**18EE605**

**Hall Ticket Number:**

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| **III/IV B.Tech (Regular) DEGREE EXAMINATION** | | | |
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| **June, 2022** | **Electrical & Electronics Engineering** | | |
| **Sixth Semester** | **Power System Operation, Control & Stability** | | |
| **Time:** Three Hours | | **Maximum:**50 Marks | |
| ***Answer question 1 compulsory.*** | | | **(10X1 = 10Marks)** |
| ***Answer one question from each unit.*** | | | **(4X10=40Marks)** |

|  |  |  | CO | BL | M |
| --- | --- | --- | --- | --- | --- |
| 1 | a) | What is an incremental fuel cost and what are its units? | CO1 | L1 | 1M |
|  | b) | Write the expression of Penalty factor and discuss the terms involved in it | CO1 | L1 | 1M |
|  | c) | Define current distribution factor. | CO2 | L1 | 1M |
|  | d) | What do you mean by load frequency control? | CO2 | L1 | 1M |
|  | e) | What are two control loops in Automatic Generation Control? | CO2 | L1 | 1M |
|  | f) | What is shunt compensation? | CO3 | L1 | 1M |
|  | g) | What is booster transformer? | CO3 | L1 | 1M |
|  | h) | Define voltage stability. | CO4 | L1 | 1M |
|  | i) | Write swing equation. | CO5 | L1 | 1M |
|  | j) | Define critical clearing time. | CO5 | L1 | 1M |
| **Unit-I** | | | | | |
| 2 | a) | Obtain the condition for optimum operation of a power system with ‘n’ plants when  losses considered. | CO1 | L2 | 5M |
|  | b) | A plant consists of two units. The incremental fuel characteristics for the two units are given as Rs./MWh  Rs./MWh  Find the optimal load sharing of two units when a total load of 150 MW is connected to the system. | CO1 | L2 | 5M |
|  |  | **(OR)** |  |  |  |
| 3 | a) | Derive general transmission line loss formula and state assumptions made in calculating B- coefficients. | CO1 | L3 | 5M |
|  | b) | Explain the incremental cost of generation. | CO1 | L2 | 5M |
| **Unit-II** | | | | | |
| 4 | a) | Obtain the dynamic response of load frequency control of isolated power system for first order approximation. | CO2 | L3 | 5M |
|  | b) | A 100 MVA synchronous generator operates on full load at a frequency of 50Hz. The load is suddenly reduced to 50MW. Due to time lag in the governor system, the steam valve begins to close after 0.4sec. Determine the change in frequency that occurs in this time. Given H=5KW- sec/kVA of generator capacity | CO2 | L3 | 5M |
| **(OR)** | | | | | |
| 5 | a) | Explain why it is necessary to maintain the system frequency constant. | CO2 | L2 | 5M |
|  | b) | Explain the various components of a fly ball speed Governor system with the help of a neat sketch. | CO2 | L2 | 5M |
| **Unit-III** | | | | | |
| 6 | a) | Explain the following (i) Booster transformers (ii)Tap changing transformer | CO3 | L2 | 5M |
|  | b) | Explain Automatic Voltage Regulator with neat sketch. | CO3 | L3 | 5M |
| **(OR)** | | | | | |
| 7 | a) | What is FACTS controllers and explain their importance in power system | CO3 | L2 | 5M |
|  | b) | Explain static capacitors and phase advancers. | CO3 | L2 | 5M |
| **Unit-IV** | | | | | |
| 8 | a) | With neat sketch Explain equal area criteria whenever sudden change in mechanical input. | CO4 | L2 | 5M |
|  | b) | Briefly explain reactive power flow and voltage collapse. | CO4 | L2 | 5M |
| **(OR)** | | | | | |  |  |
| 9 | a) | Explain the factors affecting the steady state and transient stabilities. | CO5 | L2 | 5M |
|  | b) | Discuss the comparison between rotor angle and voltage stability in a system | CO5 | L3 | 5M |

