



Regulation R18

Subject code: 2P6BC

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A' Grade)

B.Tech VI Semester Supplementary Examinations, January 2023
POWER SYSTEM ANALYSIS

Maximum Marks: 70

17/01/23

Duration: 3 hours

- Note:
1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit which carries 10M.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks

(10x2M=20 Marks)

- 1 A generator rated at 30 MVA, 11 kV A as a reactance of 20%. Calculate its per unit reactance for a base of 50 MVA and 10 kV.
- 2 Define per unit.
- 3 What are the different types of bus in load flow studies?
- 4 Write short about PQ buses
- 5 Define negative sequence and Zero sequence components.
- 6 What are symmetrical components.
- 7 Classify steady state stability limit.
- 8 Define stability.
- 9 Different types of stability in power system.
- 10 Write The swing equation.

Part-B

Answer All the following questions.

(10MX 5=50Marks)

- 11 Form the Y_{bus} for a given network by using direct inspection method. As shown Table 10M

Element	Positive sequence reactance
1-2	0.05j
1-3	0.3j
1-4	0.5j
2-3	0.6jj
2-4	0.4j
3-4	0.5j

OR

- 12 Derive an expression for adding BRANCH elements between two buses in the Z_{bus} building algorithm 10M

- 13 The following is the system data for a load flow solution. Determine the voltages at the end of first iteration using Gauss- Seidel method. 10M

Bus code	impedance
1-2	2-j8.0
1-3	1-j4.0
2-3	0.666-j2.664
2-4	1-j4.0

Bus code	P	Q	V	Bus Type
1	-	-	1.06	Slack
2	0.5	0.2	1+j0.0	PQ
3	0.4	0.3	1+j0.0	PQ
4	0.3	0.1	1+j0.0	PQ

OR

- 14 Draw a Flow Chart for Gauss-seidel load flow method when P-V buses are absent. 10M
 15 Derive an expression for fault current of Line-Ground fault with fault impedance. 10M

OR

- 16 Draw and Explain the positive, negative and zero sequence diagram . 10M
 17 Draw and Explain power angle curve of synchronous machine 10M

OR

- 18 a. Define Synchronizing power coefficient and explain its significance. 6M
 b. 4-pole ,50hz 22kv turbo alter nator has rating of 100MVA, power factor 0.8 lagging. The moment of inertia of rotor is 9000kg-m² . Determine M and H. 4M
 19 Two turbo alternator with rating given below are connection via short line. Macine-1: 4-pole, 50hz, 80MW, 0.8 P.F Lagging. Moment of inertia 30,000Kg-m²
 Macine-2: 2-pole, 50hz, 80MW, 0.85 P.F Lagging. Moment of inertia 10,000 Kg-m² Calculate the inertia constant of single equation machine on base of 300MVA 10M

OR

- 20 Give the applications of Equal area criterion 10M