

CBCS SCHEME

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18AU822

Eighth Semester B.E. Degree Examination, July/August 2022 Advanced IC Engines

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain the following properties:
(i) Flame structure and speed
(ii) Knock
(iii) Partial burning and misfire (10 Marks)
b. With a neat diagram, explain the stages of combustion in SI engine. (10 Marks)

OR

- 2 a. Explain the following properties:
(i) Normal combustion
(ii) Abnormal combustion
(iii) Octane number
(iv) Cetane number
(v) Brake power (10 Marks)
b. Explain Abnormal Combustion Process with neat suitable diagram. (10 Marks)

Module-2

- 3 a. Explain direct injection system in CI engine with neat diagram. (10 Marks)
b. With neat diagram, explain the stages of combustion in CI engine. (10 Marks)

OR

- 4 a. Explain indirect injection system in CI engine with neat suitable diagram. (10 Marks)
b. Explain the factors affecting the delay period in CI engine. (10 Marks)

Module-3

- 5 a. Explain the equilibrium charts for burnt mixture with suitable neat diagram. (10 Marks)
b. Explain transmission from unburned to burnt mixture. (10 Marks)

OR

- 6 a. Explain the working principle of Simple Brayton Cycle and derive the expression for efficiency. (10 Marks)
b. Brayton cycle with regeneration produces 150 KW power. Determine the rate of heat addition and rejection. Assume air is an ideal gas with constant specific heats at room temperature. Kinetic and potential changes are negligible. [Given data: $c_p = 1.005 \text{ kJ/kgK}$ and $\gamma = 1.4$] (10 Marks)

Module-4

- 7 a. Explain the following:
- (i) Lean Burn Engines (04 Marks)
 - (ii) Ceramic Engines (03 Marks)
 - (iii) Adiabatic Engines (03 Marks)
- b. Explain the process of Exhaust Gas Recirculation (EGR) and write advantages and disadvantages of EGR. (10 Marks)

OR

- 8 a. Explain the modern changes in sports vehicle engine. (10 Marks)
- b. Explain the working principle, operation and performance of MPFI system. (10 Marks)

Module-5

- 9 a. Explain the construction and working principle of stratified engine. (10 Marks)
- b. Explain the convergence of SI and CI engine. (10 Marks)

OR

- 10 a. Explain Exhaust Muffler and different types of Muffler. (10 Marks)
- b. With neat sketch, explain waste heat recovery system. (10 Marks)

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