B.E. Eighth Semester (Mechanical Engineering) (CGS)

10894 : I. C. Engines : 8 ME 03

P. Pages : 2 | **AU - 2987**

Time : Three Hours | Max. Marks : 80

Notes :
1. All question carry equal marks.
2. Answer **three** question from Section A and **three** question from Section B.
3. Due credit will be given to neatness and adequate dimensions.
4. Assume suitable data wherever necessary.
5. Diagrams and chemical equations should be given wherever necessary.
6. Retain the construction lines.
7. Illustrate your answer necessary with the help of neat sketches.
8. Use of pen Blue/Black ink/refill only for writing the answer book.

SECTION - A

1. a) Derive an expression for an air standard efficiency of Otto cycle. **6**

b) Explain construction & working of two stroke I. C. Engine with neat sketch. **7**

OR

2. a) How do the specific heats vary with temperature? What is physical explanation for this variation? **6**

b) Find the percentage increase in efficiency of Diesel Cycle having compression ratio of 16 & cut off ratio is 10% of the swept volume, if C_V decreases by 2%. **7**

Take $C_V = 0.717\,kJ/kg\,k$ & $\nu = 1.4$.

3. a) What are the functional requirements of an injection system? **6**

b) Discuss alcohols as an alternate fuel for I. C. engine. State its advantages & disadvantages. **7**

OR

4. a) What are functions of nozzles? With neat sketch explain various types of nozzles. **6**

b) Discuss LPG as an alternate fuel for I. C. engine. State its advantages & disadvantages. **7**

5. a) What is abnormal combustion? Explain the phenomenon of knock in SI engine. **7**

b) What are various types of combustion chambers used in SI engine. **7**

OR

6. a) Discuss effect of engine variables on knock in SI engine. **7**

b) Explain flame propagation & that factors influencing flame propagation. **7**

SECTION - B

7. a) What is Cetane rating of C.I. engine fuel. 6

   b) What is delay period & what are the factors that affects the delay period. 7

OR

8. a) Sketch & Explain various indirect injection type combustion chambers in C.I. engine. 7

   b) Explain stages of combustion in C.I. engine with neat sketch. 6

9. A full load test was conducted on a two stroke engine & the following results were obtained. 13

   Speed = 500 rpm
   Brake load = 500 N
   imep = 3 bar
   oil consumption = 5 kg/hr.
   Jacket water temp. rise = 35°C.
   Jacket water flow rate = 7 kg/min.
   A/F ratio by mass = 30
   Exhaust gas temp = 350°C
   Room temp = 25°C,
   Atm. pressure = 1 bar
   Cylinder diameter = 22 cm.
   Stroke = 28 cm.
   Brake diameter = 1.6 m.
   C.V of fuel = 42000 kJ/kg
   Proportion of H_2 by mass in fuel = 15%
   Specific heat of exhaust gas = 1.0 kJ / kg k
   Sp. heat of dry steam = 2.0 kJ / kg k

   Calculate :
   i) Indicated thermal efficiency.
   ii) Specific fuel consumption.
   iii) Volumetric efficiency

   Draw a heat balance sheet for test.

OR

10. a) Explain various supercharging methods used in I. C. engine with neat sketches. 6

    b) List various methods available for finding friction power of an engine. Explain Morse Test in detail. 7

11. a) Discuss Euro Norms in details for emission control. 7

    b) Sketch & explain working of catalytic converter. 7

OR

12. a) What is NO_X emission? Discuss its effect on human health. 7

    b) Sketch & Explain Exhaust gas Recirculation. 7

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