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**BME-058**

01164

# DIPLOMA IN ELECTRICAL AND MECHANICAL ENGINEERING

## Term-End Examination

## June, 2011

## BME-058 : POWER PLANT ENGINEERING

*Time : 3 hours* *Maximum Marks : 70*

***Note :*** *Answer **any seven** questions. Assume if any data is missing. Use of scientific calculator is permitted.*

1. (a) Describe briefly various sources of Energy Production and discuss their merits and demerits. 5

   (b) List out the advantages of liquid and gaseous fuels. 5

2. (a) Give the layout of a modern steam power plant and explain it briefly. 5

   (b) Describe the rankine cycle as applied to a system using super heated system. What is the utility of this cycle in the study of steam power plants ? 5

3. (a) What is evaporator ? How are evaporators classified ? Explain any one of them with neat sketch. 5

(b) The 5400 kg of steam is produced per hour at a pressure of 7.5 bar in a boiler with feed water at 415°C. The dryness fraction of steam at exit is 0.98. The amount of coal burnt per hour is 670 kg of calorific value 31000 kJ/kg. Determine 5

(i) Boiler efficiency

(ii) Equivalent evaporation.

4. (a) Explain with help of neat diagram the construction and working of a nuclear power plant. 5

(b) Discuss the advantages and disadvantages of nuclear power plants as compared with conventional power plants. 5

5. (a) Discuss the various factors to be considered while selecting a site for nuclear power plant. 5

(b) What is "Boiling Water Reactor" ? How it differs from "Pressurised Water reactor" ? 5

6. (a) List out the advantages and disadvantages of Diesel Power Plants. 5

(b) During the trial of a four stroke diesel engine, the following observations were recorded 5

Area of indicator diagram = 475 $mm^2$

Length of indicator diagram = 62 mm

Spring Index = 1.1 bar/mm

Diameter of Piston = 100 mm

Length of stroke = 150 mm

Engine speed = 375 rpm

Determine

(i) Indicated mean effective pressure

(ii) Indicated power

7. (a) Explain the working of simple gas turbine plant with help of neat diagram. 5

(b) List out the applications and limitations of gas turbine power plants. 5

8. (a) What is dam ? What are the various types of dams ? Explain any one with neat sketch. 5

(b) The gas turbine has an overall pressure ratio of 5:1 and a maximum cycle temperature of 550°C. The turbine drives the compressor and an electric generator the mechanical efficiency of the drive being 97%. The ambient temperature is 20°C and compressor and turbine efficiencies are 0.8 and 0.83 respectively. Calculate the power output in Kilowatts for an airflow of 15 kg/s. Calculate the thermal efficiency and work ratio, 5

neglect changes in Kinetic energy and the loss of pressure in combustion chamber.

9. (a) What safety measures need to be taken for the safe operation of an Hydro - Electric Power Plant ? 5

(b) Enumerate and explain briefly various methods used to calculate the depreciation cost. 5

10. Write short notes on *any two* of the following : 5+5=10

(a) Equivalent Evaporation

(b) Super Heater

(c) Condensing system