PAPER ID-310259

Subject Code: RME051

Roll No: | | | | | | | | | | | | | |

**BTECH**
**(SEM V) THEORY EXAMINATION 2023-24**
**I.C. ENGINES & COMPRESSORS**

**TIME: 3 HRS** **M.MARKS: 70**

**Note: 1.** Attempt all Sections. If require any missing data; then choose suitably.

## SECTION A

**1. Attempt *all* questions in brief.** **2 x 7 = 14**

| | |
|---|---|
| a. | Whose efficiency is more IC engine or EC engine? Why? |
| b. | Why is the actual cycle differing from fuel- air cycle? |
| c. | What are the requirements of a good combustion chamber is S.I. engines? |
| d. | What is turbo charging? |
| e. | What drawbacks does gasoline-alcohol mixed fuel have? |
| f. | What are applications of air compressors? |
| g. | What distinguishes an air blower from an air compressor? |

## SECTION B

**2. Attempt any *three* of the following:** **7 x 3 = 21**

| | |
|---|---|
| a. | Discuss the optimum opening position of exhaust valve to reduce the exhaust blow down loss. |
| b. | What are the advantages of electronic ignition systems over conventional systems? Give the brief explanation of TCI & CDI system with its circuit diagram. |
| c. | What are the effects of unburnt hydrocarbons on environment and human health? |
| d. | Provide a detailed table that compares the suitability of natural gas, LPG, alcohol, hydrogen, and vegetable oils as fuel for internal combustion engines. |
| e. | What distinguishes a centrifugal compressor from a reciprocating compressor? Describe how intercooling affects a reciprocating compressor's performance. Find the expression for the ideal pressure ratio using intercooling in one step. |

## SECTION C

**3. Attempt any *one* part of the following:** **7 x 1 = 7**

| | |
|---|---|
| (a) | Write a short note on valve timing diagram for four stroke petrol engines running at high speed and low speed. |
| (b) | Find the percentage loss in ideal efficiency of a Diesel engine with compression ratio 15, by delaying the fuel cut-off from 5% to 8% of the stroke. |

**4. Attempt any *one* part of the following:** **7 x 1 = 7**

| | |
|---|---|
| (a) | Give the detailed comparison of combustion phenomenon in CI and SI engine. |
| (b) | What is supercharging? Enumerate the main objectives of supercharging. Describe the methods of supercharging. |

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**5. Attempt any *one* part of the following: 7 x 1 = 7**

| | |
|---|---|
| (a) | Draw sketches showing the constructional features of different type of nozzle used in automobile diesel engine and explain the function of each. |
| (b) | Which are the main causes of pollution in the air? What kinds of pollutants do internal combustion engines emit? Using a clean sketch, explain how any particular kind of pollution control device operates. |

**6. Attempt any *one* part of the following: 7 x 1 = 7**

| | |
|---|---|
| (a) | What are the engine modifications required to use compressed natural gas (CNG) as fuel? |
| (b) | Write the short notes on following-<br>(i) Mist lubrication system (ii) Crankcase ventilation |

**7. Attempt any *one* part of the following: 7 x 1 = 7**

| | |
|---|---|
| (a) | Explain what an axial flow compressor does. What distinguishes it from a centrifugal compressor? Using an axial flow compressor, draw the velocity diagram. |
| (b) | Explain about the multistage compressor's importance of intercooling. Add a process to the T-S and P-V diagrams as well. |