C.U.SHAH UNIVERSITY
Wadhwan City

Subject Code :4TE01EME1   Summer Examination-2014   **Date: 03/06/2014**
Subject Name Elements of Mechanical Engineering
Branch/Semester:- B.Tech/I   **Time:10:30 To 1:00**
Examination : Remedial

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Instructions:-
(1) Attempt all Questions of both sections in same answer book / Supplementary
(2) Use of Programmable calculator & any other electronic instrument is prohibited.
(3) Instructions written on main answer Book are strictly to be obeyed.
(4) Draw neat diagrams & figures (If necessary) at right places
(5) Assume suitable & Perfect data if needed

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SECTION-I

Q-1   **Attempt the following:**

1.	Define terms: (i) Pressure (ii) Temperature	02
4.	State the Second law of thermodynamics.	02
5.	Distinguish between flow and non-flow processes	02
6.	Define compression ratio.	01

Q-2   (a)   Represent the following compression process on p-V diagram with same   04
initial conditions: (i) Constant volume (ii) Constant pressure (iii)
Isothermal (iv) Adiabatic.

    (b)   Prove that $C_p - C_v = R$ with usual notations.   05

    (c)   In air compressor, air enters at 1.013 bar and 27°C having volume of 5   05
m3/ kg and it is compressed to12 bar isothermally. Calculate work done
and change in internal energy.

OR

Q-2   (a)   Explain different states of a steam.   04
    (b)   With neat sketch explain throttling calorimeter.   05
    (c)   Find the enthalpy of 3 kg of steam at a pressure of 12 bar when (i) Steam   05
is dry saturated, (ii) superheated to 300°C. Take Cps=2.1kJ/kg K.

Q-3   (a)   Derive an expression for the efficiency of diesel cycle.   07
    (b)   Determine the air standard efficiency of Otto cycle from the following   07
data: Bore of the cylinder = 14 cm, stroke length = 13 cm, clearance
volume = 290 cm^3

OR

Q-3   (a)   (1) Differentiate between boiler mounding and accessories.   03
           (2) Give detail classification of boiler.   04
    (b)   Explain with neat sketch Babcock and Wilcox boiler.   07

SECTION-II

Q-4   **Attempt the following:**

1.	Define terms (1) Stroke length (2) Clearance volume	02
2.	Give the uses of clutch and brakes.	02
3.	Distinguish between window and split air conditioner	02
4.	List the types of belt drive.	01

Q-5 (a) What is difference between reciprocating and rotary compressor. 04
(b) Derive an expression of work done for compressor without clearance for adiabatic compression. 05
(c) A single stage reciprocating air compressor compresses air through pressure ratio of 9 from a pressure of 1 bar. Free air delivery is 3 m^3 /min. Swept volume and index of compression are 15 liters and 1.3 respectively. Determine power required in kW. 05

OR

Q-5 (a) Define: (i) shaft (ii) Axle 04
(b) Explain with neat sketch vapour compression refrigeration system. 05
(c) Give comparison between individual drive and group drive. 05

Q-6 (a) Explain with a sketch the working of a four stroke Petrol engine. 07
(b) A two stroke internal combustion engine has a stroke length of 140 mm and cylinder bore 90 mm. Its mean effective pressure is 5.4 bar and speed of the engine is 1000 rpm. Determine brake power of the engine. Assume mechanical efficiency as 85%. 07

OR

Q-6 (a) Give classification of governor. Also explain Watt governor with neat sketch. 07
(b) Explain with neat sketch the vane pump. 07

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