**Subject Name:PS-I**

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**Year and Sem, Department: II-EEE SEM-II**

**Unit-I: GENERATION OF ELECTRIC POWER**

**Important points / Definitions: (Minimum 15 to 20 points covering complete topics in that unit)**

**Short Questions (minimum 10 previous JNTUH Questions – Year to be mentioned)**

1 Why pulverized fuel is preferred

2 What are the functions of Economizer Super Heater

3 Discuss about nuclear fission process?

4 What are the different merits and demerits of nuclear power plant?

5 Discuss about nuclear fusion process?

6 What are the different merits and demerits of thermal power plant?

7 What are the different merits and demerits of hydel power plant?

8 What are the points to be considered for the selection of site for thermal power plant?

9 What are the points to be considered for the selection of site for hydel power plant?

10 What are the points to be considered for the selection of site for nuclear power plant?

**Long Questions (minimum 10 previous JNTUH Questions – Year to be mentioned)**

1.Explain the function of the following in thermal power plant and explain the principle of operation of each:

i. Economizer

ii. Electrostatic precipitator

iii. Condenser

iv. Super heater

v. Cooling tower

2.Draw a general layout of a modern thermal power plant and explain the working of different circuits

3.Classify the hydro power plants?

4.Give the classification of nuclear reactors and explain about BWR, PWR and FBR with a neat sketch

5.Explain in detail the constructional aspects of a gas turbine plant.

6.Give the comparison of steam power plant, nuclear power plant and gas power plant on the basis of different factors

7.Enumerate & explain essential components of a nuclear reactor

8.Discuss and compare the performance of different types of boilers used in thermal power plants

9.Draw a general layout of a modern nuclear power plant and explain each component in detail?

10.Define Non conventional energy source? Give the examples for Non conventional energy sources and explain them in detail

**Choose the Best: (Minimum 10 to 15 with Answers)**

1. Which of following power plants is free from environmental problem? ( B )

a)Steam b) Hydroelectric c) Nuclear d) Diesel engine

1. Gas turbine power plants for maximum efficient may have (D)

a)Reheating b) Heat exchangers c) Multistage compression d) All of above

1. Which of the following plants has the maximum capital cost? (B)

a) Diesel plants b) Nuclear plants c) Hydro-plants d) Steam plants

1. Which of following generating plants has the minimum operating cost? (C)

a) Diesel plants b) Nuclear plants c) Hydro-plants d) Steam plants

1. Direct conversion of heat energy into electrical energy is possible through. (D)

a) Thermal converters b) Fuel or solar cell. c) MHD generator d) Both A and C.

1. A regenerator in a gas turbine

(a) reduces heat loss in exhaust (b) permits use of higher compression ratio

(c) improves thermal efficiency (d) permits use of fuels of inferior quality..

1. The total power of a wind power is proportional to

(a) velocity of stream (b) ( velocity of stream )2

(c) (velocity of stream )3 (d) 1/ (velocity of stream)

1. Batteries used for electrical energy storage are

(a) Laclanche cells (b) Edison cells

(c) Lead acid cells (d) Any of the above.

1. The function of a moderator in a nuclear reactor is......

(a)To slow down the fast moving electrons (b)To speed up the slow moving electron

(c)To start the chain reaction (d)To transfer heat inside the reactor to exchanger

1. In a nuclear reactor function of reflector is to......

(a)Reduce the speed of the neutrons  (b)Stop the chain reaction

(c)Reflect the escaping neutrons back into the core (d)None of the above

**Fill in the Blanks: (Minimum 10 to 15 with Answers)**

1. \_\_\_\_\_power plants will take long period in erection and installation.
2. \_\_\_\_\_\_power plants can generate power at unpredictable or uncontrollable time.
3. A thermal power plant is being supplied with coal having much more ash content than that for which it was designed. \_\_\_\_\_\_units needs major modifications.
4. A generating station which has a high investment cost and low operating cost is usually operated as a \_\_\_\_\_\_.
5. A gas turbine power plant is best suited for \_\_\_\_\_\_plants.
6. Pulverized coal means\_\_\_\_\_\_\_\_\_\_\_\_.
7. In a hydro-electric plant \_\_\_\_\_\_\_\_\_\_\_\_conduct system for taking water from the intake works to the turbine is known as
8. Solar cells are made of\_\_\_\_\_\_\_\_\_\_\_\_.
9. \_\_\_\_\_\_\_\_\_\_\_\_are Batteries used for electrical energy storage.

10.The function of a surge tank is\_\_\_\_\_\_\_\_\_\_\_\_

**Unit-II:**

**Important points / Definitions: (Minimum 15 to 20 points covering complete topics in that unit)**

**Short Questions (minimum 10 previous JNTUH Questions – Year to be mentioned)**

**1 Define connected load.**

**2 Define maximum demand.**

**3 Define demand factor.**

**4 Define average load.**

**5 Define load factor.**

**6 Define Diversity factor.**

**7 Define Load curve, Load duration curve**

**8 What is tariff? Classify tariff?**

**9 What are the factors affecting tariff?**

**10 Define the base load and peak load plants?**

**Long Questions (minimum 10 previous JNTUH Questions – Year to be mentioned)**

1.What do you understand by the load curve? What information is conveyed by a load curve

2.Write short notes on the following:

a) Two - part tariff b) Power factor tariff. c) Three - part tariff

3.A generating station has a connected load of 43MW and a maximum demand of 20 MW; the units generated being 60 x 106 per annum. Calculate (a) the demand factor and (b) load factor

4.From a load duration curve, the following data are available: the maximum demand on the system is 25 MW. The load supplied by two units is 15 MW and 12.5 MW. Unit no.1 acts as a base load unit and No.2 as a peak load unit. The base load unit works for 100% of the time and peak load unit for only 40% of time. The energy generated by unit No.1 is 1×10 8 units and that by No.2 is 1×10 7 units. Determine the load factor, plant capacity factor and plant

use factor of each unit and load factor of the total plant.

