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**Third Semester B.E. Degree Examination, June/July 08**  
**Electrical Power Generation**

Time: 3 hrs.

Max. Marks:100

**Note : Answer FIVE full questions, selecting  
at least two questions from each part.**

**PART - A**

- 1 a. With a schematic diagram, explain the working of a solar power plant. What is importance of this plant in the present energy crisis in the world? (10 Marks)
- b. With a neat sketch explain the working of Geo thermal power plant. (05 Marks)
- c. Write a short note on wind power plant. (05 Marks)
- 2 a. Explain the working of a gas turbine power plant with a schematic diagram. (08 Marks)
- b. Discuss the advantages and disadvantages of a diesel power plant. (06 Marks)
- c. With a neat sketch explain gas turbine plant using the regenerator in open cycle plant. (06 Marks)
- 3 a. Explain the general arrangement and operation of a hydro electric power plant. (08 Marks)
- b. With a neat sketch explain the function of pumped storage plant. (04 Marks)
- c. Draw schematic layout of a typical thermal power plant and explain the functions of various components. (08 Marks)
- 4 a. What factors are taken in to account while selecting the site for a nuclear power station. Discuss each factor. (05 Marks)
- b. Draw the schematic diagram of nuclear power station and discuss its operation. (08 Marks)
- c. Draw a neat diagram of a liquid metal cooled reactor and explain it. Give its advantages and disadvantages. (07 Marks)

**PART - B**

- 5 a. Explain the following terms as applied to power system:  
i) Diversity factor ii) Plant use factor iii) Load duration curve and load curve. (06 Marks)
- b. A generating station has a maximum demand of 20 MW, a load factor of 60%, a plant capacity factor of 40% and a plant use factor of 80%. Find i) The daily energy produced  
ii) The reserve capacity of the plant iii) The maximum energy that could be produced daily if the plant were running all the time iv) The maximum energy that could be produced daily if the plant (when running according to operating schedule) were fully loaded. (10 Marks)
- c. Discuss the base load and peak load power plants. (04 Marks)
- 6 a. What do you understand by electrical tariff? Discuss two part tariff, three-part tariff and power factor tariff. (10 Marks)
- b. What are the effects of low power factor and what are the methods of improving power factor? (Any one method) (06 Marks)
- c. Discuss the advantages of interconnection of power stations. (04 Marks)
- 7 a. With the help of neat sketch explain:  
i) Ring bus-bar schemes. ii) Double bus-bar scheme with single breaker (06 Marks)
- b. Write a short notes on current limiting reactors. (08 Marks)
- c. A three phase transmission line operating at 10 kV and having a resistance of  $1\Omega$  and reactance of  $4\Omega$  is connected to the generating station bus-bar through 5MVA step-up transformer having a reactance of 5%. The bus-bars are supplied by a 10 MVA alternator having 10% reactance. Calculate the short circuit KVA fed to symmetrical fault between phases if it occurs at the end of transmission line. (06 Marks)
- 8 a. Discuss the importance of grounding in electrical system. With neat sketches explain  
i) Reactance grounding ii) Resistance grounding (10 Marks)
- b. With a neat sketch explain earthing of transformer. (05 Marks)
- c. A 230 kV, 3 phases, 50 Hz, 200 km transmission line has a capacitance to earth of  $0.02\mu\text{F}/\text{km}$  per phase. Calculate the inductance and KVA rating of the Peterson coil used for earthing the above system. (10 Marks)

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**Third Semester B.E. Degree Examination, Dec. 07 / Jan. 08**  
**Electric Power Generation**

Time: 3 hrs.

Max. Marks:100

**Note : Answer any FIVE full questions.**

- 1
  - a. Explain with sketches the working of single basin and double basin Tidal power plant. (06 Marks)
  - b. State the principle of Wind Energy Conversion System. Explain with block diagram the basic components of Wind Energy Conversion System. (08 Marks)
  - c. Explain the concept of co-generation and combined heat power generation. (06 Marks)
- 2
  - a. State the field of use of Diesel-Electric Station. (04 Marks)
  - b. Explain the principle of working of Gas Turbine Plant. Also explain open cycle and closed cycle for Gas Turbine Plant. (08 Marks)
  - c. State the principle of bio-generation. Explain with block diagram the working of bio-generation plant. (08 Marks)
- 3
  - a. Describe the main features of the substructure and superstructure of a hydroelectric power station. (04 Marks)
  - b. Explain with diagram the principle of operation of pumped storage plant. How does it help to take up sudden peak load in a power system? (06 Marks)
  - c. Describe the schematic arrangement of a thermal power station. Explain the function of each, briefly. (10 Marks)
- 4
  - a. State the main components of a nuclear power station. Describe the function of each. (10 Marks)
  - b. What are the Pros and Cons of nuclear power station? (06 Marks)
  - c. How the nuclear fuel is extracted? (04 Marks)
- 5
  - a. What is diversity factor? State the advantages of diversity of load in a power system. (06 Marks)
  - b. A generating station has a maximum demand of 80 MW, a reserve capacity of 50 MW, an average demand of 52 MW, a rated capacity of 104 MW, sum of individual maximum demand of 102 MW and the maximum energy that could be produced if plant is running all the time is 1560 MWh. Calculate: i) Diversity factor ii) Plant capacity factor iii) Plant use factor and iv) Plant utilization factor. (08 Marks)
  - c. What do you understand by load duration and energy load curves of a power system? What are the uses of load duration curve? (06 Marks)
- 6
  - a. Name different types of tariffs. Explain them briefly. (06 Marks)
  - b. A consumer is taking a load of 20 kW at power factor of 0.8 lagging. Find the rating of capacitor to raise the power factor to 0.95 lagging. (04 Marks)
  - c. Name different types of bus schemes of substation. Explain them briefly. (10 Marks)
- 7
  - a. What is a reactor? Explain different types of reactors. Obtain an expression for short circuit MVA calculation. (10 Marks)
  - b. What is ground resistance? How to evaluate the resistance for different grounding systems? (10 Marks)
- 8
  - a. State the conditions of resonant grounding, illustrate them with expressions. What is the function of arc suppression coil? (10 Marks)
  - b. Explain transformer earthing and neutral ground practices. (06 Marks)
  - c. Determine the value of inductance of arc suppression coil to neutralize the charging current of overhead line having line to ground capacitance  $0.4 \mu\text{F}$ . If the supply frequency is 50 Hz and the operating voltage is 132 kV, find the kVA rating of the coil. (04 Marks)

