

III B. Tech II Semester Supplementary Examinations, April/May- 2019
POWER SYSTEM ANALYSIS
 (Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answering the question in **Part-A** is compulsory
 3. Answer any **THREE** Questions from **Part-B**

PART -A

- 1 a) Write the draw backs of the per unit system representation. [3M]
 b) Write short notes on the swing bus. [3M]
 c) What are the advantages of calculation of Z_{bus} matrix? [4M]
 d) Discuss how a symmetrical fault is identified in the power system. [4M]
 e) Define positive and negative sequence components. [4M]
 f) List out the types of stabilities in the power system. [4M]

PART -B

- 2 a) Explain the differences between the per unit representations of single phase and three phase systems by deriving necessary equations. [8M]
 b) A synchronous generator is rated at 150MVA, 22kV has a reactance of 0.25 p.u and is connected to an over head line through a transformer rated 200 MVA, 230/18 kV star delta with $X_{p.u}$ is 0.21. Find the p.u reactance by considering the (i) generator ratings and (ii) transformer ratings as base values. [8M]
- 3 a) Explain the representation of various components in power system for the power flow calculation by deriving the necessary expressions. [8M]
 b) Compare the decoupled method and fast decoupled methods with the Newton Rapson method. [8M]
- 4 a) Derive the expression for mutual impedance calculation when a branch is added to existing partial network. [8M]
 b) Explain the procedure for removal of elements from Z_{bus} matrix by deriving necessary equations. [8M]
- 5 a) Derive the expression for the short circuit current during the transients in the power system. [8M]
 b) By drawing the current wave form of the alternator under short circuit derive the relation between transient, sub transient and steady state reactance. [8M]
- 6 a) Prove that the complex power is computed from the symmetrical components of voltages and currents of an unbalanced 3 phase system. [8M]
 b) Derive the sequence impedance networks of the transmission line. [8M]
- 7 a) Draw and explain the characteristics between power received and load angle with necessary equations. [8M]
 b) An alternator supplies 50 MW to the infinite bus bar, the steady state limit of the system being 100 MW. Determine whether the alternator will remain the synchronism if the prime mover input is increased to 32 MW by assuming the losses are zero. [8M]
