

Code No: R1622032

R16**SET - 1****II B. Tech II Semester Supplementary Examinations, November - 2018****THERMAL ENGINEERING-I**

(Com to ME, AME)

Time: 3 hours

Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)2. Answer **ALL** the question in **Part-A**3. Answer any **FOUR** Questions from **Part-B**

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**PART -A**

1. a) Draw the P-v plot of actual cycle and fuel air cycle by considering the effect of time losses. (3M)
- b) What is the purpose of cooling of IC engine (2M)
- c) What is meant by abnormal combustion? (2M)
- d) Define Mean effective pressure ? Explain its importance for calculation of MEP in the performance test? (2M)
- e) What are the advantages of multi compression in the reciprocating compressor (2M)
- f) What is meant by pressure coefficient and adiabatic coefficient of dynamic compressor? (3M)

**PART -B**

2. a) Compare the actual and fuel air cycles of a gasoline engine (7M)
- b) Briefly explain the following (7M)
  - (i) Time loss factor
  - (ii) heat loss factor
  - (iii) Spark advance
3. a) Explain the working of Wankel engine e with neat sketch (7M)
- b) Explain the working of simple carburetor with neat sketch (7M)
4. a) Explain the effect of various engine variables on SI engine knock (7M)
- b) Explain with figures the various types of combustion chambers used in CI engines (7M)
5. a) Explain the use of prony brake and rope brake in measuring the power output of the engine (7M)
- b) A single cylinder engine running at 1800 rpm develops a torque of 8 Nm. The indicated power of the engine is 1.8 kW. Find the loss due to friction power as the percentage of brake power (7M)
6. A two-stage double acting air compressor, operating at 220 rpm takes in air at 1 bar and 27°C. The size of the LP cylinder is 360x400 mm; the stroke of HP cylinder is the same as that of the LP cylinder and the clearance of both the cylinders is 4%. The LP cylinder discharges the air at a pressure of 4.0 bar. The air passes through the intercooler so that it enters the HP cylinder at 27°C and 3.80 bar, finally it is discharged from the compressor at 15.2 bar. The value of  $n$  in both the cylinders is 1.3,  $C_p = 1.0035$  kJ/kg K and  $R = 0.287$  kJ/kg K. Calculate : (i) The heat rejected in the intercooler (14M)
  - (ii) Diameter of HP cylinder
  - (iii) The power required to drive HP cylinder

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7. An axial flow air compressor of 50% reaction design has blades with inlet and outlet angles of  $50^\circ$  and  $15^\circ$  respectively. The compressor is to produce a pressure ratio of 6:1 with an overall isentropic efficiency of 0.8 when the air inlet temperature is  $45^\circ\text{C}$ . The blade speed and axial velocity are constant throughout the compressor. (14M)

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