Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 41000

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018
Fourth Semester
Electrical and Electronics Engineering
EE6402 – TRANSMISSION AND DISTRIBUTION
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. What are the advantages of FACTS controllers ?
2. What are the advantages of an interconnected system ?
3. What is meant by proximity effect ?
4. What are the methods adopted to reduce corona loss ?
5. What is Ferranti effect ?
6. What is surge impedance loading ?
7. State the advantages of suspension type insulators.
8. What are main requirements of the insulating materials used for cable ?
9. What is sag template ?
10. What is gas insulated substation ?

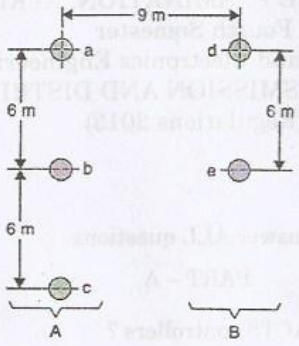
PART – B (5×13=65 Marks)

11. a) Draw and explain the structure of modern power system with typical voltage levels.

(OR)

b) Discuss the advantages of HVDC transmission over HVAC transmission in detail.

12. a) Determine the inductance of a single phase transmission line consisting of three conductors of 2.5 mm radii in the 'go' conductor and two conductors of 5 mm radii in the, return, conductor. The configuration of the line is as shown in Figure below.



(OR)

b) A three-phase, 50 Hz, 132 kV overhead transmission line has conductors placed in a horizontal plane 4 m apart. Conductor diameter is 2 cm. If the line length is 100 km, calculate the charging current per phase assuming complete transposition.

13. a) Determine the efficiency and regulation of a 3-phase, 100 km, 50 Hz transmission line delivering 20 MW at a.p.f. of 0.8 lagging and 66 kV to a balanced load. The conductors are of copper, each having resistance 0.1 ohm per km, inductance 0.1117 H per km and capacitance 0.9954 μF per km. Neglect leakage and use nominal-π method.

(OR)

b) Derive the expression for voltage and current at any point 'x' from the receiving end of a long transmission line.

14. a) In a 33 kV overhead line, three are there units in the string of insulators. If the capacitance between each insulator pin and earth is 11% of self-capacitance of each insulator, find the distribution of voltage over 3 insulators and string efficiency.

(OR)

b) i) Derive the expression for the capacitance of a single-core cable. **(8)**

ii) A single core cable has a conductor diameter of 1 cm and internal sheath diameter of 1.8 cm. If impregnated paper of relative permittivity 4 is used as the insulation, calculate the capacitance for 1 km length of the cable. **(5)**

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

(OR)

b) Explain the following neutral grounding methods.

i) Solid grounding. **(6)**

ii) Resistance grounding. **(7)**

PART – C **(1×15=15 Marks)**

16. a) A 2-wire d.c. street mains AB, 600 m long is fed from both ends at 220 V. Loads of 20 A, 40 A, 50 A and 30 A are tapped at distances of 100 m, 250 m, 400 m and 500 m from the end A respectively. If the area of X-section of distributor conductor is 1 square centimeter, find the minimum consumer voltage. Take $\rho = 1.7 \times 10^{-6}$ ohm-cm.

(OR)

b) A single phase distributor 'AB' 300 m long supplies a load of 200 A at 0.8 pf lagging at its far end 'B' and a load of 100 A at 0.0707 pf lagging at 200 m from sending end point A. Both pf are referred to the voltage at the far end. The total resistance and reactance per km (go and return) of the distributor is 0.2 ohm and 0.1 ohm. Calculate the total voltage drop in the distributor.
