

Code No: R1931035

R19

SET - 1

III B. Tech I Semester Regular Examinations, February-2022

IC ENGINES & GAS TURBINES

(Mechanical Engineering)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions **ONE** Question from **Each unit**

All Questions Carry Equal Marks

UNIT-I

1. a) Write the thermal efficiency, mean effective pressure and work output of Otto cycle using PV and TS diagrams. [8M]
b) Compare air standard cycles and actual cycle. [7M]

(OR)

2. a) Derive the expression for the efficiency and mean effective pressure of a dual cycle. [8M]
b) Write a short note on (i) Time loss factor, and (ii) Exhaust blow-down factor. [7M]

UNIT-II

3. a) Explain the classification of IC engines. [5M]
b) Write and explain the working principle of four stroke spark ignition engine. [5M]
c) Draw and explain petrol lubrication system. [5M]

(OR)

4. a) Explain the principle of turbo charges. [8M]
b) Explain air cooling systems in IC engines. [7M]

UNIT-III

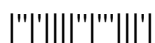
5. a) Explain the phenomenon of knocking in SI engines. [8M]
b) What are the diesel fuel requirements? [7M]

(OR)

6. a) Explain in detail about various types of abnormal combustion in SI engines. [8M]
b) Draw and explain open type combustion chamber in diesel engine. [7M]

UNIT-IV

7. a) What is friction power? What are the various methods used to find the friction power? Explain any three methods. [10M]
b) Write the principle of dynamometer with a neat diagram. [5M]



(OR)

8. a) What is NDIR method? How carbon monoxide emissions are measured using NDIR? [8M]
b) Explain in detail the heat balance sheet? [7M]

UNIT-V

9. a) What is a gas turbine power plant? What are the components of a simple gas turbine power plant? Write its classification. [8M]
b) Draw and explain Ram jet engine with advantages and disadvantages. [7M]

(OR)

10. a) A 5000 kW gas turbine plant operates with pressure ratio of 9:1. A high pressure turbine is used to drive the compressor and a low pressure turbine drives the generator. The temperature of gases at entry to HP turbine is 625°C and gases are reheated to 625°C after expansion in the first turbine. The air inlet temperature to the unit is 20°C . The isentropic efficiencies of compressor and turbine are 0.8 and 0.85 respectively. Calculate (i) Thermal efficiency (ii) Work ratio (iii) mass flow in kg/sec. Neglect the mass of the fuel and $C_p = 1.005 \text{ kJ/kg}$ and $\gamma = 1.4$ for air and gases. [10M]
b) Differentiate jet propulsion and rocket propulsion. [7M]

