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C09–M–405

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BOARD DIPLOMA EXAMINATION, (C–09)

OCT/NOV—2013

DME—FOURTH SEMESTER EXAMINATION

THERMAL ENGINEERING—II

Time : 3 hours] [*Total Marks* : 80

PART—A

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. Write any three advantages of internal combustion engines over external combustion engines.

2. List various methods of lubricating systems in IC engines.

3. Write any three differences between axial-flow and radial-flow compressors.

4. Give the classification of the jet propulsion units.

5. What is the function of shock absorber?

6. Explain forced draught system in a steam boiler.

7. List out any six mountings used in a steam boiler.

8. Write the expression for the exit velocity of steam in a convergent-divergent nozzle neglecting friction.

9. Differentiate the throttle governing from nozzle control governing.

10. Write the factors on which the blade height of turbine depends.

PART—B

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. A diesel engine has compression ratio of 14 : 1 and the fuel is cut-off at 0·08 of the stroke. If the relative efficiency is 0·5, estimate the consumption of fuel in kg/kWh when the calorific value of fuel is 44000 kJ/kg and for air is 1·4.

12. A two-stage compressor takes $3\,m^3$ of air per minute at a pressure of 1 bar. It delivers the air at 9 bar. The compression is carried out in each cylinder according to the law $pV^{1\,2} = C$. The air is cooled to its initial temperature in an intercooler. Neglecting clearance, find the minimum power required to drive the compressor.

13. Explain the working principle of constant pressure gas turbine with the help of a neat sketch.

14. Discuss in detail the constructional features of clutch components.

15. Describe about Benson boiler with the help of a neat sketch.

16. 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.

17. In a De Laval steam turbine, the blade angle is 30° at inlet and exit. The steam leaves the nozzle at 400 m/sec and the blade speed is 80 m/sec. Draw the velocity diagram and find *(a)* the nozzle angle, *(b)* blade efficiency and *(c)* power developed.

18. *(a)* Explain the forced circulation water cooling system with neat sketch.

(b) Write the classification of steam turbines.

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