

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
SEVENTH SEMESTER B.TECH DEGREE EXAMINATION(S), MAY 2019

Course Code: AU409

Course Name: SIMULATION AND ANALYSIS OF IC ENGINE PROCESSES

Max. Marks: 100

Duration: 3 Hours

PART A

Answer any three full questions, each carries 10 marks.

Marks

- 1 a) What are the factors on which the final temperature of the products of combustion depends on? (5)
- b) Define heat of reaction at constant pressure or constant volume. (2)
- c) Define energy release. (3)
- 2 Explain the procedure for measurement of U_{TP} with neat sketches. (10)
- 3 a) List at least five assumptions needed for ideal cycle SI engine simulation with air as the working medium. (5)
- b) List the differences between actual spark ignition engine and ideal cycle. (5)
- 4 Define the full throttle and part throttle simulation of SI engine with sketch. (10)

PART B

Answer any three full questions, each carries 10 marks.

- 5 The compression ratio for an ideal diesel cycle is 16. At the beginning of the compression stroke the pressure is 1 atm and the temperature is 300 K. The cut off ratio is 4. Determine the (10)
 - (i) p, V, T values at the end of each process of the cycle
 - (ii) thermal efficiency and
 - (iii) mean effective pressure.Take the bore (B) of the engine as 80 mm and stroke (S) of the engine as 110 mm; the ratio of specific heats for air is 1.4, C_P is 1.004 kJ/kg K and C_V is 0.717 kJ/kg K.
- 6 Derive the efficiency of an ideal diesel cycle. (10)
- 7 a) Define Volumetric efficiency. List out the factors affecting it. (7)
- b) Define Mach index (3)
- 8 Explain the term "Swirl and Squish" in a combustion chamber. How does it affect engine operation? (10)

PART C

Answer any four full questions, each carries 10 marks.

- 9 a) “In a 2 stroke engine it is better to have a deflector top type piston”. Justify the statement. (3)
- b) Compare the relative merits and demerits of different scavenging systems. (7)
- 10 Discuss in detail about the perfect displacement and product mixing models for scavenging. (10)
- 11 Explain the port timing diagram of 2 stroke petrol and diesel engines. (10)
- 12 How is “engine friction” defined? Discuss the various frictional losses. (10)
- 13 What are the effects of load on brake thermal efficiency? (10)
- 14 How the volumetric efficiency affected by load? Explain in detail. (10)
