PVP 14

Code: EE6T5

III B.Tech - II Semester – Regular Examinations – May 2017

POWER SYSTEM ANALYSIS
(ELECTRICAL & ELECTRONICS ENGINEERING)

Duration: 3 hours Max. Marks: 70

PART – A

Answer *all* the questions. All questions carry equal marks

11x 2 = 22 M

1.

a) Why do Y_{bus} is used in load flow study instead of Z_{bus}?
b) What is swing bus in power flow study?
c) How the buses are classified in a power system?
d) Mention two objectives of short circuit analysis.
e) Write the boundary conditions for single line to ground fault.
f) Compare Guass-Seidel method and N-R method with respect to number of iterations taken for convergence and memory requirement.
g) Write the symmetrical component currents of phase ‘a’ in terms of three phase currents.
h) Mention assumptions made in fast decoupled load flow.
i) What are the observations made from the analysis of various faults?
j) Define swing curve. What is the use of this curve?
k) Find the frequency of oscillation for a co-efficient of 0.6 inertia constant H=4 and system frequency of 50Hz.

PART – B

Answer any *THREE* questions. All questions carry equal marks.

3 x 16 = 48 M

2. a) What is pu system? Explain its use. 4 M

b) Obtain the per unit impedance (reactance) diagram of the power system

G1: 20 MVA, 10.5 KV, X" = 1.4 Ω, Xn1 = 0.5 Ω,
G2: 10 MVA, 6.6 KV, X" = 1.2 Ω, Xn2 = 0.5 Ω,
T1 (3 phase): 10 MVA, 33 / 11 KV, X = 15.2 Ω per phase on high tension side.
T2 (3 phase): 10 MVA, 33 / 6.6 KV, X = 16 Ω per phase on high tension side.
Transmission line: 22.5 Ω per phase. Choose a common base of 20 MVA. 12 M

3. a) Distinguish between steady state, transient and dynamic Stability. 8 M

b) Explain methods of improving power system stability. 8 M

4. a) Classify the different types of unsymmetrical faults that can be occurring on a 3-phase system. 10 M

b) A 25 MVA, 13.2 KV alternator with solidly grounded neutral has a sub transient reactance of 0.25 p.u . The negative and zero sequence reactance are 0.35 and 0.01 p.u.

respectively. If a double line-to-ground fault occurs at the alternator. Determine the fault current and line-to-line voltages at the fault. 6 M

5. a) Write the flowchart for load flow solution using N-R (without PV bus). 8 M

b) Explain fast De coupled load flow algorithm with assumptions. 8 M

6. The system data for a load flow problem are given in Table 1 and Table 2. 16 M

i. Compute Y_{bus}.

ii. Determine bus voltages at the end of 1^{st} iteration by Gauss-Seidel method. Take acceleration factor as 1.6.

Table - 1

Bus code	Admittances(p.u)
1-2	2-j8
1-3	1-j4
2-3	0.6-j2.6

Table - 2

Bus code	P in p.u	Q in p.u	V in p.u	Remarks
1	-	-	$1.06\angle 0^{O}$	Slack
2	0.5	0.2	-	PQ
3	0.4	0.3	-	PQ