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**Question Paper Code: 57101**

B.E./B.Tech. DEGREE EXAMINATION, DEC 2020

Fifth Semester

Electrical Engineering

15UEE502 - POWER SYSTEM ANALYSIS

(Regulation 2015)

Duration: One hour

Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

**(Answer any six of the following questions)**

1. Single line diagram of which of the following power system is possible? CO1- R  
(a) Power system with LLG fault (b) Power system with LG fault  
(c) Power system with LL fault (d) Balanced power system
2. The per unit value of a 2 ohm resistor at 100 MVA and 10 kV base voltage is CO1- R  
(a) 4 pu (b) 2 pu (c) 0.5 pu (d) 0.2 pu
3. The convergence characteristics of the Newton-Raphson method for solving a load flow problem is CO2- R  
(a) Quadratic (b) Linear (c) Geometric (d) Cubic
4. Range of accelerating factor is CO2- R  
(a) 50 to 100 (b) 1 to 10 (c) 1.6 to 1.8 (d) 10.8 to 11.2
5. If the fault is very nearer to the generator, the fault current CO3- R  
(a) Less (b) Zero (c) Larger (d) Any of the above
6. In a synchronous generator for how much time sub transient period of symmetrical short circuit current lasts? CO3- R  
(a) For 200 Cycles (b) For 500 Cycles (c) For 30 Cycles (d) For 2 Cycles
7. What is the value of  $(1 + a + a^2)$ ? CO4- R  
(a) 0 (b) 1 (c) -1 (d)  $\infty$

8. What is the value of zero sequence impedance in line to line faults? CO4- R  
 (a)  $Z_0 = 1$  (b)  $Z_0 = \infty$  (c)  $Z_0 = 3 Z_n$  (d)  $Z_0 = 0$
9. The Power Systems are operated with power angle around CO5- R  
 (a)  $10^\circ$  (b)  $30^\circ$  (c)  $70^\circ$  (d)  $80^\circ$
10. With fault clearing time, the transient stability limit of a power system CO5- R  
 (a) Increases (b) Decreases  
 (c) First increases then decreases (d) First decreases and then increases

PART – B (3 x 8= 24 Marks)

**(Answer any three of the following questions)**

11. A 120 MVA, 19.5 kV Generator has a synchronous reactance of 0.15 p.u and it is connected to a transmission line through a Transformer rated 150 MVA, 230/18 kV(star/delta) with  $X = 0.1$  p.u. CO1- App (8)  
 (i) Calculate the p.u reactances by taking generator rating as base values  
 (ii) Calculate the p.u reactance for a base value of 100 MVA and 220 kV on H.T side of transformer.
12. Explain the step by step computational procedure for the Newton-Raphson method of load flow studies. CO2- U (8)
13. With a help of a detailed flowchart, explain how a symmetrical fault can be analyzed using Z bus ? CO3- U (8)
14. Determine the symmetrical components of three voltages CO4- App (8)  
 $V_a = 200 \angle 0^\circ$ ,  $V_b = 200 \angle 245^\circ$  and  $V_c = 200 \angle 105^\circ$  V
15. A 50 Hz generator is delivering 50% of the power that it is capable of delivering through a transmission line to an infinite bus. A fault occurs that increases the reactance between the generator and the infinite bus to 500% of the value before the fault. When the fault is isolated, the maximum power that can be delivered is 75% of the original maximum value. Determine the critical clearing angle for the condition described. CO5- App (8)