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BOARD DIPLOMA EXAMINATION, (C–14)

MARCH/APRIL—2016

DME—FOURTH SEMESTER EXAMINATION

HEAT POWER ENGINEERING—I

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. Show all the processes of Carnot cycle on *P-V* and *T-S* diagrams.

2. Define air standard cycle.

3. Briefly classify heat engines.

4. Write materials for given components of IC engine :

(a) Cylinder

(b) Piston

(c) Crank Shaft

5. Write any three differences between air cooling and water cooling.

6. Define supercharging.

7. Write expression for isothermal compression work and explain the terms involved in it.

8. Define *(a)* isothermal efficiency and *(b)* adiabatic efficiency.

9. Give any six applications of gas turbines.

10. List out the fuels used in rockets.

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 diesel engine has a cylinder bore of 25 cm and stroke of 40 cm. Cut off takes place at 5% of stroke. Calculate—*(a)* air standard efficiency and *(b)* mean effective pressure if the clearance volume and pressure at the beginning of the suction are 0·0012 m^3 and 1·2 bar.

12. Explain with neat sketch, the components of the IC engine.

13. Explain with neat sketches, the working principles of *(a)* primary filter and *(b)* secondary filter.

14. Explain the working principle of pressure lubrication system with the support of neat diagram.

15. The following observations were made during a test on a 4-cylinder petrol engine :

Diameter of cylinder	=	30 cm
Stroke length	=	40 cm
Speed	=	900 r.p.m.
Effective diameter of brake wheel	=	0·7 m
Net load on the brake drum	=	480 N
Mean effective pressure	=	0·28 N/mm^2

Calculate—

(a) indicated power;

(b) brake power;

(c) friction power;

(d) mechanical efficiency.

16. A single stage single acting air compressor 30 cm diameter, 40 cm stroke makes 100 r.p.m. It takes air at 1 bar and 20 °C and compresses it to a pressure of 5 bar. Find the work done when *(a)* isothermal, *(b)* $pV^{1.2}$ = Const. and *(c)* adiabatic.

17. *(a)* Explain the vane type compressor with neat sketch.

(b) Find the percentage increase in efficiency of ideal Otto cycle if compression ratio is raised from 7 to 8.

18. With the help of neat sketch, explain the turbojet engine.

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