SHIVAJI UNIVERSITY, KOLHAPUR

Subject : Basic Mechanical Engineering   Code : 59186

First Year Engineering   Sem - I (New Course)

Day and Date : Saturday 28 - 12 - 2013   Time : 10.00 a.m. to 01.00 p.m.

Total Marks : 100

Note : Attempt any three questions from each

SECTION - I

Q. 1 a) What is meant by thermodynamic system ? Explain it.   08

b) The following data is given for an air compressor , If rate of air flow is 5 kg/s and

	Inlet	Outlet
Pressure	80kpa	600kpa
Specific volume	0.65m³/kg	0.12 m³/kg
Specific internal energy	40KJ/Kg	140KJ/Kg
Velocity	6m/s	4m/s

Heat rejected to cooling water is 50 kw

Find   (i) Power required to drive the compressor in kw.

(ii) Ratio of inlet pipe diameter to outlet pipe diameter   10

Q. 2 a) Explain the working of C.I. two strokes I.C. Engine with neat sketch.   08

b) Describe Carnot engine   08

Q. 3 a) What is vapour compression refrigeration? Explain in detail.   08

     b) Explain

         i. Saturated air, degree of saturation

         ii. Humidity, relative humidity.   08

Q. 4 a) Describe statements of second law of thermodynamics   08

     b) Differentiate two stroke and four stroke I.C. engine.   08

     c) Explain Carnot refrigerator.   08

     d) Explain state, process and cycles.   04

Section –II

Q. 5 a) Explain with the help of neat sketch, construction and working of
hydroelectric power plant.   08

     b) Differentiate renewable and non renewable energy sources. Explain Biogas
plant with the help of neat sketch.   08

Q. 6 a) Two pulleys having diameters 2 m and 1.5 m are separated by a distance of
5 m. The initial tension in the belt is 3 KN. The coefficient of friction
between the belt and pulley is 0.3. Calculate the power transmitted by open
belt when smaller pulley rotates at 200 rpm. Neglect centrifugal tension.   08

     b) Explain with neat sketch, the working of centrifugal pump. Explain the need
of priming and Enlist its applications.   08

Q. 7 a) Define manufacturing process. Explain metal joining process with its
applications.   08

     b) Explain the metal removing process with suitable diagram and give its
application.   08

Q. 8 a) Explain sand casting process.   06

     b) Explain with neat sketch oldhams coupling.   06

     c) Explain flat plate collector with neat diagram.   06