

Generation, Transmission & Distribution

4th sem. (EE) Full mark-80

No Answer ~~at~~ Ten questions of the following,

- No (a) Define Demand Factor. (2×10) ~~20~~
- (b) state the reason of armouring the under ground cable.
- (c) state the type & use of supports used in electrical transmission & distribution lines.
- (d) Define two-port form of tariffs.
- (e) what do you mean by skin effect?
- (f) state the use of a surge tank?
- (g) what is cross arm?
- (h) what is corona?
- (i) state kelvin's law?
- (j) what is voltage regulation of a transmission line and its limits?

No Answer any six of the following questions.

- (a) state the causes of low power factor in power system & suggest to improve it. $[5 \times 6]$
- (b) with a neat diagram explain the working of nuclear power plant.
- (c) Explain corona and factor affecting corona.

(d) Derive sag in overhead line with support at same level.

(e) Explain briefly different methods of cable laying.

(f) state different types of insulators and their uses.

(g) state and explain kelvin's law for economical size of the conductor with graph.

No 3 The tower of height 30m & 90m respectively supports a transmission line conductor at water crossing. The horizontal distance betⁿ the towers is 500m. If the tension in the conductor is 1600 kg. Find the minimum clearance of the conductor and water and clearance mid-way betⁿ the supports. weight of conductor is 1.5 kg/m. Bases of the tower can be considered to be at water level.

No 4 Explain ~~the~~ with diagrams the Murray loop test to locate earth fault in cables.

No 5 A two wire dc distributor AB, 600 meters long is loaded as under:

Distance from A (meters) 150 300 350 450

Load in Amperes: 100 200 250 300

The feeding point 'A' is maintained at 440 V and that of B at 430 V. If each conductor

has a resistance of 0.01Ω per 100 metres
calculate:

- (i) The current supplied from A to B
- (ii) the power dissipated in the distributor.

Q6 Discusses the various methods for power factor improvement.

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NO1 Answer all questions [2x10]

- Name the different source of energy available in nature.
- state the use of surge tank.
- Name the material used in control rods in an atomic reactions with reason.
- define the Demand factor.
- define two-part form of tariff.
- what do you mean by skin effect?
- state the necessity of armouring in the UG cables.
- what are the various types of line supports
- what do you mean by corona loss in a transmission line?
- define plant capacity factor.

NO2 Answer any six of the following [5x6]

- Derive the equations for sag in overhead lines with supports at different level.
- A consumer has a maximum demand of 300 kW at 60% load factor. If the tariff is RS. 0.60 per kW of maximum demand and two rupees per each kWh, Find the overall cost of each kWh.
- Explain with circuit diagram the Murray loop test for location of earth fault in UG cable.
- A 2-wire DC distribution cable AB is 2 km long and supplies load of 100A, 200A and 50A at 500m, 1000m and 2000m from the feeding A with p.d of 950V. If the conductor has 0.01 ohm per km and p.d at each load part.

- (e) with a neat sketch explain the construction features of LT cable.
- (f) state the types and used line insulators.
- (g) Murray loop test is performed on a faulty cable 300 m long. At balance, the resistance connected to the faulty core was set at 15 ohms and the resistance of the resistor connected to the sound core was 45 Ω . calculate the distance of the fault point from the test end.

Q3: - state and explain Kelvin's law for economical size of the conductor with graph. Also state its limitations. [10]

Q4: A transmission line has 150 m between two level supports. The cross-sectional area of the conductor is 1.25 cm^2 and weight 100 kg per 100 m. The breaking stress is 4220 kg/cm^2 Factor of safety is 4. Assume a maximum wind pressure of 100 kg per square meter. calculate the sag of the line [10]

Q5 with the block diagram explain the working of thermal power plant. [10]

Q6 state types of HT cables with construction features. Explain the different methods of cable-laying. [10]

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NO1 Answer all questions. [2x10]

- what is flash over voltage for an insulator?
- what is cross-arm?
- define the diversity factor.
- state the necessity of earthing and earth conductivity in transmission lines.
- write the causes of low power plant.
- state limitations of kelvin's law.
- what is block rate tariff.
- write the methods of cable laying.
- The max^m demand on a power station is 100 MW, if the annual load factor is 40%. calculate the total energy generated in a year.

(j) what is sag?

NO2 Answer ~~one~~ six of the following questions [5x6]

- state the types and used line insulators.
- Discuss the methods of improvement of power factor.
- Explain the connection schemes of a distribution system.
- Explain in brief the effect of corona.
- with a neat sketch show the different components of Hydroelectric power station.
- write down the effect of wind on sag of a transmission line.

No 3

An overhead 3- ϕ transmission line delivers 5000 kW at 22 kV at 0.8 pf lagging. The resistance and reactance of each conductor is 4Ω & 6Ω respectively. Determine

- (i) sending end voltage
- (ii) Percentage regulation
- (iii) Transmission efficiency.

No 4

Explain HVDC transmission with sketch, also state its advantages over HVAC transmission.

No 5

A two-wire distributor cable 100 metres long is loaded with 0.5 A/metre. Resistance of each conductor is $0.05 \Omega/\text{km}$. Calculate the maximum voltage drop if the distributor is fed from both ends with equal voltage of 220 V. What is the maximum voltage and where it occurs?

NO1 Answer all questions (2710)

- What do you mean by skin effect.
- Name the material used in control rods in an atomic reactions with reason.
- Define the load factor.
- What do you mean by flat rate tariff.
- Draw the diagram of power triangle.
- Write the causes of low power factor.
- Define sag.
- What do you mean by sheathing of a cable.
- What are the functions of moderator and separator in a Nuclear power plant.
- What is cross arm.

NO2 Answer six (5+6)

- Derive the expression for sag in overhead line with different level support.
- How power factor can be improved, explain briefly.
- Draw the day diagram of a typical 11KV/400V indoor sub-station.
- Explain briefly different methods of cable laying.
- A consumer has a maximum demand of 200 kW at 40% load factor. If the tariff is Rs 100 per kW of maximum demand plus 10 paise per kWh. Find the overall cost per kWh.
- Describe the desirable characteristics of a tariff.

NO3 Deduce an expression for voltage regulation of a short transmission line with help of vector diagram.

NO4 A transmission line has a span 200 metres between level supports. The conductor has a cross-sectional area of 1.29 cm^2 , weights 1170 kg/km and has a breaking stress of 9218 kg/cm^2 , calculate the sag for a safety factor of 5, allowing a wind pressure of 122 kg per square metre of projected area, what is the vertical sag?

NO5 A 250 m, 2-wire dc distributor fed from one end is loaded uniformly at the rate of 1.6 A/metre . The resistance of each conductor is 0.00022 per metre. Find the voltage necessary at feed point to maintain 250 V (i) at the far end
(ii) at the mid-point of the distributor.