

# CBCS SCHEME

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## Fourth Semester B.E. Degree Examination, July/August 2022 Automotive Engines

Time: 3 hrs.

Max. Marks: 100

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

### Module-1

- 1 a. In what respects four-stroke cycle CI engine differ from that of an SI engine? (10 Marks)
- b. In an Otto cycle air at 17°C and 1 bar is compressed adiabatically until the pressure is 15 bar. Heat is added at constant volume until the pressure rises to 40 bar. Calculate the air standard efficiency, the compression ratio and the mean effective pressure for the cycle. Assume  $C_v = 0.717 \text{ KJ/kg K}$  and  $R = 8.314 \text{ KJ/K mol K}$ . (10 Marks)

OR

- 2 a. Derive the expression for the efficiency of the diesel cycle. (10 Marks)
- b. With neat sketches explain the working principle of four-stroke spark ignition engine. (10 Marks)

### Module-2

- 3 a. Sketch and explain the working principle of simple carburetor. (12 Marks)
- b. Explain the need of a valve. Also describe the valve operating mechanism. (08 Marks)

OR

- 4 a. Sketch and explain the types of nozzles. (12 Marks)
- b. What do you mean by a Governor? Explain its significant role in diesel engines, also briefly explain its types. (08 Marks)

### Module-3

- 5 a. Explain with sketches piston and cylinder temperature distribution. (10 Marks)
- b. Write the advantages and limitations of liquid cooling and air cooling system. (10 Marks)

OR

- 6 a. What is meant by crankcase ventilation? Explain the details with neat sketch. (10 Marks)
- b. What are the various desired properties of a lubricant and explain how additives help to achieve the desired properties. (10 Marks)

### Module-4

- 7 a. What are the factors that affect power output of an engine? Explain how supercharging helps to improve the power output. (10 Marks)
- b. Explain with a neat sketch the principle of exhaust turbo charging of a single cylinder engine. (10 Marks)

OR

- 8 a. Briefly explain the various methods of supercharging an engine with suitable sketch. (10 Marks)
- b. Make the thermodynamic analysis of a supercharged engine cycle. (10 Marks)



**Module-5**

- 9 a. How does Actual scavenging process differ from theoretical one? Explain by means of suitable graphs. (10 Marks)
- b. What are the advantages and disadvantages of a two-stroke engine? Compare two-stroke SI and CI engines? (10 Marks)

**OR**

- 10 a. Explain the various scavenging pumps used in a two – stroke engine. (10 Marks)
- b. Compare various scavenging methods. (10 Marks)

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