**18EE501**

**Hall Ticket Number:**

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| **III/IV B.Tech (Regular) DEGREE EXAMINATION** | | | |
| **February, 2021** | **Electrical and Electronics Engineering** | | |
| **Fifth Semester** | **Power Systems-II** | | |
| **Time:** Three Hours | | **Maximum: 5**0 Marks | |
| *Answer ALL Questions from PART-A.* | | | (1X10 = 10 Marks) |
| *Answer* ***ANY FOUR*** *questions from PART-B.* | | | (4X10=40 Marks) |
|  | | | **Part-A** |

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| 1. | a) | List any four different types of sub stations |  | |  |
|  | b) | What is a single line diagram? |  | |  |
|  | c) | What is the need of base values? |  | |  |
|  | d) | Define kelvins law. |  | |  |
|  | e) | Define Grading of cables. |  | |  |
|  | f) | What is maximum momentary short circuit current? |  | |  |
|  | g) | What is the wave velocity of travelling wave? |  | |  |
|  | h) | Write any two types of Lightning Arresters. |  | |  |
|  | i) | Compare indoor and outdoor substations. |  | |  |
|  | j) | What are the usual insulating materials for cables |  | |  |
|  | k) |  |  | |  |
|  | l) |  |  | |  |
| **Part-B** | | | | | |
| 2. | a) | Explain in detail about Kelvin’s law for most economical cross section and its limitations. |  | 6M | |
|  | b) | A 2-wire DC distributor cable AB is 2 km long and supplies loads of 100A, 150A, 200A and 50A situated 500 m, 1000 m, 1600 m and 2000 m from the feeding point A. Each conductor has a resistance of 0·01 Ω per 1000 m. Calculate the potential difference at each load point if a potential difference of 300 V is maintained at point A. | | 6M | |
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| 3. |  | Explain substation bus bar arrangements by comparing each with neat sketches. |  | 12M | |
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| 4. |  | Classify grading methods of cables and explain them. |  | 12M | |
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| 5. |  | A 100 MVA, 33 kV 3-phase generator has a sub-transient reactance of 15%. The generator is connected to the motors through a transmission line and transformers as shown in Fig. The motors have rated inputs of 30 MVA, 20 MVA and 50 MVA at 30 kV with 20% sub-transient reactance. The 3-phase transformers are rated at 110 MVA, 32 kV, Δ/110 kV Y with leakage reactance 8%. The line has a reactance of 50 ohms. Selecting the generator rating as the base quantities in the generator circuit, determine the base quantities in other parts of the system and evaluate the corresponding p.u. values. | | 12M | |
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| 6. | a) | Discuss the effect of synchronous machine excitation in detail with the help of phasor diagrams? | | 12M | |
| 7. | a) | Derive the fault current expressions for a LLG fault of an unloaded generator? | | 6M | |
|  | 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’s are 0.35 and 0.1p.u. respectively. A single line to ground fault occurs at the terminals of an unloaded alternator; determine the fault current. Neglect resistance. | | 6M | |
| 8. | a) | Derive the expression for velocity of a travelling wave through a loss less line. |  | 6M | |
|  | b) | Derive the coefficient of reflection and refraction of voltage and current for open ended line. | | 6M | |
| 9. |  | Explain types of lightning arresters with neat sketches. |  | 12M | |

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