**20EE502**

**Hall Ticket Number:**

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| **III/IV B.Tech (Supplementary) DEGREE EXAMINATION** | | | |
| **July/August,2023** | **Electrical & Electronics Engineering** | | |
| **Fifth Semester** | **Power System Analysis** | | |
| **Time:** Three Hours | | **Maximum: 7**0 Marks | |
| *Answer Question No. 1 Compulsorily.* | | | (14X1 = 14 Marks) |
| *Answer* ***ANY ONE*** *question from each Unit.* | | | (4X14=56 Marks) |

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| 1. | a) | Write a formula for potential gradient of a single core cable. | CO1 | L2 | 1M |
|  | b) | **What is one line diagram?** | CO1 | L1 | 1M |
|  | c) | **How are the loads represented in reactance or impedance diagram?** | CO1 | L1 | 1M |
|  | d) | **What is sequence network?** | CO2 | L1 | 1M |
|  | e) | **What is the need for short circuit studies?** | CO2 | L1 | 1M |
|  | f) | **List various type of shunt and serious faults.** | CO2 | L1 | 1M |
|  | g) | **Write about the symmetrical components of a three phase systems?** | CO3 | L2 | 1M |
|  | h) | **What are the components of power system?** | CO3 | L1 | 1M |
|  | i) | What is the need of short circuit studies for fault analysis? | CO3 | L1 | 1M |
|  | j) | Why does pole mounted substations are very popular? | CO3 | L2 | 1M |
|  | k) | What are the effects of high primary voltage on the distribution system? | CO4 | L1 | 1M |
|  | l) | Why is 3 wire d.c distribution preferred to 2- wire d.c distribution? | CO4 | L2 | 1M |
|  | m) | What are the effects of high primary voltage on the distribution system? | CO4 | L1 | 1M |
|  | n) | What are the differences between indoor and outdoor substations? | CO4 | L1 | 1M |
| **Unit -I** | | | | | |
| 2. | a) | Describe the various methods of laying underground cables. What are the relative advantages and disadvantages of each method? | CO1 | L2 | 14M |
|  |  | **(OR)** |  |  |  |
| 3. | a) | Explain Reactance diagram & approximations made in reactance diagram, Describe the formation of reactance diagram from single line diagram. | CO1 | L2 | 10M |
|  | b) | What is per unit quantity? Mention its advantages. | CO1 | L1 | 4M |
|  |  | **Unit -II** |  |  |  |
| 4. | a) | Derive the power angle equation as applied to salient pole synchronous machine | CO2 | L3 | 7M |
|  | b) | A 3 phase power system consists of a synchronous generator connected to an infinite bus bar through a loss less double circuit transmission line. A fault occurs on the transmission line. The maximum power transfer for the system when unfaulted is 5 pu and immediately prior to the instant of fault the power transfer is 2.5 pu. The power angle curves during fault and post fault conditions have peak values of 2pu and 4 pu respectively. Determine the critical clearing angle. | CO2 | L4 | 7M |
|  |  | **(OR)** |  |  |  |
| 5. | a) | Formulate the Zbus Matrix when a link is added to the existing network. | CO2 | L2 | 7M |
|  | b) | The positive sequence network data shown in table below, obtain Zbus by step by step algorithm.     |  |  |  | | --- | --- | --- | | Sl.No | p-q (Nodes) | Pos. seq. reactance in pu | | 1 | 0-1 | 0.25 | | 2 | 0-3 | 0.20 | | 3 | 1-2 | 0.08 | | 4 | 2-3 | 0.06 | | CO2 | L3 | 7M |
| **P.T.O**  **20EE502**  **Unit -III** | | | | | |
| 6. | a) | A double line to ground fault occurs at the terminals of an unloaded generator. Derive an expression for fault current, draw the connection of sequence network. | CO3 | L4 | 7M |
|  | b) | What are the three types of sequence networks define and draw the three types of networks for an unloaded generator. | CO3 | L1 | 7M |
|  |  | **(OR)** |  |  |  |
| 7. | a) | A 3 phase, 50 MVA , 11KV , star connected neutral solidly grounded generator operating on no load at rated voltage give the following fault currents for the fault specified. 3 phase fault: 2000A, LL fault: 1800A, LG fault:2200A. Determine the 3 sequence reactance’s in ohm and per unit. | CO3 | L3 | 14M |
|  |  | **Unit -IV** |  |  |  |
| 8. | a) | Derive an expression for the voltage drop for a uniformly loaded distributor fed at one end. | CO4 | L1 | 7M |
|  | b) | What are the advantages of 3 wire distribution over 2 wire distribution? | CO4 | L3 | 7M |
|  |  | **(OR)** |  |  |  |
| 9. | a) | Give the comparison of outdoor and indoor substations. | CO4 | L2 | 7M |
|  | b) | Explain the following systems in distribution.   1. Radial system 2. Ring main system 3. Interconnected system | CO4 | L2 | 7M |

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