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BME-031

00664

BACHELOR OF TECHNOLOGY IN MECHANICAL ENGINEERING (COMPUTER INTEGRATED MANUFACTURING)

Term-End Examination

June, 2011

BME-031 : ENERGY CONVERSION

Time : 3 hours *Maximum Marks : 70*

Note : *Answer **seven** questions. Use of calculator is permitted. Suitable data may be assumed if required.*

1. (a) What is energy ? Discuss and justify the statement, "Energy consumption as a measure of prosperity". 5

   (b) Explain the application of engineering sciences to energy conversion systems. 5

2. Explain the following laws in brief. **2x5=10**

   (a) Law of conservation of mass.

   (b) Law of conservation of energy.

   (c) Avagadro's law.

   (d) Dalton's law of partial pressures.

   (e) Amagat's law.

3. (a) With a neat schematic diagram explain Solar Power Plant. 5

(b) Explain Biogas plant with a neat sketch. 5

4. (a) What is a nozzle and what are its functions ? Also Explain the following : 5

(i) Degree of supersaturation.

(ii) Degree of undercooling.

(b) Give the classification of steam turbines. Explain principle of working of steam turbines. 5

5. (a) Explain the necessity of steam condensers. 5

(b) In a surface condenser following readings were noted, 5

- Mass flow rate of cooling water=300 kg/hr
- Inlet temp of cooling water = 20°C
- Outlet temp of cooling water = 70°C
- Enthalpy of steam at inlet = 1900 kJ/kg
- Enthalpy at outlet = 200 kJ/kg
- Take C_p of water = C_{p_w} = 4.187 kJ/kg-K
- Find mass flow rate of condensate collected in kg/hr

6. (a) Explain reheat cycle with the help of T - S diagram. 5

(b) Give the advantages of reheat cycle. 5

7. (a) Explain in brief about, 5

(i) Liquified Petroleum Gas (LPG)

(ii) Liquified Natural Gas (LNG)

(iii) Compressed Natural Gas (CNG)

(b) Explain the following terms, 5

(i) Stoichiometric air.

(ii) Excess air.

(iii) Air - fuel ratio.

(iv) Mixture strength.

8. (a) Explain with a neat diagram Fluidised Bed Combustion (FBC) system for the boilers. 5

(b) What do you mean by a packaged boiler ? Explain with a neat sketch. 5

9. (a) Explain the working of 4 - stroke cycle petrol engine with neat sketches. 5

(b) Give the classification of I.C. engines and describe in brief. 5

10. (a) With a neat sketch explain working of Hydro Electric Power plant. Explain Reservoir, penstock, power house, water turbines. 5

(b) Draw a neat diagram of inplant coal handling system and indicate the names of equipments used at different stages. 5