**18EE605**

**Hall Ticket Number:**

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| **III/IV B.Tech (Regular) DEGREE EXAMINATION** | | | | | | | | | |
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| **August, 2021** | | | | **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) | Draw heat rate curve of thermal power station | | | | CO1 | L1 | 1M | |
|  | b) | What is the need of economic load dispatch? | | | | CO1 | L1 | 1M | |
|  | c) | What are the main components of speed governor system? | | | | CO2 | L1 | 1M | |
|  | d) | Write the importance of Load frequency control | | | | CO2 | L1 | 1M | |
|  | e) | What is the necessity to keep frequency as constant? | | | | CO2 | L1 | 1M | |
|  | f) | State the importance of series compensation in transmission lines. | | | | CO3 | L1 | 1M | |
|  | g) | List any two methods for voltage control of distribution systems | | | | CO3 | L1 | 1M | |
|  | h) | Define FACTS as per IEEE | | | | CO4 | L1 | 1M | |
|  | i) | What is voltage collapse? | | | | CO5 | L1 | 1M | |
|  | j) | Write the factors affecting steady state stability | | | | CO5 | L1 | 1M | |
| **Unit-I** | | | | | | | | | |
| 2 | a) | Derive the formula for loss coefficients. What are the assumptions made? | | | | CO1 | L3 | 5M | |
|  | b) | The fuel input per hour of plant 1 and 2 are given as C1=0.2P12 +40P1+120 Rs/hr, C2=0.25P22 +30P2+150 Rs/hr. Determine the economic operating schedule and the corresponding cost of generation if the max and min loading on each unit is 100MW and 25MW, the demand is 180 MW and transmission losses are neglected. If the load is equally shared by both the units, determine the saving obtained by loading the units as per equal incremental production cost. | | | | CO1 | L3 | 5M | |
|  |  | **(OR)** | | | |  |  |  | |
| 3 | a) | Explain optimum allocation between thermal plants | | | | CO1 | L2 | 5M | |
|  | b) | A system consists of two plants connected by a transmission line and only load is connected to bus of plant 1. Data for the loss equation consisting of the information that 150 MW transmitted from plant 2 to the load results in a transmission loss of 15MW. Find the optimum generation schedule considering transmission loss to supply a load of 200 MW. Assume that Incremental costs of plants are given by  (IC)1 = 16 + 0.05Pg1 Rs//MWh;  (IC)2 = 14 + 0.025Pg2 Rs//MWh; | | | | CO1 | L2 | 5M | |
| **Unit-II** | | | | | | | | | |
| 4 | a) | Discuss the components of speed governor system of an alternator? Derive its transfer function with an aid of a block diagram. | | | | CO2 | L3 | 5M | |
|  | b) | Two 1000KW alternators operate in parallel. The speed regulation of first alternator is 100% to 103% from full load to no load and that of other 100% to 105%. Show how will the two alternators share load of 1200KW and at what will one machine cease to supply any portion of the load. | | | | CO2 | L2 | 5M | |
| **(OR)** | | | | | | | | | |
| 5 |  | Deduce the expression for steady state frequency change for single area system with the following cases.  (i)Changes in load with fixed speed  (ii)Changes in speed with fixed demand | | | | CO2 | L4 | 10M | |
| **Unit-III** | | | | | | | | | |
| 6 | a) | Model the components of Automatic Voltage Regulator (AVR) of Synchronous Generator. Draw the block diagram and find the steady state response and error for step input. | | | | CO3 | L2 | 5M | |
|  | b) | Explain voltage control of distribution systems | | | | CO3 | L2 | 5M | |
| **(OR)** | | | | | | | | | |
| 7 | a) | Explain the operation of TCR & TSC. | | | | CO3 | L2 | 5M | |
|  | b) | Explain the importance of FACTS devices in reactive power compensation. | | | | CO3 | L2 | 5M | |
| **Unit-IV** | | | | | | | | | |
| 8 | a) | With neat sketch Explain equal area criteria whenever sudden change in mechanical input. | | | | CO4 | L2 | 5M | |
|  | b) | Write the factors affecting steady state and transient stabilities | | | | CO4 | L2 | 5M | |
| **(OR)** | | | | | | | | | |  |  |
| 9 | a) | Derive swing equation for a single machine connected to infinite bus system? | | | | CO5 | L3 | 5M | |
|  | b) | Write the difference between angle & voltage stability | | | | CO5 | L2 | 5M | |

