

TME-602

102

Printed Pages : 4

Paper Code & Roll No. to be filled in your Answer Book

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B. Tech. (Mechanical Engineering)

UTU (SEM.-VI)

Examination-2015

I. C. Engines

*Time : 3 Hrs.**Max. Marks : 100*

NOTE: Attempt all the question, the marks assign to each question is indicated at question itself.

1. Attempt any four questions. (4×5)

- (a) Mention the various assumptions made in air standard cycle analysis.
- b) Define the following:
- Swept volume
 - Clearance Volume
 - Compression Ratio
 - Cubic Capacity
 - Mean Effective pressure
- c) With neat Sketches explain the working principle of four stroke CI engine.

- d) In an engine working on ideal Otto cycle the temperature at the beginning and end of compression are 50°C and 373°C . Find the compression ratio and the air standard efficiency of the engine.
- e) Draw the P-V and T-S diagram of Stirling cycle and derive the expression for its efficiency.
- f) In an engine working on Diesel cycle inlet pressure and temperature are 1 bar and 17°C respectively. Pressure at the end of adiabatic compression is 35 bar. The ratio of expansion is 5. Calculate the heat addition, heat rejected and efficiency of the cycle.

2. **Attempt any four questions.**

(4×5=20)

- a) How are SI and CI engine fuels rated?
- b) Briefly discuss the air fuel mixture requirements of a petrol engine from no load to full load.
- c) The venturi of a simple carburetor has a throat diameter of 20 mm and the coefficient of flow is 0.8. The fuel jet has a diameter of 1.14 mm and the coefficient of flow is 0.65. The gasoline surface is 5mm below the throat; calculate the air fuel ratio for a pressure of 0.08 bar. Assume the density of air and fuel as 1.2 and 750 kg/m^3 respectively.

- d) Briefly explain the stages of combustion in SI engine.
- e) Explain the effect of various engine variables on SI engine knock.
- f.) With a neat sketch explain the battery ignition system.

3. **Attempt any two questions** (2×10=20)

- a) How are the injection system classified? Describe them briefly.
- b) What is meant by abnormal combustion? Explain the phenomena of knock in CI engine.
- c) What are the emissions that come out of engine exhaust?

4. **Attempt any two questions.** (2×10)

- a) Explain and compare the wet sump and dry sump lubrication system.
- (b) What is meant by supercharging and turbo charging? What are the effects on engine performance?
- (c) The bore and stroke of a water cooled, single cylinder, four stroke diesel engine are 80mm and 110 mm respectively and torque is 23.5 Nm. Calculate the brake mean effective pressure of the engine.

P.T.O.

5. **Attempt any two question.** (2×10)
- a) Describe the working of a single stage reciprocating air compressor with the help of P-V and T-S diagram.
- (b) Explain the working of a centrifugal compressor with a neat sketch and obtain an expression for the work done.
- (c) A single stage reciprocating air compressor is required to compress 1 kg of air from 1 bar to 4 bar. The Initial temperature is 270C. Compare the work requirement in the following cases:
- Isothermal compression
 - Isentropic compression
 - Polytropic compression with $n=1.2$

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