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B.TECH
(SEM V) THEORY EXAMINATION 2022-23
AUTOMOBILE ENGINES AND COMBUSTION

Time: 3 Hours ***Total Marks: 100***

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

SECTION A

1. Attempt *all* questions in brief. **2 x 10 = 20**

(a) What are the properties of LPG as a SI engine fuel?
(b) Calorific value of the fuel.
(c) Draw P-V and T-S diagrams for dual cycle.
(d) Why 2 strokes engines are not popular in 2 wheelers in current scenario.
(e) What are the necessary properties for choosing a suitable lubricant?
(f) Explain crankcase ventilation.
(g) What is meant by cylinder row and cylinder bank?
(h) Name of various types of nozzles used in injection systems of IC engines.
(i) Explain the factors affecting the combustion in IC engine.
(j) What are the knocking and detonation in IC engines?

SECTION B

2. Attempt any *three* of the following: **10 x 3 = 30**

(a) Explain stochiometric ratio. How the stochiometric ratio affect the heating value and emissions of an IC engine.
(b) What are the various types of combustion chambers used in SI engines? Explain them briefly.
(c) In a S.I. engine working on the ideal Otto cycle, the compression ratio is 5.5. The pressure and temperature at the beginning of compression are 1 bar and 27 ◦C respectively. The peak pressure is 30 bar. Determine the pressure and temperatures at the salient points, the air-standard efficiency and the mean effective pressure. Assume ratio of specific heats to be 1.4 for air.
(d) What is the main function of a spark plug? Draw a neat sketch of a spark plug and explain its various parts
(e) With a neat sketch explain a charcoal canister for controlling non exhaust emission.

SECTION C

3. Attempt any *one* part of the following: **10 x 1 = 10**

(a) Explain the various types of fuel injection system used in CI engines. Which fuel injection system is suitable for CI engine? Justify your answer.
(b) Explain turbo-charging. Give a brief note on variable geometry turbocharger and waste gate turbocharger.

4. Attempt any *one* part of the following: 10 x 1 = 10

(a) Explain briefly
- (i) mean effective pressure
- (ii) fuel-air ratio
- (iii) specific output
- (iv) heating value of the fuel
- (v) specific fuel consumption

(b) Comparison of the Otto, Diesel and dual cycles on the basis of
- (i) Same Compression Ratio and Heat Addition
- (ii) Same Compression Ratio and Heat Rejection
- (iii) Same Peak Pressure, Peak Temperature and Heat Rejection
- (iv) Same Maximum Pressure and Heat Input

5. Attempt any *one* part of the following: 10 x 1 = 10

(a) Explain the flame propagation in SI engines. Explain the various factors affecting flame propagation.

(b) Explain the burning velocity of fuels. What are the factors affect it. Explain the method of measurement of burning velocity.

6. Attempt any *one* part of the following: 10 x 1 = 10

(a) Explain CDI ignition system with a suitable diagram. Illustrate the advantages of CDI.

(b) Explain the working of magneto ignition system. Differentiate between the magneto ignition system and battery ignition system.

7. Attempt any *one* part of the following: 10 x 1 = 10

(a) Briefly explain the petroleum refining process

(b) Write a brief note on engine emissions. What are the sources and factors affecting the emissions? Write short notes on Bharat Stage-VI for emission standard for vehicles.