

POWER SYSTEM – II

QUESTION BANK

UNIT I

DISTRIBUTION

BIG QUESTIONS:

1. Explain with necessary diagrams, the different types of bus bar arrangements in a substation. Also list their advantages and disadvantages.
2. List out the substation equipments and explain.
3. Compare the cost of conductor in AC 3 phase 4 wire to DC 2 wire system.
4. Compare the cost of AC single phase 3 wire system against 2 wire system.
5. Explain in detail the different connection schemes of distribution system.
6. Explain the parts of the distribution system.
7. Diagrammatically represent the layout of a typical 110 KV/11 KV substation and 11 KV/400 V substation with all details and explain.
8. Explain indoor and outdoor substations with their advantages and disadvantages.
9. Explain how AC distribution calculation differs from DC distribution calculations. (5 marks)
10. With an example, explain the consequence of disconnection of neutral in a three phase 4 wire system.

Problems:

1. A single phase AC distributor AB 300m long is fed from end A and is loaded as follows:
(i) 100A, 0.707 pf lag and 200m away from A. (ii) 200A, 0.8 pf lag and 300m away from A.
The total resistance and reactance of the distributor is 0.2 and 0.1 ohm per km respectively.
Calculate the total voltage drop and sending end voltage in the distributor. The load power factors refer to the voltage at far end.
2. A single phase AC distributor AB 300m long is fed from end A and is loaded as follows:
(i) 150A, 0.9 pf lag and 200m away from A. (ii) 100A, 0.8 pf lag and 300m away from A.
The total resistance and reactance of the distributor is 0.2 and 0.1 ohm per km respectively.
Calculate the total voltage drop and sending end voltage in the distributor.
3. A single phase distributor has loop resistance of 0.3 ohm and a reactance of 0.4 ohm. The far end of a distributor has a load current of 80A and power factor 0.8 Lagging at 220V. The midpoint 'C' of the distributor has a load current of 50 A at power factor of 0.707 lagging with reference to voltage at 'C'. Calculate the sending end voltage.

UNIT II
INDUSTRIAL DRIVES

BIG QUESTIONS:

1. With neat sketches, explain the different types of electric drives.
2. Suggest suitable motors for the following applications. Give reasons for our choice.
(i) Textile mill (ii) Cranes (iii) centrifugal pumps (iv) Paper mill (v) vacuum cleaner
(vi) Cement mill (vii) Machine tools (viii) Belt conveyors (ix) Lifts and hoists
(x) steel rolling mills
3. Briefly explain shunt transition and bridge transition.
4. Explain the factors to be considered while selecting a motor for a specific application.
5. Explain dynamic braking applied to AC and DC motors.
6. Explain in detail various classes of duty cycles.
7. What is regenerative braking? Explain with neat diagram how it is applied D.C series motor
D.C shunt motor and induction motor.
8. Impart the importance about the standard ratings of motor.
9. Explain various types of transmission drives
10. Explain in detail about the contactor type bridge transition control.
11. Explain the desirable characteristics of traction motors.
12. Show that series parallel control of traction motor results in saving of energy than plain
rheostatic control.

UNIT III
ELECTRIC TRACTION

BIG QUESTIONS:

1. Explain different methods of supplying power to traction system.
2. Draw and explain speed time curve of traction motor.
3. Explain different current collectors used in electric traction.
4. Derive the expression for maximum speed obtained from trapezoidal speed time curve
5. Explain the different systems of track electrification.
6. What is the function of booster transformer in traction? Explain with an illustration
7. Define the following terms: (i) Tractive effort (ii) Specific energy output (iii) Specific energy consumption and factors affecting it (iv) crest speed (v) average speed (vi) schedule speed
8. Derive an expression for tractive effort
9. Explain speed time curve for different services.
10. Explain OH equipments in detail.

UNIT IV

ILLUMINATION

BIG QUESTIONS:

1. With neat sketches, explain the two laws of illumination with their statements. Also enumerate the requirements of good lighting system
2. Explain various lighting schemes in detail.
3. Explain with neat sketch the working of high pressure mercury vapour lamp.
4. Explain stroboscopic effect and how it is eliminated in fluorescent tube light
5. Explain with neat diagram the construction and working of sodium vapour lamp
6. Explain the factors to be considered while designing lighting schemes.
7. Explain CFL and LED lamps in detail
8. Explain briefly about different type of lighting systems.
9. Explain the different types of induction lamps in detail.
10. Define illumination, Space height ratio, utilization factor, reflection factor, maintenance factor, depreciation factor, solid angle, M.S.C.P, luminous intensity, glare

Problems:

1. Lamp having an uniform luminous intensity of 300 CP is suspended 6 m above the street level. What will be the illumination on the ground vertically below the lamp and 8 meters away from it?
2. It is required to provide an illumination of 100 lux in a factory hall of 40 x 10m. Assuming a depreciation factor of 0.8, co-efficient of utilization of 0.4 and a lamp efficiency of 14 lumens per watt, calculate the number of 300W lamps required and suggest suitable arrangement.
3. A lamp having an intensity of 1000 lumens per steradian is hung 6m over the center of the floor of a hall. Find the illumination below the lamp and corners of the hall neglecting reflection from the wall and the floor. The hall measures 15m x 15m area.

UNIT V

ELECTRIC HEATING AND WELDING

BIG QUESTIONS:

1. Explain the construction and working of Ajax Wyatt vertical core furnace with neat sketch.
2. Explain electron beam welding with neat sketch.
3. Explain the operation of a direct core type induction furnace with neat sketch and list its drawbacks.
4. Explain in detail about laser beam welding with its advantages.
5. Explain the different types of arc furnaces in detail.
6. Describe different methods of high frequency electric heating in detail.
7. With a neat sketch, explain ultrasonic welding. Also compare resistance welding and arc welding
8. Explain the methods of temperature control of resistance heating. Also explain the advantages of electric heating.
9. Explain with a neat sketch, the construction and working of an indirect coreless induction furnace with its advantages.
10. Explain the different types of AC welding equipments in detail.
11. Explain the different types of resistance welding with neat sketches
12. Explain direct resistance heating with neat sketch. Also explain the commonly used heating element materials and their requirements in detail.