

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 0480

Roll No.

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**B. Tech.**

(SEM. VIII) THEORY EXAMINATION 2010-11

**POWER PLANT ENGINEERING***Time : 3 Hours**Total Marks : 100*

**Note :** (1) Attempt **all** questions. Each question carries equal marks.

(2) Assume suitably, any missing data.

(3) Be precise in your answer.

1. Attempt any **two** of the following : **(10×2=20)**

(a) The incremental fuel costs for two generating units A and B of a thermal power plant are given by

$$\frac{dF_a}{dP_a} = 0.06P_a + 11.4 \text{ and } \frac{dF_b}{dP_b} = 0.07P_b + 10,$$

where P is in MW and F is in rupees per hour. Find, load shared by two units for the economic operation of the plant when the total load supplied by the station is 150 MW. Also calculate the loss in fuel cost per hour if the load is equally shared by the two units.

- (b) Discuss the elements which contribute to the cost of electricity generated. How load factor affect the generation cost ?
- (c) Answer the following :
- (i) Discuss sinking fund method of finding the depreciation rate.
- (ii) A power station of 30 MW capacity has the maximum annual demand of 25 MW. If the annual load factor is 45%, then find energy supplied per year and capacity factor.

2. Attempt any two of the following : (10×2=20)

- (a) What do you understand by proximate analysis of coal ? Discuss the effect of ash contents and volatiles on furnace design.
- (b) Answer the following :
- (i) Discuss gland sealing and flange heating system of steam turbine.
- (ii) Discuss different methods used for coal storage at power plant.
- (c) Answer the following :
- (i) Why feed water treatment is necessary ? Discuss the hot lime-soda process of removing impurities from the feed water.
- (ii) Explain the working of FBC (Fluidized Bed Combustion) with neat sketch. State the advantages of FBC system over conventional system.

3. Attempt any **two** of the following : **(10×2=20)**
- (a) What do you understand by closed cycle gas turbine plant ?  
List out its merit and demerit over open cycle power plant.
  - (b) Write short notes on :
    - (i) Combustion chamber for gas turbine plant.
    - (ii) Combined cycle power plant.
  - (c) Draw a neat line diagram of diesel power plant showing all the systems. Why the starting of diesel plant is more difficult ? What different methods are used for starting diesel engine ?
4. Attempt any **two** of the following : **(10×2=20)**
- (a) Write short notes on :
    - (i) Run off river plant and pumped storage plant.
    - (ii) Different methods used to find average rainfall.
  - (b) Draw a neat diagram of nuclear reactor and level different components. Discuss the function of moderator. Why lighter materials are used as moderator ?
  - (c) Write short notes on :
    - (i) Fast breeder reactor
    - (ii) Tidal energy.
5. Attempt any **two** of the following : **(10×2=20)**
- (a) List the major electrical equipments used in power plants.  
Discuss cooling of generators in detail.

(b) Answer the following :

- (i) Discuss the effect of  $\text{SO}_x$  and  $\text{NO}_x$  on the environment. Discuss different methods to control these emissions.
  - (ii) Discuss, how pollutants from nuclear power plant are controlled.
- (c) State the various types of instrument which are normally used in power plant. Discuss any one instrument used for measuring pollutants in flue gas.