C09–M–405

3505

BOARD DIPLOMA EXAMINATION, (C–09)

MARCH/APRIL—2016

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. Name any six parts of an IC engine which requires lubrication.

2. State the function of a carburettor in a petrol engine.

3. List out any three reasons for the use of multi-stage compressors.

4. Write down the essential difference between turbo-jet engine and ram-jet engine.

5. Write down the objectives of vehicle suspension.

6. Write down the merits of water tube boilers over fire table boilers.

7. Define the terms *(a)* equivalent evaporation and *(b)* factor of evaporation in a boiler.

8. State the law of continuity of flow in a nozzle.

9. What is the optimum blade speed ratio? Write its significance.

10. Write the working principle of impulse turbine.

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. *(a)* What is the necessity of cooling an IC engine?

(b) Explain different methods of cooling IC engines.

12. *(a)* Compare the relative advantages and disadvantages of four-stroke and two-stroke cycle engines.

(b) What is the effect of blade friction on turbine performance?

13. A single-acting single-stage reciprocating air compressor takes 1 m^3 of air per minute at 1·013 bar, 15 °C and delivers it at 7 bar.

(a) Assuming that the law of compression is $PV^{1\,35}$ = constant, and the clearance is negligible, calculate the indicated power.

(b) If the compressor is driven at 300 r.p.m., calculate the cylinder bore required, assuming a stroke to bore ratio of 1·5 : 1.

(c) Calculate the power of motor required to drive the compressor if the mechanical efficiency of the compressor is 85% and that of the motor transmission is 90%.

14. *(a)* How are the gas turbines classified?

(b) Briefly explain them with sketches.

(c) What are their relative advantages?

15. Explain the working of front axle with a neat sketch.

16. How do you say fusible plug is a safety device? Draw a neat sketch and describe the fusible plug.

17. Illustrate the principle of working of steam injector with a neat sketch.

18. Steam with velocity of 600 m/s enters an impulse turbine row of blades at are angle of 23° to the plane of rotation of the blades. The mean blade speed is 250 m/s. The exit angle of the blades is 28°. Determine—

(a) the blade angle at entry;

(b) work done/kg steam;

(c) diagram efficiency;

(d) axial thrust/kg steam.

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