A **Reg. No. :** | | | | | | | | | | |

Question Paper Code: 55302

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2019

Fifth Semester

Electrical and Electronics Engineering

15UEE502 - POWER SYSTEM ANALYSIS

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. _____ is diagrammatic representation of power system in which the components are represented by their symbols and the interconnections between them are shown by straight lines. CO1- R

   (a) Single line diagram (b) Power system diagram

   (c) Electrical connection diagram (d) None of the above

2. Impedance diagram is used for analysis of ____. CO1- R

   (a) Load flow (b) Alternator (c) Fault (d) Transmission line

3. Load bus is also called as _____ bus. CO2- R

   (a) PQ bus (b) PV bus (c) QV bus (d) VQ bus

4. What percentage of buses in the power system are generator buses? CO2- R

   (a) 5 % (b) 25 % (c) 70 % (d) 10 %

5. The fault is called _____ fault, if the fault current is equal in all the phases. CO3 R

   (a) Asymmetrical (b) Symmetrical (c) Equal (d) Unequal

6. In which portion of the transmission system the occurrence of the fault is more common? CO3- R

   (a) Alternators (b) Transformers

   (c) Transmission lines (d) Underground cables

7. In single L to G fault, positive, negative and zero sequence component currents are _____ CO4- R

(a) Series (b) Equal (c) Unequal (d) Parallel

8. What happens if the neutral is not grounded in case of the single line to ground fault? CO4- R

(a) Only the zero sequence impedance will be zero

(b) Zero sequence impedance will be infinite

(c) Fault current will be zero

(d) Both (b) and (c)

9. The angle between relative position of the rotor axis and the stator magnetic field axis is _____ CO5- R

(a) Load angle (b) Power angle (c) Voltage angle (d) Current angle

10. The stability of the power system is not affected by _____. CO5- R

(a) Line losses (b) Generator reactance

(c) Excitation of generators (d) All of these

PART – B (5 x 2= 10 Marks)

11. What are the components of power system? CO1- R

12. What are the different types of buses in a power system? CO2- R

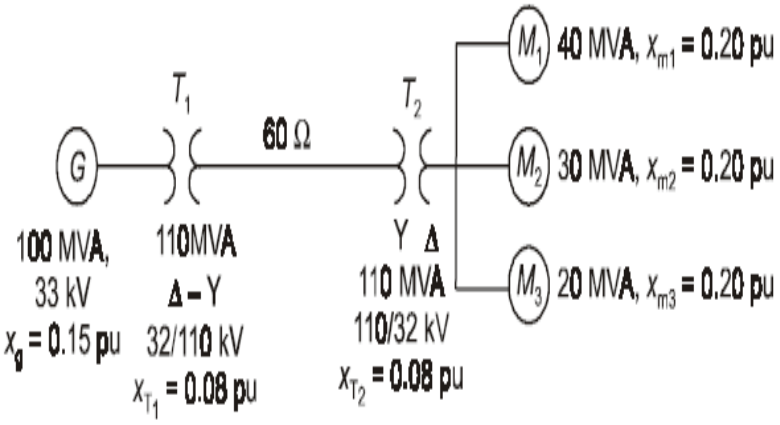
13. The generator emf is 1 p.u and the sub transient reactance is 20 %. Find the sub transient current? CO3- R

14. Name the various unsymmetrical faults in a power system. CO4- R

15. Define steady state stability and steady state stability limit. CO5- R

PART – C (5 x 16= 80 Marks)

16. (a) A 100 MVA, 33kV, three phase generator has a reactance of 15%. The generator is connected to the motors through a transmission line and transformers as shown in Fig. Motors have rated inputs of 40 MVA, 30 MVA and 20 MVA at 30 kV with 20% reactance each. Draw the per-unit circuit diagram. CO1- App (16)



Or

(b) Find out the Y matrix of the sample power system as shown in Fig. Data for this system are given in Table. CO1- App (16)

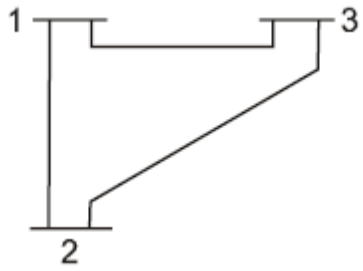


Fig: bus sample power system

17. (a) What is decoupled method of power flow analysis? Write the algorithmic steps involved. CO2-Ana (16)

Or

(b) Derive load flow algorithm using Newton – Raphson method with flow chart and discuss the advantages of the method. CO2 Ana (16)

18. (a) Explain the step by step procedure for systematic fault analysis using bus impedance matrix CO3- Ana (16)

Or

(b) Explain how fault analysis is carried out using Z-bus matrix. CO3- Ana (16)

19. (a) Derive the equation for fault current when LL fault occurs. CO4- U (16)

Or

(b) (i) The currents flowing in the lines toward a balanced load connected in delta are $I_a = 100\angle 0^0$, $I_b = 141.4\angle 225^0$ and $I_c = 100\angle 90^0$. Find the symmetrical components of the given line currents. CO4- App (8)

		(ii) Develop an expression of three power in terms of symmetrical components.	CO4- Ana	(8)
20.	(a)	(i) Enumerate the classification of power system stability.	CO5- U	(8)
		(ii) Derive swing equation for a synchronous machine.	CO5- U	(8)
		Or		
	(b)	With a neat flow chart, explain the computational algorithm for obtaining swing curves of multi machine system using modified Euler's and Runge – Kutta method	CO5- U	(16)