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EEE042

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

PAPER ID : 2781 Roll No. | | | | | | | | | | |

**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)**

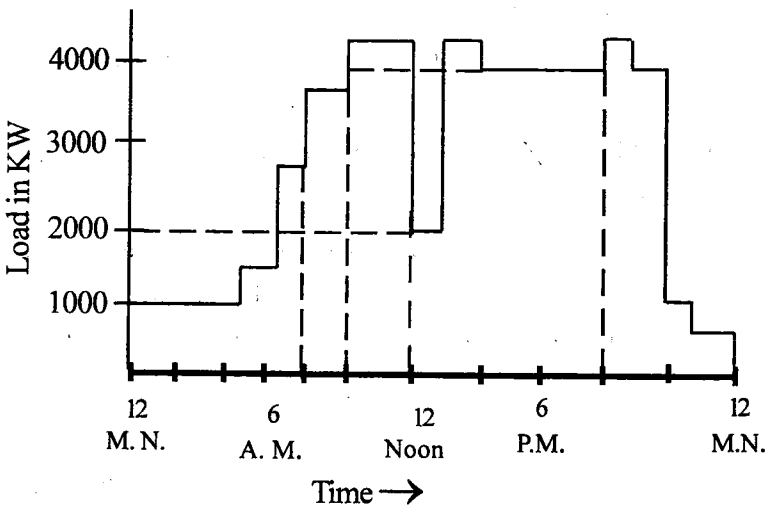
(a) Figure below shows the load curve of a generating station. Calculate :

(i) load factor

(ii) suitable number and size of generators

(iii) plant reserve capacity required

(iv) plant capacity faster 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 :

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

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

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 Andrean units of wind mills with relevant diagrams.