



**K. K. Wagh Institute of Engineering Education & Research, Nashik**  
(An Autonomous Institute From A.Y. 2022-23)

| InSem Examination-I Winter2024             |                          |
|--|--------------------------|
| Exam Seat No.:                             |                          |
| Academic Year:2024-2025                    | Semester:III             |
| Class:SY                                   | Program:B.Tech           |
| Branch Code:MEC                            | Pattern:2023             |
| Name of Course:Energy Systems for Mobility | Course Code:2305206      |
| Max. Marks:30                              | Duration:1 Hr 15 Minutes |

**Instructions:** Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains 02 page(s).
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.

**Marks CO**

**Question No. 1**

- 1 a) In air standard Otto cycle, compression begins at 1 bar and 300 K. The compression ratio is 8. Heat added per kg of air is 2500 kJ/kg. Calculate pressure and temperature of each state point. Make suitable assumptions if required. (7) CO1

**Question No. 2**

- 2 a) How is actual cycle different from air standard cycle? (4) CO1  
2 b) Write a note on Valve timing Diagram. (4) CO1

Group OR

- 2 c) Compare two stroke engine and four stroke engine. (4) CO1  
2 d) Classify engines on the basis of: (4) CO1  
i) Thermodynamic cycle used  
ii) Cylinder arrangement  
iii) Cooling method used  
iv) No. of strokes per cycle

**Question No. 3**

- 3 a) Explain in detail with neat sketch various phases of Combustion in CI Engines. (7) CO2

**Question No. 4**

- 4 a) Explain in detail with neat sketch a MPFI system. Also list various advantages of using MPFI system in SI engines. (4) CO2  
4 b) Explain knocking in CI engines. When does it occur? What are the factors affecting knocking in CI Engines? (4) CO2

Group OR

4 c) Explain Common Rail Injection (CRI) system with neat sketch.

(4) CO2

4 d) How is catalytic convertor used in reducing pollution? Explain in detail with neat sketch.

(4) CO2

..... End of question paper.....