2628

Internal Combustion Engine
(New) (1050)

P. Pages : 2

Time : Three Hours

Max. Marks : 100

Instructions to Candidates :
1. Do not write anything on question paper except Seat No.
2. Answersheet should be written with blue ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. All questions are compulsory and solve **any two** bits out of a, b, and c in each question.
5. Assume suitable data if necessary.
6. Use of non programmable calculator is allowed.

1. a) Show that the efficiency of Diesel cycle is lower than the otto cycle for same compression ratio. Comment why the higher efficiency of otto cycle compared to Diesel cycle for the same compression ratio is only of academic interest and not practical importance. **10**

   b) An air standard cycle has a compression ratio of 14. The pressure at the beginning of compression stroke is 1 bar and the temperature is $27°$ C the maximum temperature is $2500°C$. Determine the thermal efficiency and mean effective pressure. **10**

   c) Write short note on the following. **10**
   i) Available energy
   ii) Unavailable energy
   iii) Second law efficiency
   iv) Pumping losses
   v) Time losses.

2. a) Explain fuel injection pump with neat sketch ? Explain any one type of injection nozzle. **10**

   b) Develope an expression of air fuel ratio neglecting compressibility for a simple carburettor. **10**

   c) Describe with suitable sketches the following systems for modern carburettor. **10**
   i) Main metering jet
   ii) Idling system.
   iii) Economizer system
   iv) Acceleration pump system.

3. a) What is under cooling and overcooling of an engine ? Explain the types
        of liquid cooling with neat sketch for following.   **10**
        i)   Thermosyphon system   ii)   Cooling with thermostatic regular

    b) What are the requirements of ignition system ? Explain battery ignition system
        with neat sketch ? What are the latest development in ignition system ?   **10**

    c) What is meant by supercharging and turbo charging what is it's effect
        on engine performance.   **10**

4. a) Discuss on the combustion in spark ignition engine and compression
        ignition engine.   **10**

    b) What are the important factors which should be taken in consideration
        in design of C.I. Combustion chamber ? What is 'M' combustion chamber ?
        What advantages are claimed for this design ?   **10**

    c) Explain the phenomenon of diesel knock compare with phenomenon of
        detonation in SI engine.   **10**

5. a) Describe exhaust gas recirculation (EGR) device for control of NOx
        emission from S.I. engine. What is basic principle of catalytic convertor. **10**

    b) The following observations were recorded in a test of one hour duration on a
        single cylinder oil engine working on four stroke cycle.   **10**
        Bore -   = 300 mm
        Stroke   = 450 mm
        Fuel used   = 8.8 kg
        calorific value of fuel   = 41800 kJ/kg
        Average speed   = 200 r.p.m.
        Mean effective pressure   = 5.8 bar
        Brake friction load   = 1860 N
        Quantity of cooling water   = 650 Kg
        Temperature rise   = 22°C
        Diameter of brake wheel   = 1.22 m
        calculate :
        i)   Mechanical efficiency
        ii)   Brake thermal efficiency Draw neat balance sheet on hourly basis.

    c) Explain the effect of following on the performance of S. I engine.
        i)   Compression ratio.
        ii)   A : F ratio.
        iii) Spark ignition timing.
        iv)   Pressure of induced charge.

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