



# P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

**Seventh Semester, B.E. - Automobile Engineering**

**Semester End Examination; Jan. / Feb. - 2021**

**Automotive Engines and Systems**

*Time: 3 hrs*

*Max. Marks: 100*

*Note: Answer FIVE full questions, selecting ONE full question from each unit.*

## UNIT - I

- |   |    |  |    |
|---|----|--|----|
| 1 | a. | Draw a neat sketch of IC engine and name the components.                       | 6  |
|   | b. | What are the various classifications of IC engines?                            | 4  |
|   | c. | Explain the 4 stroke petrol engine with simple sketches.                       | 10 |
| 2 | a. | Compare petrol and diesel engines on at least ten different parameters.        | 10 |
|   | b. | With a pressure and crank angle diagram, explain the combustion in CI engines. | 10 |

## UNIT - II

- |   |    |  |    |
|---|----|--|----|
| 3 | a. | With a neat sketch, explain the working of a carburetor. What are their benefits and limitations?  | 5  |
|   | b. | Explain with a neat sketch fuel injection system in a petrol engine.   | 5  |
|   | c. | With a neat sketch, show the components of distributor type diesel fuel injection and explain how timing and injection quantity is controlled. | 10 |
| 4 | a. | What are the components of inline fuel injection pump system? What are their limitations?  | 10 |
|   | b. | Explain the working of CRDI engine with a block diagram showing all the essential components.  | 10 |

## UNIT - III

- |   |    |   |    |
|---|----|---|----|
| 5 | a. | Explain the conventional battery ignition system for a 3 cylinder engine with a circuit diagram.                    | 10 |
|   | b. | What is supercharging? What are the benefits?   | 4  |
|   | c. | What are the limits of supercharging in SI and CI engine? Discuss why CI engines perform better with supercharging? | 6  |
| 6 | a. | Explain magneto ignition system with a simple sketch.   | 10 |
|   | b. | What are the methods of spark advance mechanism for load and speed variations?                                      | 10 |

## UNIT - IV

- |   |    |  |   |
|---|----|--|---|
| 7 | a. | What is combustion chamber? Show the variation of temperature across piston and cylinder.            | 5 |
|   | b. | With a neat sketch, explain forced circulation liquid cooling system. What is the use of thermostat? | 7 |
|   | c. | Discuss the benefit and limitations of air cooling and liquid cooling.                               | 8 |

- 8 a. What is necessity of lubrication? Which are the critical points in a vehicle which needs lubrication? 6
- b. What are the ideal properties of lubricants for automotive application? 10
- c. What are the types of lubricants? Write a note on SAE rating of lubricants. 4

**UNIT - V**

- 9 a. Explain at least four engine performance parameters with their significance. 10
- b. What is a dynamometer? What are types of dynamometers? 4
- c. Explain the arrangement in a brake drum type of dynamometer and how this is used? 6
- 10 a. What are the pollutant emissions formed during the combustion in SI and CI engine? Mention the causes. 8
- b. What are Green house gases? How are this different from pollutants? 4
- c. With a neat sketch, explain the working of non-dispersive infrared analyzer. 8

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