Roll No. | | | | | | | | | | | | |

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B.Tech.(Electronics & Electrical) (2011 Onwards O.E.)/
(Electrical & Electronics) (2013 OE) (Sem.–6)

ELEMENTS OF POWER SYSTEM

Subject Code : BTEEE-OPC
M.Code : 71135

Time : 3 Hrs. Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. Write briefly :

(a) What is radial distribution network?

(b) A conductor consists of seven identical strands each having a radius of r. Determine the factor by which r should be multiplied to find the self GMD of the conductor.

(c) A load of three impedances each (6+j9) is supplied through a line having an impedance of (1+j2) ohm. The supply voltage is 400V, 50Hz. Determine the power input & output when the load is delta connected.

(d) What are the uses of transposition of power lines?

(e) State Kelvin's law.

(f) What is meant by surge impedance?

(g) Give a comparison between AC and DC distribution system.

(h) What is meant by capacitance grading of a cable?

(i) What is void formation in a cable?

(j) What is the use of synchronous phase modifiers?

SECTION-B

Q2. A three phase 50 Hz transmission line has conductors of factor 90 mm^2 and effective diameter of 1 cm and are placed at the vertices of an equilateral triangle of side lm. The line is 20 km long & delivers a load of 10 MW at 33 kV and 0.8 power factor. Neglect capacitance and assume temperature of 20°C. Determine the voltage regulation of line.

Q3. A transmission line conductor having a diameter of 19.5 mm weighs 0.85 kg/m. The span is 275 m. The wind pressure is 39 kg/m^2 of projected area with ice coating of 13mm, the ultimate strength of the conductor is 8000 kg. Calculate the maximum sag, if the factor of safety is 2 and ice weighs 910 kg/m^3.

Q4. What is a stringing chart? Explain clearly the procedure adopted for stringing the power conductors on the supports.

Q5. State the classification of cables according to voltage and discuss their general construction.

Q6. Derive an expression for the capacitance per phase of a three phase line with equilateral Spacing.

SECTION-C

Q7. A single circuit 50 Hz, 3 phase transmission line has the following parameters /km: R = 0.2 ohm, L = 1.3 mH, C = 0.01μF, The voltage at the receiving end is 132 kV. Determine the efficiency of the line if line is 120 km long and delivers 40 MW at 132kV and 0.8 pf lagging.

Q8. Derive for a long line the sending end voltage and current relations in terms of receiving end voltage and current and the parameters of line.

Q9. A 3 phase transmission line 160 km long transmits a load of 90 MW at 0.8 power factor Lagging. The line voltage at the receiving end is 230 kV. The constant of the line are as follows :

A = D = 0.9785 / 0.3° B = 85.2 / 77.47° C = 0.000503 / 90.1°

Construct the receiving end and sending end circle diagrams for the transmission line and calculate the sending end voltage, current, power factor, regulation and efficiency of the transmission line.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.