Code No: R09220202   R09   Set No. 2

II B.Tech II Semester Examinations,APRIL 2011
POWER SYSTEMS-I
Electrical And Electronics Engineering

Time: 3 hours   Max Marks: 75

Answer any FIVE Questions
All Questions carry equal marks
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1. In a 3-phase 4-wire distribution system with 240 volts between lines and nuetral there is a balanced motor load of 250 kW at power factor 0.8 lamp loads connected between respective lines and neutral absorb 25 kW, 75 kW and 100kW.

   Calculate:

   (a) the current in each line

   (b) the current in nuetral wire of the feeder.   [11+4]

2. (a) What is the effect of low power factor on the generating stations?

   (b) Why is the unity power factor not the most economical power factor?   [7+8]

3. (a) What is feed water? What are the problems faced due to impurities in fuel water? How are they eliminated?

   (b) Write short notes on:
       i. Draft-tube
       ii. Cavitation
       iii. Water Hammer.   [7+8]

4. (a) Name the various components present in a substation and explain them.

   (b) Draw a single line diagram of layout of an outdoor substation.   [9+6]

5. (a) List out various bus-bar schemes and explain.

   (b) In a 3-phase, 4-wire distribution system with 240 volts between lines and neutral there is a balanced motor load of 250 kW at 0.8 power factor. Lamp loads connected between respective lines and neutral absorb 25, 75 and 100 kW. Calculate the current in each line and in the neutral wire of the feeder cable.   [7+8]

6. Explain how load curves help in the selection of size and number of generating units.   [15]

7. A supply company offers the following alternative tariffs:

   (a) Standing charges of Rs. 75 per annum plus 3 paise/kWh

   (b) First 300 kWh at 20 paise/ kWh; and additional energy at 5 paise/kWh.

   If the annual consumption is 1800 kWh, which tariff is more economical and by how much?   [15]

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8. (a) Explain clearly the various processes that can take place, when a neutron collides with a heavy atom.

   (b) Describe the construction and uses of nuclear reactor core. [7+8]

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FIRSTRANKER

Code No: R09220202 | **R09** | **Set No. 4**

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POWER SYSTEMS-I
Electrical And Electronics Engineering

Time: 3 hours | Max Marks: 75

Answer any FIVE Questions
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1. Discuss the different classifications of costs of electrical energy. [15]

2. (a) Discuss the relative merits and demerits of underground and overhead systems.

   (b) An 800m distributor fed from both ends A and B is loaded uniformly at the rate of 1.2A/m run, the resistance of each conductor being 0.05 ohm per/km. Determine the minimum voltage and the point where it occurs if feeding points A and B are maintained at 255 V and 250 V respectively. Find also the current supplied from feeding point A and B. [7+8]

3. A power station has a daily load cycle as under. 260 MW for 6 hours; 200 MW 8 hours; 160 MW for 4 hours; 100 MW for 6 hours. If the power station is equipped with 4 sets of 75MW each calculate:

   (a) daily load factor

   (b) capacity factor

   (c) daily requirement if the calorific value of oil used were 10000 k cal/ kg and the average heat rate of the station were 2860 k cal/kWh [15]

4 Explain in detail the constructional aspects of a gas insulated substation. [15]

5. (a) What are the different types of chimneys and discuss each type in thermal plants?

   (b) Explain super heating. [8+7]

6. Give the best values of capacitor banks to improve the load p.f. from 0.7 to 0.95 from the following data: Load 750 kVA, operating voltage 3.3kV for

   (a) Star connection

   (b) Delta connection [15]

7. (a) Explain the function of a moderator. How is a moderator selected? Why does a breeder reactor require no moderator?

   (b) Discuss the working of boiling water reactor, along with its merits and demerits. [7+8]

8. A single phase AC distributor 1 km long has resistance and reactance per conductor of 0.1 ohm and 0.15 ohm respectively. At the far end, the voltage $V_B = 200$ volts and the current is 100 A at the power factor of 0.8 (lagging). At the midpoint M of the distributor, a current of 100 A is tapped at a power factor 0.6 lagging with reference to the voltage V_M at the midpoint. Calculate

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(a) Voltage at midpoint

(b) Sending end voltage V_A

(c) Phase angle between V_A and V_B. [15]

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II B.Tech II Semester Examinations,APRIL 2011
POWER SYSTEMS-I
Electrical And Electronics Engineering

Time: 3 hours   Max Marks: 75

Answer any FIVE Questions
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⋆ ⋆ ⋆ ⋆ ⋆

1. (a) What is the importance of power factor in the supply system?

   (b) What are the disadvantages of low power factor?   [8+7]

2. What is a tariff? Discuss and compare various tariffs used in practice.   [15]

3. (a) Name the different nuclear materials. Explain each of them with examples.

   (b) What are the different merits and demerits of nuclear power plant?   [7+8]

4. (a) What is a bus bar? Discuss about different schemes of bus bar arrangements.

   (b) Write short notes on installation of gas insulated substation.   [8+7]

5. (a) Explain the function of the following in thermal power plant and explain the
       principle of operation of each:
       i. Economiser
       ii. Electrostatic precipitator
       iii. Condenser
       iv. Superheater
       v. Cooling tower

   (b) Discuss and compare the performance of different types of boilers used in
       thermal power plants.   [7+8]

6. A substation is to supply three regions of loads whose maximum values are 6000
   kW, 10,000 kW and 5000 kW. The diversity factor of the load at the substation is
   1.5 and the average annual load factor is 0.65. Calculate the peak demand on the
   substation and annual energy supplied from the substation.   [15]

7. (a) Draw the layout of a typical 11KV/400V Indoor substation and explain the
       equipments in detail.

