PAPER ID-410138

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BTECH
(SEM V) THEORY EXAMINATION 2021-22
IC ENGINE, FUEL AND LUBRICATION

Time: 3 Hours
Total Marks: 100

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

SECTION A

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

   a. Define the term Heat Engine.
   b. Discuss the term "Relative efficiency".
   c. Discuss the term Ignition Delay in CI Engine.
   d. Explain the term "Flame Speed" in SI engines.
   e. Discuss the injection timings.
   f. Explain the terms "Lean and Rich Mixture ".
   g. Discuss NOx Emission.
   h. Explain Cetane Number and Diesel Index for fuel.
   i. Explain working of Radiator.
   j. Define stratified charge engine.

SECTION B

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

   a. Discuss the classification of IC Engines in detail.
   b. Explain with diagram the stages of combustion for SI engine.
   c. Evaluate the working of MPFI and its different types with the help of neat and clean diagrams.
   d. Illustrate Particulate emissions & also give methods of controlling Emissions.
   e. Summarize the requirements of a good cooling System and compare air and liquid cooling system in brief.

SECTION C

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

   (a) Discuss an expression for thermal efficiency of air standard Otto Cycle.
   (b) An I.C. engine working on Diesel cycle has bore 200 mm, stroke 300 mm. if the clearance volume is 420 cc and fuel injection takes place at the constant pressure for 5% of the stroke, determine the thermal efficiency of the engine. If the cut-off is delayed from 5 to 8% what will be the percentage loss in efficiency in both cases, the compression ratio is the same?

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

   (a) Demonstrate combustion process and its phases in CI engine with neat sketch.
   (b) Demonstrate phenomenon of knock in S.I. Engine. Discuss the effects of knock in S.I. engines and methods reduce the detonation.

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

(a)   Derive an expression for the calculation of exact A-F ratio when air is considered as incompressible.

(b)   Derive an expression for the quantity of fuel to be injected per cylinder per cycle for a four-stroke engine in terms of brake specific fuel consumption, B.P. and rpm. Determine the velocity of injection of fuel in solid injection system when the difference in oil pressure and cylinder pressure is 75 bar. Assume the specific gravity of fuel as 0.905 and coefficient of discharge for orifice is 0.86.

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

(a)   Discuss EGR system also demonstrate the working of catalytic convertor with neat sketch.

(b)   Discuss the alternative fuels for IC engines also discuss the rating for SI engine fuel.

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

(a)   Explain the function of lubricants in I.C. Engines. Explain different wet lubricating system with neat sketch.

(b)   Explain the working of battery ignition system with neat sketch also discuss the types of electronic ignition system.