



C14-M-404

**4450**

**BOARD DIPLOMA EXAMINATION, (C-14)**

MARCH / APRIL - 2019

**DME - IV 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) Answer should be brief and straight to the point and shall not exceed five simple sentences.

- 1 State any three assumptions in air standard cycle. **3×1**
- 2 Define cut-off ratio. Write the effect of cut-off ratio in diesel cycle.  **$1\frac{1}{2}+1\frac{1}{2}$**
- 3 Write any three differences between S.I. and C.I. engines. **3×1**
- 4 Define : (a) Clearance volume (b) Swept volume  **$1\frac{1}{2}+1\frac{1}{2}$**
- 5 Write any three functions of carburetor. **3×1**
- 6 Why cooling is required in I.C. engine ? Write the effect of over cooling ?  **$1\frac{1}{2}+1\frac{1}{2}$**
- 7 Draw PV diagram for a single stage reciprocating compressor without clearance. **3×1**
- 8 Define : (a) Isothermal efficiency (b) Volumetric efficiency.  **$1\frac{1}{2}+1\frac{1}{2}$**
- 9 Classify the gas turbines. **3×1**
- 10 State any three applications of Jet engine. **3×1**

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**PART - B****10×5=50**

- Instructions :**
- (1) Answer any **FIVE** questions.
  - (2) Each question carries **TEN** marks.
  - (3) Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer.

- 11** (a) Explain the working of Otto cycle with the help of PV and TS diagrams. **5**
- (b) Derive the formula for Air standard efficiency of Otto cycle. **5**
- 12** Describe the working principle of 4-stroke diesel engine with legible sketch.
- 13** Write the purpose of governing. Explain the different methods of governing in I.C. engines. **2+3+3+2**
- 14** List the different types of ignition systems and describe the working of battery ignition system with the help of legible sketch. **2+4+4**
- 15** The following particulars refer to a 2-stroke diesel engine. **2**  
 Bore = 100 mm, stroke = 150 mm, piston speed = 300m/min,  
 Torque developed = 58 Nm, Mechanical efficiency = 81%,  
 Indicated thermal efficiency = 40%, calorific value of the fuel used = 45000 kJ/kg.  
 Determine :
- (a) Indicated power. **3**
  - (b) Indicated Mean effective pressure. **2**
  - (c) Specific fuel consumption based on Brake power. **3**

- 16 Air from an initial conditions of 25°C and 1 bar is compressed in 2-stage according to the law  $PV^{1.25} = \text{constant}$ , and with complete inter cooling to a pressure of 36 bar. Estimate the minimum work required and heat rejected in the inter cooler per kg of air. Assume  $C_p = 1.05 \text{ kJ/kg}$  and  $R = 0.29 \text{ kJ/kg K}$ .
- 17 (a) A diesel engine has a compression ratio 14 to 1, and heat supply is cut-off at 0.06 stroke. Find the air standard efficiency of the cycle. Assume adiabatic ratio as 1.4. **5+5**
- (b) Explain the effect of inter cooling in a multi stage reciprocating compressor.
- 18 (a) Explain the effect of regeneration in gas turbine plant. **5+5**
- (b) Explain the working of Ramjet engine with a neat sketch.
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