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207504

Dec., 2018

B.Tech. Vth Semester

POWER SYSTEM-II

(EE-307C)

Time : 3 Hours] [Max. Marks : 75

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
2. *Answer any four questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other*

PART–A

1. (a) What are volt time curves? What is their significance in power system studies? (1.5)

(b) Discuss how synchronous compensators can supply leading as well as lagging vars. (1.5)

(c) What are the requirements of a ground wire for protecting power conductors against direct lightning strokes? (1.5)

(d) Why the receiving end voltage of an unloaded long line may be more than the sending end voltage? (1.5)

(e) What are current limiting reactors? (1.5)

(f) Discuss the advantages of per unit system for analysing power system problems. (1.5)

(g) What is load compensation? Discuss its objectives in power systems. (1.5)

(h) What do you mean by 'attenuation of travelling waves'? (1.5)

(i) What is meant by 'short circuit capacity of a bus'. (1.5)

(j) Define 'insulation co-ordination'. (1.5)

PART–B

2. (a) Explain what is meant by loadability of overhead lines and discuss loadability characteristics of these lines. (7.5)

(b) A radial long uncompensated line with constant sending end voltage is terminated through an asynchronous load. Derive an expression for maximum power transfer when termination is through a variable resistance. Hence discuss the voltage instability problem. (7.5)

3. (a) What is a travelling wave? Explain the development of such a wave on an overhead line. (7.5)

(b) Explain the variation of current and voltage on an overhead line when one end of the line is short circuited and at the other end a source of constant emf V is switched in. (7.5)

4. (a) Determine the efficiency and regulation of a 3 phase, 100 km, 50 Hz transmission line delivering 20 MW at a power factor of 0.8 lagging and 66 kV to a balanced load. The conductors are of copper, each having 0.1 ohm per km, 1.5 cm outside dia, spaced equilaterally 2 metres between centres. Neglect leakage and use nominal-T. (7.5)

(b) Derive for a long line the sending end voltage and current relations in terms of receiving end voltage and current and the parameters of the line. (7.5)

5. Write short note on :

(i) Peterson coil.

(ii) Surge diverters.

(iii) Surge absorber. (5*3)

6. (a) A three phase synchronous generator delivers 10 MVA at a voltage of 10.5 kV. The line impedance is 5 ohm. Determine the voltage drop in the line in per unit and in volts. Use the reference base as 12 MVA at 11 kV. (7.5)

(b) Discuss different methods of voltage control. (7.5)

7. (a) Discuss the significance of positive, negative and zero sequence components. (5)

(b) A 25 MVA, 13.2 kV alternator with solidly grounded neutral has a subtransient reactance of 0.25 pu. The negative and zero sequence reactances are 0.35 and 0.1 p.u. respectively. A single line to ground fault occurs at the terminals of an unloaded alternator, determine the fault current and line to line voltages. Neglect resistance. (10)