5.Give the basis for expressing the cost of electrical energy as (a + b kW + c kWh) and explain the factors on which a, b, and c depend

6.A hydro electric plant costs Rs. 3000 Per KW of installed capacity the total annual charges consists of 5% as interest, depreciation at 2%, operation and maintenance at 2% and insurance, rent etc.1.5%. Determine the suitable two parts tariff if the losses in transmission and distribution are 12.5% and diversity of load is 1.25. Assume that maximum demand on the station is 80% of the capacity and annual load factor is 40%. What is the overall cost of

generation per KWh.

7.A generating station has a maximum demand of 15 MW and the daily load on the station is as follows:

Time kW

10 P.M. to 5 A.M. 2500 kW

1 P.M. to 4 P.M. 10,000 kW

5 A.M. to 7 A.M. 3000 kW

4 P.M. to 6 P.M. 12,000kW

7 A.M. to 11A.M 9000 kW

6 P.M. to 8 P.M. 15,000 kW

11 A.M. to 1P.M. 6000 kW

8 P.M. to 10 P.M. 5,000 kW

Determine the size and number of generator units, plant load factor, plant capacity factor and use factor of the plant.

8.From a load duration curve, the following data are available: the maximum demand on the system is25MW. The load supplied by two units are 15MW and 12.5MW.

Unit no.1 acts as a base load unit and No.2 as a peak load unit. The base load unit works for100% of the time and peak load unit for only 40% of time the energy generated by unit No.1 is1×108 units and that by No.2 is1×107 units. Determine the load factor, plant

capacity factor and plant use factor of each unit and load factor of the total plant.

9.The annual load duration curve of a certain power station can be considered as a straight line from 20MW to 4MW. To meet this load, three turbine-generator units,Tworated at10MWeach and one rated at 5MW are installed. Determine

i. Installed capacity

ii. Plant factor

iii. Units generated per annum and

iv. Utilization factor

10.A generating station supplied the following loads: 150MW, 120MW, 85MW, 60MWand5MW.The station has a maximum demand of 220MW.

The annual load factor of the station is48%,calculate

i. The number of units supplied annually

ii. The diversity factor and

iii. The demand factor

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**Choose the Best: (Minimum 10 to 15 with Answers)**

1. For economy in generation power

a)diversity factor should be high b)plant utilization factor

c)load factor should be high d)load factor and diversity factor should be low.

1. Size and cost of installation depends upon \_\_\_\_\_\_\_\_\_\_\_\_  
   a) average load b) maximum demand c) square mean load d) square of peak load
2. For a thermal power plant, which is not the fixed cost ?
3. Interest on capital b)Depreciation c)Insurance charges d)Cost of fuel.
4. Depreciation cost of a plant is calculated by

a)Straight line method b)Diminishing value method

c)Sinking fund method d)Any of the above.

1. For the same plant size, initial cost of which plant is the highest ?

a)Steam power plant b)Diesel engine plant

c)Nuclear power plant d)Gas turbine plant.

1. Capacity factor and load factor become identical when
   1. peak load is equal to the capacity of the plant
   2. Average load is half the capacity of the plant
   3. Average load is same as peak load
   4. Group diversity factor is equal to peak diversity factor
2. Which of the following relation is incorrect ?
   1. Capacity factor = Utilization factor x Load factor
   2. Load factor x Maximum load = Average load
   3. Demand factor x Connected load = Maximum demand
   4. None of the above.
3. A low utilization factor for a plant indicates that
   1. plant is under maintenance
   2. plant is used for base load only
   3. plant is used for stand by purpose only
   4. plant is used for peak load as well as base load.
4. Sinking fund is
   1. Initial value - Salvage value
   2. Capital cost - Operating cost
   3. Periodical maintenance - Breakdown maintenance
   4. Capital cost / Useful life.
5. In what practice is the value of diversity factor?  
   a) Less than Unity  
   b) Geater than Unity  
   c) Equal to or greater than Unity  
   d) Less than zero

**Fill in the Blanks: (Minimum 10 to 15 with Answers)**

1. The area under the load curve represents \_\_\_\_\_\_\_\_\_\_\_\_
2. The load of a consumer is generally measured in terms of\_\_\_\_\_\_\_\_\_\_\_\_
3. The ratio, maximum demand of the installation / sum of individual maximum demands is known as\_\_\_\_\_\_\_\_\_\_\_\_
4. The highest point on a load curve represents\_\_\_\_\_\_\_\_\_\_\_\_
5. When maximum and average loads are equal, the load factor will be\_\_\_\_\_\_\_\_\_\_\_\_
6. Coincidence factor is reciprocal of \_\_\_\_\_\_\_\_\_\_\_
7. Size and cost of installation depends upon \_\_\_\_\_\_\_\_\_\_\_\_
8. The normal connected load of a domestic consumer is usually\_\_\_\_\_\_\_\_\_\_\_\_
9. diversity factor is always \_\_\_\_\_\_\_\_\_\_\_\_unity
10. load factor is curve drawn between\_\_\_\_\_\_\_\_\_\_\_\_

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