

Roll No.

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Electrical & Electronics Engg.) (Sem.-6)

ELEMENTS OF POWER SYSTEMS

Subject Code : BTEEE-OPC

M.Code : 72840

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS 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. Answer briefly :**

- a) Explain Kelvin's law.
- b) What are bundled conductors? Why are they used in overhead lines?
- c) Differentiate between radial and mesh "supply systems with the help of a diagram.
- d) The AC resistance of conductors for overhead lines is greater than DC resistance. Explain.
- e) Explain surge impedance loading.
- f) Explain classification of cables based on voltage.
- g) Draw the model of a short transmission line and derive expression for its voltage regulation.
- h) Derive expression for capacitance of a three phase line with equilateral spacing.
- i) Compare overhead and underground systems of power transmission.
- j) Explain effect of earth on line capacitance.

SECTION-B

2. Find ABCD constants of a medium length transmission line represented by nominal π (pi) model. Also draw the phasor diagram.
3. Explain skin effect and Ferranti effect referred to overhead transmission lines.
4. Explain string efficiency and methods to improve it.
5. Derive expression for capacitance of a single core cable.
6. Derive expression for power flow (both real and reactive) across a transmission line having ABCD constants.

SECTION-C

7. A single phase 50 Hz alternator supplies a load of 5000 KW at a power factor of 0.707 lag by means of an OHT line of 20 km line length. The line resistance and inductance are 0.0195 ohm per km and 0.63 mH per km respectively. If the voltage at the receiving end is to be kept at 10 kV. Determine :
 - a) Sending end voltage
 - b) Voltage regulation
 - c) Magnitude of capacitor to be placed at the load end in shunt with the load such that regulation reduces to half of that obtained in previous part.
 - d) Transmission efficiency in the two cases with and without capacitor.
8. Write a short note on different types of insulators used for overhead lines and their applications.

Deduce expression of sag for a transmission the conductor between two supports at equal heights. What is the effect of wind on it?
9. What is reactive compensation in transmission lines? Explain various methods of series and shunt compensation.

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.