



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

(An Autonomous Institution affiliated to VTU, Belagavi)

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

**Semester End Examination; Dec. - 2019**

**Auxiliary Systems of Automotive Engines**

*Time: 3 hrs*

*Max. Marks: 100*

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

*ii) Use of the Heat Transfer Data Handbook is permitted.*

## UNIT - I

- |      |  |    |
|------|--|----|
| 1 a. | Explain mixture requirements for steady state operation.                 | 10 |
|      | b. Describe with sketches the working of carter carburetor.              | 10 |
| 2 a. | What is Petrol Injection? What are its advantages and disadvantages?     | 10 |
|      | b. With block diagram, explain k-jetronic fuel injection system (Bosch). | 10 |

## UNIT - II

- |      |   |    |
|------|---|----|
| 3 a. | Explain the working principle of distribution type fuel injection pump. | 10 |
|      | b. Explain with sketch pintle, pintaux and multi-hole nozzles.          | 10 |
| 4 a. | Explain with sketch CRDI system.  | 10 |
|      | b. Explain with sketch mechanical fuel injector.                        | 10 |

## UNIT - III

- |      |  |   |
|------|--|---|
| 5 a. | Sketch a piston and show typical temperature at various places.                      | 8 |
|      | b. Why is over cooling in an engine harmful?   | 6 |
|      | c. Discuss the effects of the following variables on the cylinder temperature:       |   |
|      | i) Air fuel ratio  |   |
|      | ii) Compression ratio  |   |
|      | iii) Engine speed  | 6 |
|      | iv) Engine power   |   |
|      | v) Design of combustion chamber and material used                                    |   |
|      | vi) Spark advance  |   |
| 6 a. | Describe with a sketch the construction and working of a thermostat.                 | 7 |
|      | b. Explain with sketch evaporative cooling.  | 7 |
|      | c. What is the function of a Radiator? Explain the construction of typical radiator. | 6 |

## UNIT - IV

- |      |  |   |
|------|--|---|
| 7 a. | Describe with the help of a sketch the working principle of a bearing. | 8 |
|      | b. Discuss with the help of a sketch dry sump lubrication system.      | 8 |
|      | c. Explain SAE classification of lubricating oils.                     | 4 |

- |      |   |   |
|------|---|---|
| 8 a. | Explain with sketch the principle of mechanical governor. | 7 |
| b.   | Explain with sketch the principle of pneumatic governor.  | 7 |
| c.   | Explain the following characteristic of governors:        |   |
|      | i) Sensitivity  |   |
|      | ii) Stability   | 6 |
|      | iii) Speed droop  |   |

**UNIT - V**

- |       |   |   |
|-------|---|---|
| 9 a.  | Derive an expression for the power required for an IC engine super charger. | 8 |
| b.    | What is the effect of super charging on;                                    |   |
|       | i) Power output   | 6 |
|       | ii) Fuel consumption  |   |
| c.    | What are the super charging limits for SI engine and CI engine?             | 6 |
| 10 a. | Describe the Buchi system of turbo charging.                                | 6 |
| b.    | What are the advantages and disadvantages of pulse turbo charging?          | 8 |
| c.    | What is hyperbar turbo charging ? Explain in brief.                         | 6 |

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