compressor.
13. Explain the working principle of constant pressure gas turbine with help of a neat sketch.
14. Explain briefly about all the units of an automobile transmission system.
15. Explain about Cochran boiler with the help of neat sketch.
16. Determine the diameters of throat and exit for steam nozzle to convey 10 kg/min where the inlet conditions are 12 bar and 250 °C and the final pressure is 2 bar. Neglect initial velocity of steam and effect of friction.
17. The steam leaves the nozzle of a single impulse turbine at 900 m/sec. The nozzle angle is 20° and the blade angles are 30° at inlet and outlet each. What are the blade velocity and the steam flow in kg per hour if the power developed by the turbine is 260 kW? Assume the flow over the blades is frictionless.
18. (a) A double-cylinder, 4-stroke IC engine is to be designed to develop IP of 12 kW at 1000 r.p.m. The mean effective pressure of cycle is limited to 5 bar. Determine the bore diameter and stroke of the engine, if stroke is 1.2 times bore diameter.  
(b) Describe the principle of steam by pass governing in a steam turbine.

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