00962

BACHELOR OF TECHNOLOGY IN MECHANICAL ENGINEERING (COMPUTER AIDED MANUFACTURING)

Term-End Examination

December, 2011

BME-031 : ENERGY CONVERSION

Time : 3 hours *Maximum Marks : 70*

Note : *Answer **any seven** questions. Use of Scientific calculator is permitted.*

1. (a) In how many different forms energy is available on earth ? Classify them into two groups. Which form of energy is most widely used ? 6

   (b) What are the draw backs of hydro power plant due to which its share in total electricity has reduced ? 4

2. What is the function of a condenser in steam thermal power plant ? Explain with the help of Rankine cycle. Sketch a surface condenser. 10

3. (a) In how many forms the gas is used for producing energy ? Where is the thermal energy obtained from gas used ? 6

(b) State laws of thermodynamics and explain entropy. 4

4. Carbon, hydrogen and methane are burnt in air write equations of chemical reaction and find mass of air for complete combustion of 1 kg of each fuel. Also calculate the volume of oxygen per mol of fuel. 10

5. In a steam power plant following are essential components : Air pre-heater, Economizer, super-heater, feed pump and boiler. Show on sketch/block diagram how these components are arranged and indicate the direction of flow of water and steam. Describe functions of air preheater and economizer. 10

6. (a) How do you classify the internal combustion engines. Mention cycles on which these engines work. Why is it necessary to cool an I.C. engine ? 5

(b) With neat sketch explain the functioning of a 4-stroke petrol engine. What is other type of engine and what advantages does it offer over 4-stroke engine ? 5

7. What are the methods of removing particulate matter from flue gases ? Describe any one of them. What harmful effects are associated with particulate matter exhausting in atmosphere ? 10

8. (a) Distinguish between two types of hydro-turbine. Where are they used ? Sketch hydro power plant and mark various components. Name three turbines and state where they are used. 7

(b) Sketch one bucket of water impulse turbine. 3

9. (a) Distinguish between throttling and adiabatic processes. 4

(b) Write expressions for work done for 6

(i) isentropic process

(ii) constant volume and constant pressure processes

(iii) constant temperature process.

10. Sketch Babcock and Willcase boiler and show the position of superheater. Why are the tubes in this boiler inclined. Show the path of hot gases. 10