

Code: ME4T3

**II B.Tech - II Semester – Regular/Supplementary Examinations –
April 2018**

**IC ENGINES AND GAS TURBINES
(MECHANICAL ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

PART – A

Answer *all* the questions. All questions carry equal marks

11 x 2 = 22

1.

- a) Draw P-V and T-S diagrams for diesel cycle.
- b) Explain the difference between four stroke and two stroke.
- c) Write note on different anti knocking additives.
- d) What is delay period and what are the factors that affect the delay period?
- e) Write note on rating of fuels in SI and CI engine.
- f) Explain willans line method with schematic diagram.
- g) Compare LPG and petrol as fuel for SI engines.
- h) Define effectiveness of the regenerator.
- i) Draw P-V and T-S diagrams for brayton cycle with effect of intercooling and reheating.
- j) How jet propulsion engines are classified?
- k) What are different types of propellant used in rockets?

PART – B

Answer any **THREE** questions. All questions carry equal marks.

3 x 16 = 48 M

2. a) Describe the working of battery ignition system used for the ignition of charge in SI Engine. 8 M
- b) Explain the pressure feed system of lubrication with the help of a neat sketch. 8 M
3. a) What are different stages of combustion in CI Engine? And explain with p- θ diagram. 8 M
- b) Explain the basic function of nozzle and different types of nozzle with neat sketch. 8 M
4. a) Explain the method of testing an I.C. Engine working diesel cycle 10 M
- b) The following data refer to a four-stroke petrol engine:
Engine speed = 2000rpm; Ideal thermal efficiency = 35%;
Relative efficiency = 80%; Mechanical efficiency = 85%;
Volumetric efficiency = 70%; If the engine develops 29.42 k W break power, calculate the cylinder swept volume. 6 M

5. a) Derive the optimum pressure for maximum efficiency of simple gas turbine cycle. 8 M
- b) A gas turbine plant, that makes use of Brayton cycle in an application, takes in air at 1.2 bar (abs) and 20°C temperature and compresses it through a pressure ratio of 8. It is then heated to 850°C in a combustion chamber and is expanded back to a pressure of 1.2 bar (abs). Calculate (i) the work done, (ii) the cycle efficiency and (iii) the work ratio. It is given that the “isentropic efficiencies” of the “turbine” and the “compressor” are, respectively, 80% and 70% 8 M
6. a) With a neat sketch and T-s diagram, explain the working of turbojet engine and also derive the expression for the thrust developed. 10 M
- b) Compare the advantages and disadvantages of solid and liquid propellant. 6 M