

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

PAPER ID : 2781

Roll No.

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B.Tech.

(SEM. VII) THEORY EXAMINATION 2011-12

POWER STATION PRACTICS

Time : 3 Hours

Total Marks : 100

Note :- (1) Attempt **all** questions.

(2) All questions carry equal marks.

1. Attempt any **four** parts :

(5×4=20)

- (a) Enumerate the different electric energy sources and efficiency in their use.
- (b) Draw the schematic layout of coal-fired power station. Explain main parts and their working.
- (c) What are the factors which determine the location and site of a hydro plant ?
- (d) Bring out the comparison between impulse, reaction, Kaplan and Francis turbines.
- (e) A thermal power plant spends Rs. 25 lakhs in one year as coal consumption. The coal has heating value of 5000 k cal/kg and costs Rs. 500/ton. If the thermal efficiency is 35% and electrical efficiency is 90%, find the average load on the power plant.
- (f) Why pulverised fuel is preferred ? What are the types of pulverised fuel burners ?

2. Attempt any **two** parts : (10×2=20)

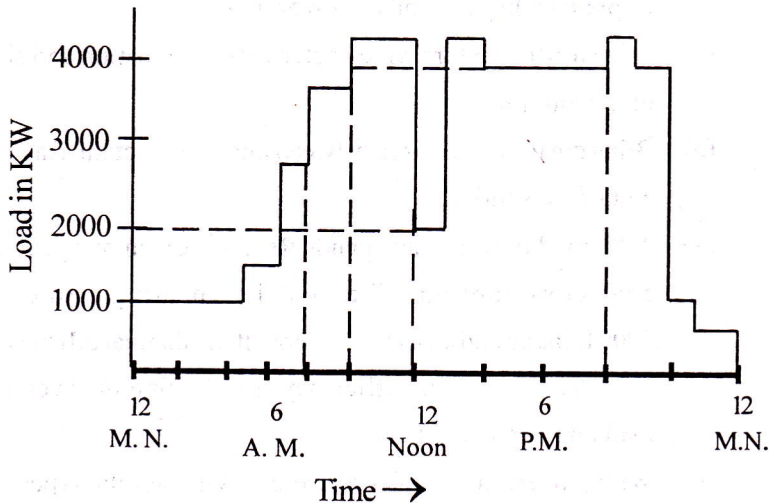
- (a) Explain the function of various parts of a nuclear reactor with requisite diagram. Differentiate between fission and fusion.
- (b) What are the different types of engines used in a diesel electric plant ? Discuss briefly with diagrams.
- (c) Discuss in detail open cycle and closed cycle gas turbine plants along with the methods to improve thermal efficiency of gas turbine plant.

3. Attempt any **two** parts : (10×2=20)

(a) Figure below shows the load curve of a generating station.

Calculate :

- (i) load factor
- (ii) suitable number and size of generators
- (iii) plant reserve capacity required
- (iv) plant capacity factor and plant use factor.



- (b) Define the following terms in connection with the power supply system :

Connected load, Maximum demand, two part tariff, diversity factor.

- (c) Draw and explain the layout of a substation. Also give different types of substation.

4. Attempt any two parts : (10×2=20)

- (a) What are the causes and effects of low power factor ?

A consumer has an annual consumption of 70,080 kWh.

The charge is Rs. 100/kw of max. demand plus 5 paise / kWh.

- (i) Find the annual bill and the overall cost per kWh if the load factor is 40%.
- (ii) What is the overall cost per kWh if the consumption was reduced by 25% with the same load factor ?
- (b) (i) What are the I/P and O/P characteristics of steam and hydro plants ? Explain with a neat graph.
- (ii) Discuss the following :
- (i) equality and inequality constraints
 - (ii) penalty factor
 - (iii) loss coefficients and
 - (iv) economic load scheduling of thermal plants.

(c) The fuel cost characteristics of 2 generators are :

$$F_{C_1}(P_{i_1}) = 1000 + 50 P_{i_1} + 0.01 P_{i_1}^2 \text{ Rs./hr}$$

$$F_{C_2}(P_{i_2}) = 1000 + 50 P_{i_2} + 0.01 P_{i_2}^2 \text{ Rs./hr}$$

If the total load supplied is 1000 MW, find the optimal load division between generators.

5. Attempt any **two** parts : **(10×2=20)**

(a) Explain the power crisis situation and how it can be overcome? What is the role of private sectors in managing the future energy demand ?

(b) What are the different sources of non-conventional energy ? Give one advantage and one disadvantage of each source.

(c) Explain Propeller type and Andean units of wind mills with relevant diagrams.