OR

The incremental fuel costs for two generating units a and b of a power plant are given by the following relations :

$$\frac{dF_a}{dP_a} = 0.06P_a + 25$$

$$\frac{dF_b}{dP_b} = 0.04P_b + 30$$

Where F is fuel cost in rupees per hour, P is the power output in MW and subscripts a and b are respectively for generating units a and b. Estimate the economic loading of two units when the total load supplied by the plant is 150 MW.

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Roll No ..

ME-602

B.E. VI Semester

Examination, December 2016

Power Plant Engineering

Time : Three Hours

Maximum Marks : 70

Note: i)   Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.

ii) All parts of each question are to be attempted at one place.

iii) All questions carry equal marks, out of which partA and B (Max. 50 words) carry 2 marks, part C (Max. 100 words) carry 3 marks, part D (Max. 400 words) carry 7 marks.

iv) Except Numericals, Derivation, Design and Drawing etc.

Unit - I

1. a)   Name the different tidal power schemes.

b)   How a fuel cell is different from a battery?

c)   How the biomass can be utilized for power production?

d)   Explain the working of open cycle MHD generator.

OR

Write a detailed note on wind energy and wind mills.

Unit - II

a) Write the advantages of pulverized fuel firing.

b) What is internal treatment of feed water?

c) Why it is essential to quench the ash before handling?

d) Draw flow sheet of a typical 220 MW capacity steam turbine driven and coal fired thermal power plant.

OR

What are the different types of cooling towers? Discuss any one.

Unit - III

a) Write a short note on binding energy.

b) What do you mean by fertile and fissionable material?

c) Discuss calandria of CANDU reactor.

d) Explain a heterogeneous nuclear reactor system, stating function of each component.

OR

Discuss the factors considered for the site selection of nuclear power plant. Also write advantages of nuclear power plant.

Unit - IV

a) What are the demerits of hydro power plant?

b) What is Forebay?

c) What is a mass curve? What does the slope of the mass curve at a point indicates?

d) Write brief notes on dam, spillway and surge tank.

OR

The following data relates to a hydroelectric power plant:

Head	= 150m
Catchment area	= 2000 km^2
Average annual rainfall	= 145 cm
Turbine efficiency	= 85%
Generator efficiency	= 90%
Percolation and evaporation losses	= 20%

Determine the power developed, and suggest type of turbine to be used if the runner speed is to be kept below 240rpm.

Unit - V

5. a) Define load factor and diversity factor.

b) How is load duration curve prepared?

c) Write brief note on different types of tariffs.

d) Estimate the generation cost per unit of electrical energy from a power plant having the following data :

Installed capacity of the plant	= 150 MW
Capital cost	= Rs. 2800 × 10^6
Interest and depreciation	= 12%
Annual load factor	= 60%
Annual cost of fuel, salaries and taxation	= Rs. 2800,000

Also discuss the effect of annual load factor on generation cost per unit by using the above data and assuming annual cost of fuel, salaries and taxation remains same.