21222

3 Hours / 70 Marks

15 minutes extra for each hour

Seat No.

Instructions :   (1)   All Questions are *compulsory.*

(2)   Answer each next main Question on a new page.

(3)   Illustrate your answers with neat sketches wherever necessary.

(4)   Figures to the right indicate full marks.

(5)   Assume suitable data, if necessary.

Marks

1.   **Attempt any FIVE of the following :**   **10**

(a)   List out any two causes of reactive power imbalance in power system.

(b)   Name any two advantages of reactive power compensation in transmission line.

(c)   Define : Load flow studies refer to power system operation.

(d)   Define the term : SLFE.

(e)   Write the condition of power system stability limit.

(f)   State the significance of load forecasting in power system.

(g)   Define overall stability and dynamic stability.

2.   **Attempt any THREE of the following :**   **12**

(a)   Explain the need of constant frequency supply for consumers.

(b)   Draw the block diagram of Automatic Generation Control (AGC) for generating system.

(c)   List out steps in developing static load flow equation – $I_{bus} = Y_{bus} \, V_{bus}$ for a simple two bus system.

(d)   Categorize the data required for load flow studies for following :

   (i)   Transmission Line

   (ii)   Transformer

   (iii)   Bus

   (iv)   Load

3.   Attempt any THREE of the following :   **12**

(a)   Draw a labelled schematic diagram of Automatic Voltage Control (AVC) used for an alternator.

(b)   Explain the functioning of Automatic Load Frequency Control (ALFC) with a labelled schematic diagram.

(c)   Identify the significance of load flow analysis for power system.

(d)   Differentiate between 'Large Disturbance' and 'Small Disturbance' in power system stability.

4.   Attempt any THREE of the following :   **12**

(a)   Identify the information obtained from load flow studies in power system operation.

(b)   List out significant features of Y-bus matrix.

(c)   Explain steady state stability of the power system.

(d)   Describe any four methods of improving transient state stability of the power system.

(e)   State the types of Load Dispatch Centre (LDC) and their locations w.r.t. Indian Power System.

5. **Attempt any TWO of the following :** 12

   (a) Explain the shunt compensation and series compensation method of reactive power compensation for transmission line.

   (b) Describe the working of Turbine Speed Governing System for turbo generator speed control with a labelled schematic diagram.

   (c) Explain the adverse effects of power system instability on consumers and utilities.

6. **Attempt any TWO of the following :** 12

   (a) Describe the functioning of state load dispatch centre in Indian Power System.

   (b) Explain any six governing factors with reference to load shedding.

   (c) Develop bus admittance matrix for the power system with following data :

Bus Code p-q	Line Impedance in P.U. Z_{pq}	Line charging Admittance in P.U. $Y_{pq/z}$
1-2	0.09 + j0.32	j0.01
2-3	0.04 + j0.062	j0.03
1-3	0.05 + j0.08	j0.02

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