Printed Pages: 02
Paper Id: 120710

Sub Code: NEE702/NEN702/EEE042
Roll No.

B.TECH.
(SEM-VII) THEORY EXAMINATION 2018-19
POWER STATION PRACTICE

Time: 3 Hours. **Max. Marks: 100**

Note: 1. The question paper contains three sections- A, B & C.
2. Read the instructions carefully in each section

SECTION A

1. **Attempt ALL the parts:** **[2 × 10=20]**
   a. What is the total power plant installed capability in India?
   b. Define load factor & penalty factor.
   c. What do understand by tariff? Give its types.
   d. Classify hydraulic turbines.
   e. What are the functions of moderator & coolant in a nuclear power plant??
   f. What do you understand by economic load dispatch & unit commitment?
   g. What are the causes of low power factor?
   h. What is the power output of a $_{92}U^{235}$ reactor if it takes 30 days to use of 2 Kg fuel? Given that energy is released per fission is 200 MeV and Avogadro is 6.023×10^{23} per mole.
   i. What are the advantages of using pulverised coal in thermal power plant?
   j. What are the different types of generators used in wind energy generation?

SECTION B

2. **Attempt any THREE parts:** **[10 × 3=30]**

a. Explain open and closed cycle gas turbine plant along with methods to improve its thermal efficiency. What are its merits and demerits compared to the steam power plants?

b. Explain following terms:
   (i)Reservoir (ii)Spillways
   (iii)Trash Rack (iv) Penstock

c. A thermal power plant spends Rs. 25 lakhs in one year on coal consumption. The coal has a calorific value of 5000 Kcal/kg. with cost of Rs. 500/ton. If thermal efficiency is 32% & electrical efficiency is 90%. Find the average load on the power plant.

d. A generating station has the following daily load cycle:

Time (hours):	0-6	6-8	8-12	12-14	14-18	18-20	20-24
Load (MW):	45	35	75	20	80	25	50

   a) Draw the daily load curve
   b) Draw the load duration curve
   c) Calculate load factor
   d) Calculate plant capacity factor if the capacity of the plant is 120 MW

e. Describe the working of open loop MHD system and closed loop MHD system with the block diagram.

SECTION C

3. **Attempt any one part:** **[10x1=10]**

   a. Draw the layout of thermal power plants & describe the working of it. A 100 MW steam power plant uses a coal of calorific value 6400 kcal/kg. Thermal efficiency of station is 30 % and

electrical efficiency is 92%. Calculate the coal consumption per hour when the station is delivering to full rated output.

b. Classify hydro-electric power plants based on (i) water flow regulation (ii) head (iii) load

4. Attempt any one part: [10x1=10]

a. Explain the working of diesel plants with the help of diagram? Give its advantages & disadvantages.

b. What are the criteria for site selection for nuclear power plant? Explain with a neat sketch the working of a nuclear power plant. Give the classification of nuclear reactors.

5. Attempt any one part: [10x1=10]

a. An electric supply system has a maximum load of 70 MW. The annual expenses of the stem are :
Generation Rs. 8,70000
Fuel cost Rs. 28,00,000
Transmission Rs. 3,45,000
Distribution Rs. 27,50,000
Repairs etc Rs. 3,00,000
The no. of units generated per year is 600 x 10^6 kWh. The consumers have an aggregate maximum demand of 75 MW. Evaluate a two-part tariff to be charged from the consumers. Assume that the fixed charges for generation, fuel, transmission, distribution, repair etc are 90%, 15%, 85%,95% and 50% respectively. Losses in transmission & distribution are 20%.

b. Explain following:
(i) Substation layout
(ii) Busbar arrangements

6. Attempt any one part: [10x1=10]

a. Explain hydrothermal scheduling with various power system constraints.

b. What do you understand by economic load scheduling? Explain & derive the expression (i)Neglecting transmission losses (ii)Considering transmission losses

7. Attempt any one part: [10x1=10]

a. Explain generation of electricity by photovoltaic cell & thermoelectric converters for direct conversion of solar energy into electricity.

b. What is geothermal energy? How it is utilized for the power generation?