

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

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|---|---|------|
| 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_{rp} 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.

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|---|---|------|
| 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
(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. | (10) |
| 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)
