PAPER ID-410163

Subject Code: REE502

Roll No: | | | | | | | | | | | | | |

B. TECH
(SEM- V) THEORY EXAMINATION 2021-22
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. What is the difference between a primary and secondary distribution?
b. Define skin effect.
c. Discuss the advantages of suspension-type insulators.
d. Why Bundle conductors are preferred? Comment on it.
e. What is the need for grounding in the power system?
f. What are the advantages of insulators used in translation lines?
g. Define Ferranti Effect and discuss its cause.

SECTION B

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

a. State and prove Kelvin's law for the size of the conductor in a transmission line.
b. Draw a phasor diagram of a nominal transmission line finding out its A, B, C, D constants.
c. Write short notes on the following
i) Relative merits and demerits of EHV
ii) Power System Elements.
d. An overhead stranded galvanized steel conductor has a 183 span. The conductor has 37 strands each 0.259 cm in diameter. The weight of the conductor is 7.15 N/m and the breaking strength is 67700 N. The factor of safety should be 2.5. Calculate the sag under ice and wind condition if the radial thickness of ice is 0.96 cm and the wind load is 382 N/m^2 of projected area (coated with ice). The weight of ice is 8920 N/m^3.
e. A 3-φ, 132kV, 100km, 50Hz single circuit line has horizontal spacing with 3.5m between adjacent conductors. The conductor's diameter is 1.2cm. Find:
i) The inductance of the conductor.
ii) Capacitance per phase and charging current with the effect of earth.

SECTION C

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

(a) Write short notes on (i) bus bar (ii) circuit breaker and (iii) isolator.
(b) A 50 KM long transmission line supplies a load of 5 MVA at 0.8 power factor lagging at 33kV. The efficiency of transmission is 90 percent. Calculate the volume of conductor aluminium required for the line when a single-phase, 2-wire system is used. Take resistivity of aluminium as $2.85*10^{-8}$ Ω-m

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

(a) What are the main electrical considerations in the design of transmission lines? Describe the factors affecting the mechanical design of overhead transmission lines

(b) Drive an expression for the capacitance of a 3-phase unsymmetrically spaced Transmission line.

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

(a) Discuss the factors affecting corona and how can be reduced the effect of it.

(b) Derive the expression for string efficiency of suspension insulators.

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

(a) Show that centenary formed by overhead transmission line having a small span length is a parabola.

(b) Compare all the types of insulators. A string insulator has 4 units and each unit of the string is having capacitance "C" from pin to earth capacitance is C/10 find the voltages across each unit of the string and also string efficiency.

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

(a) What are the design considerations of the distribution system? Discuss the classification of the distribution system with a diagram.

(b) A 220 kV, 3-phase, 50 Hz transmission line of 150km consists of 3 conductors equilaterally spaced with 7m and having an effective diameter of 3cm. Find the inductance and MVA rating of the Peterson's coil in the system.