



Answer The Following Questions:

Question (1)

(15 Marks)

- a) Discuss the advantages of high transmission voltage
- b) Compare the volume of conductor material required in a dc 2-wire system and ac 3-phase, 3-wire system on the basis of equal maximum voltage between any conductor and earth. Make suitable assumptions.
- c) A power supply is having the following loads:

Type of load	Max demand (kW)	Diversity of group	Demand Factor
Domestic	1500	1.2	0.8
Commercial	2000	1.1	0.9
Industrial	10000	1.25	1.0

If the overall system diversity factor is 1.35 and the annual load factor is 0.6, determine:

- The maximum demand
- The connected load of each type
- The annual generated units (kWh)

Question (2)

(15 Marks)

- a) How inductance and capacitance of a transmission line are affected by the spacing between the conductors?
- b) Evaluate the generalized circuit constants for medium transmission line, nominal π -method
- c) A balanced 3-phase load of 30 MW is supplied by means of a transmission line at 132 kV, 50 Hz and 0.85 p.f lagging. The percentage line efficiency is 95.47%. The inductive reactance of a single conductor is 52Ω and the total phase-neutral admittance is 315μ Siemens. Using π method, Calculate:
- The A, B, C and D of the line
 - The sending end voltage, current and power factor.
 - Regulation and efficiency of T.L.

Question (3)

(15 Marks)

- a) **What** are ACSR conductors and why are preferred over copper conductors for O.H.T.L? **Why** are the stranded conductors used?
 - b) **Discuss** the desirable properties of insulators of overhead transmission lines.
 - c) A string of suspension insulators consists of three units. The capacitance between each link pin and earth is one-sixth of the self capacitance of each unit. If the maximum voltage per unit is not exceeding 35 kV, **determine** the maximum voltage that the string can withstand. Also **calculate** the string efficiency.
 - d) **What** is the critical disruptive potential with reference to corona?
-

Question (4)

(15 Marks)

- a) **Discriminate** between the overhead transmission line and the underground cable in rated voltage, cost and maintenance
- b) If V is the operating voltage in a single-core cable, d and D are the conductor and sheath diameter, **show** that maximum stress is Given by:

$$\frac{2V}{d \log_e(D/d)}$$

- c) The maximum and minimum stresses in the dielectric of a single core cable are 40 kV/cm (r.m.s.) and 10 kV/cm (r.m.s.) respectively. If the conductor area is 3.14 cm² and the relative permittivity of the dielectric used in the cable is 3, **find** :
 - i. Thickness of insulation
 - ii. Operating voltage
 - iii. Capacitance of the cable per km length
 - d) **Explain** the difference between neutral grounding and equipment grounding.
-

End of Exam Questions, Good Luck