

Code: ME4T3

**II B.Tech - II Semester – Regular/Supplementary Examinations –  
April 2017**

**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) How IC engines are classified based on cylinder arrangement?
- b) Draw the P-V and T-S diagrams of Diesel cycle.
- c) Write a short note on scavenging.
- d) Define pre-ignition.
- e) Draw the sketch of hemispherical combustion chamber.
- f) Briefly discuss William's line method.
- g) What are the methods of measuring fuel consumption on an IC engine?
- h) What are the components of gas turbine plant?
- i) State the methods of improving the thermal efficiency in open cycle gas turbine.
- j) What is the difference between shaft propulsion and jet propulsion?
- k) List the different types of jet engines.

## PART – B

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

3 x 16 = 48 M

2. a) Discuss briefly the Heat loss factor. 6 M

b) Explain the working of 4-stroke petrol engine with a neat sketch. 10 M

3. a) Explain normal and abnormal combustion in CI engines. 10 M

b) Write a short note on delay period in CI engines. 6 M

4. a) A four stroke gas engine has a cylinder diameter of 25cm and stroke 45cm. The effective diameter of the brake is 1.6m. The observations made in a test of the engine were as follows:

Duration of test	=	40 min
Total number of revolutions	=	8080
Total number of explosions	=	3230
Net load on the brake	=	90 kg
Mean effective pressure	=	5.8 bar
Volume of gas used	=	7.5 m <sup>3</sup>
Pressure of gas indicated in meter	=	136 mm water of gauge
Atmospheric temperature	=	17 <sup>0</sup> C

Calorific value of gas = 19 MJ/m<sup>3</sup> at NTP

Rise in temperature of jacket cooling water = 45<sup>0</sup>C

Cooling water supplied = 180 kg

Draw up a heat balance sheet and estimate the indicated thermal efficiency and brake thermal efficiency. Assume atmospheric pressure as 760 mm of Hg. 10 M

b) State the advantages and disadvantages of Methanol as alternative fuel for IC engine. 6 M

5. a) Explain regeneration in a gas turbine plant. 8 M

b) State the advantages and disadvantages of inter-cooling in gas turbine plant. 8 M

6. a) Explain the principle of operation of a turbojet engine and state its advantages and disadvantages 12 M

b) What are the types of rocket engines? 4 M