Sub Code: REE502

Paper Id: 120502 Roll No: | | | | | | | | | | | | | |

B.TECH
(SEM V) THEORY EXAMINATION 2019-20
POWER TRANSMISSION & DISTRIBUTION

Time: 3 Hours ***Total Marks: 70***

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 7 = 14

a.	How a circuit breaker is specifically different from a switch.
b.	State the empirical formula for determining the system voltage of transmission line.
c.	What are ACSR conductor stands?
d.	For what purpose bundle conductor are used in transmission line.
e.	What is Dielectric strength of Air?
f.	How are voltage distribution and the string efficiency affected by rain?
g.	What is the role of earthing transformer in neutral grounding?

SECTION B

2. Attempt any *three* of the following: 7 x 3 = 21

a.	Derive formula to calculate the ratio of copper volume used in two phase four-wire system and a two-wire d.c. system.
b.	Draw a phasor diagram of a nominal-T transmission line and find its A,B,C,D constants.
c.	Derive expressions for voltages induced due to (i) electromagnetic and (ii) electrostatic effects of interference between power and telephone lines and show how these results can be used for calculating electromagnetically and electrostatically induced emf's on telephone line when the power line is 3-phase and there are two telephone conductors.
d.	Derive expression for sag and tension in a power conductor string between two supports at equal heights considering the wind and ice loading.
e.	What is the need of grounding the neutral. Describe briefly the various grounding technique.

SECTION C

3. Attempt any *one* part of the following: 7 x 1 = 7

(a)	Draw single line diagram of a three bus system having generator G_1 connected to bus-1 through transformer T_1, generator G_2 connected to bus-2 through transformer T_2, three synchronous motors M_1 to M_3 connected to bus-3 through transformer T_3, transmission lines TL_1, TL_2 and TL_3 connected between bus 1-2, 2-3 and 1-3 respectively.
(b)	State Kelvin's law. Determine the best current density in amp/mm^2 for a three phase overhead line. The line is in use for 2600 hours per year and conductor costs Rs. 3.0 / kg. It has a specific resistance of 1.73 x 10^{-8} Ω-m and weighs 6200 kg / m^3.Cost of energy is 10 paise / unit. Interest and depreciation is 12 % of conductor costs.

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4. Attempt any *one* part of the following: 7 x 1 = 7

(a)	Find the inductance per phase of symmetrically spaced double circuit 3-phase line.
(b)	A 3-phase,50 Hz transmission line has flat horizontal configuration with 3.5 m between adjacent conductors. The conductors are hard drawn 7 strand copper wire (outside conductor diameter = 1.05 cm). The voltage of the line is 110 KV. Find the capacitance to neutral and charging current per Km.

5. Attempt any *one* part of the following: 7 x 1 = 7

(a)	Explain the situation under which corona phenomenon starts in high voltage power transmission lines. Identify the factors with reason that affect corona.
(b)	Explain the methods of equalizing the potential across the string insulator. A string of 8 suspension insulators is to be fitted with a grading ring. If the pin to earth capacitance is equal to C, find the values of line of pin capacitances that would give a uniform voltage distribution over the string.

6. Attempt any *one* part of the following: 7 x 1 = 7

(a)	Show that the most economical size of conductor in a single core cable is obtained when radius of cable sheath (R) equals e.r. where e is the base of radius of conductor. Explain dielectric loss and heating of a cable.
(b)	Derive the formula for insulation resistance of a cable. Calculate insulation resistance of 5 km length of single core cable whose insulation resistance is 5x 10^{14} W-cm, insulation thickness is 1 cm and radius of conductor is 1.25 cm.

7. Attempt any *one* part of the following: 7 x 1 = 7

(a)	Describe layout of distribution system and also Explain primary & secondary distribution.
(b)	(i) Enlist the cause of loses in distribution system. (ii) Explain Radial ring interconnected systems and stepped distribution.