   (b) Explain the following with neat diagrams:
       i. AC 3-phase, 3 wire distribution system
       ii. AC 3-phase, 4 wire system.   [15]

8. (a) Draw the single line diagram of radial primary feeder and mention the factors
       that influence the selection of primary feeder.

(b) A D.C two wire distributors are fed at F1 and F2 at 220 V and 225 V respectively. The total length of the distributor is 250 m. The loads tapped off from fed end F_1 are

Load in ampere:	20	40	25	35
Distance in metre:	50	75	100	200

The resistance per km of one conductor is 0.3 ohm. Determine the current in various sections of the distributor and the voltage at the point of minimum potential. [15]

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Code No: R09220202 | **R09** | **Set No. 3**

II B.Tech II Semester Examinations,APRIL 2011
POWER SYSTEMS-I
Electrical And Electronics Engineering

Time: 3 hours   Max Marks: 75

Answer any FIVE Questions
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1. Write short notes on

   (a) Role of substations in power system.
   (b) Main and transfer bus bar scheme.
   (c) Maintenance of gas insulated substation.   [4+5+6]

2. A factory has a maximum demand of 500kW, the load factor being 60% during working hours. The following two tariffs are available:

   (a) Rs. 8 per kW of maximum demand plus 3 paise per kWh
   (b) A flat rate of Rs.0.1/kWh

   Determine the working hours per week above which tariff (a) will be cheaper. [15]

3. A 3-phase distribution system power is supplied at A with a line voltage of 5.5 kV, balance 0.8 pf (lag) loads at B & C; using positive of currents method as shown in figure 1. Calculate:

   (a) the voltages at B & C
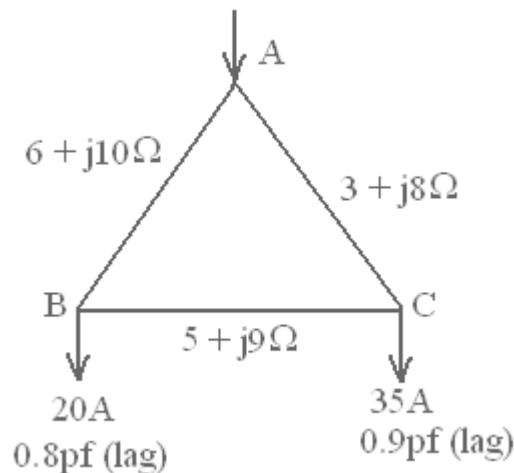   (b) the currents in the branches AB, BC and AC.   [15]

Figure 1:

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4. A 3-phase, 6.6 kV substation supplies a load of 120A at 0.8 p.f lagging at B and 75 A 0.6 p.f. lagging at C. The impedance of each branch is shown in figure 4. Find out the current in each branch, the p.f?s of the loads are referred to the station A. [15]
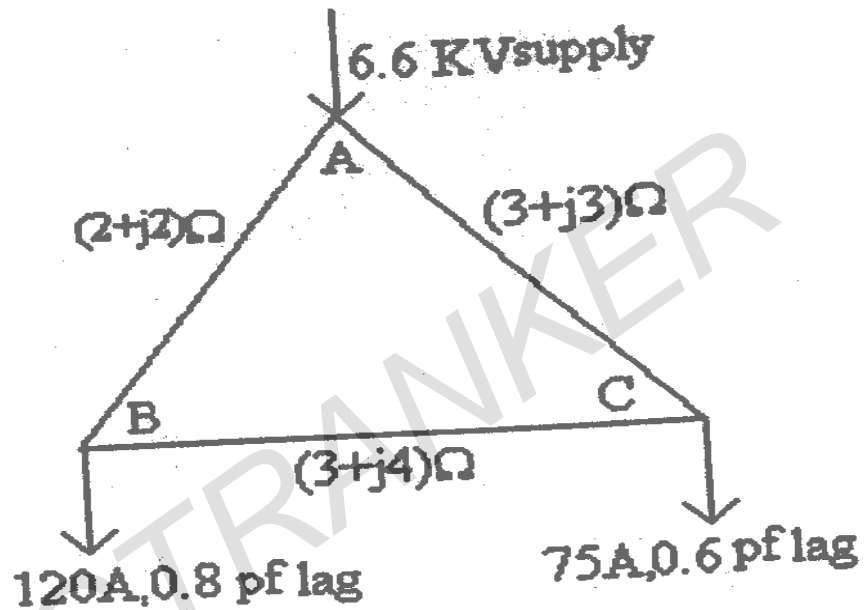

Figure 4

5. (a) What is the effect of series capacitor over voltage control?

   (b) Explain line drop compensation. [8+7]

6. (a) Draw a general layout of a modern thermal power plant and explain the working of different circuits:

   (b) Explain the function of the following in thermal power plant and explain the principle of operation of each:

      i. Economiser
      ii. Electrostatic precipitator
      iii. Condenser
      iv. Superheater
      v. Cooling tower. [7+8]

7. A power station has the following daily load cycle;

Time in hours	6 − 8	8 − 12	12 − 16	16 − 20	20 − 24	24 − 6
Load in MW	20	40	60	20	50	20

Plot the load curve and load duration curve. Also calculate the energy generated

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per day. [15]

8. (a) Discuss various radiations that are emitted from a nuclear fission process?

   (b) What are the merits and demerits of nuclear power plants? [7+8]

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