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Roll No.

18AA1101

M. Tech. EXAMINATION, May 2020

(First Semester)

(C Scheme) (Re-appear Only)

EE(PS)

MPS501C

POWER SYSTEM ANALYSIS

Time : $2\frac{1}{2}$ *Hours*]

[Maximum Marks: 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

- **Note** : Attempt *Four* questions in all. All questions carry equal marks. Draw neat diagrams wherever applicable.
- 1. Describe the load flow analysis in radial distribution system. Take any suitable example.
- 2. Use the Newton-Rapson method to find the interactions of the curves :

$$x^{2} + y^{2} = 4$$
$$e^{x} + y = 1$$

Consider initial estimation of x = 0.5 and y = -1. Do single iteration only.

- 3. Derive the formulae for fault currents for the Single line to Ground fault at *k*th bus of power *n*-bus system network.
- 4. A single line to ground fault occurs at bus no. 3 of the below mentioned network.

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P.T.O.

Calculate per unit fault current and bus voltages at all buses. Z-buses of the network are given :



	0.18 <i>j</i>	0.05 <i>j</i>	0.14j
Z bus $0 =$	0.05 <i>j</i>	0.01 <i>j</i>	0.06 <i>j</i>
	0.14 <i>j</i>	0.06 <i>j</i>	0.35 <i>j</i>

- 5. (a) How the line outage distribution factor is calculated for the outage of any of the line ?
 - (b) The line reactance of the five bus system is as follows :

Line between	Reactance (p.u.)
buses	
1–2	0.2
1–4	0.25
2-3	0.15
2–4	0.3
3–4	0.4

Determine the generator shift distribution factor for outage of generator connected to bus no. 2.

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- 6. Describe the optimal reactive power dispatch.
- 7. (a) How are the weighted least square estimates of the state variables performed ?(b) How and why the Chi-square test is needed in State Estimation ?
- **8.** What are the benefits of State Estimation technique in power system ? What additional equations are used in state estimation in comparison to N-R method.
- 9. (a) Classify various types of busses in Power Systems.
 - (b) What is meant by degree of freedom in state estimation ?
 - (c) Why is system considered at no load while performing short circuit studies ?
 - (d) What is the aim of system monitoring in power system ?
 - (e) How do we consider the effect of AVR in load flow analysis?