22232

3 Hours / 70 Marks

Seat No.

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

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

(3) Figures to the right indicate full marks.

(4) Assume suitable data, if necessary.

(5) Use of Non-programmable Electronic Pocket Calculator is permissible.

Marks

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

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

   (b) Suggest type of Reactive power compensation equipment for Load and Line.

   (c) State the data required for load flow studies w.r.t. transmission line.

   (d) List the information obtained from load flow studies (any two).

   (e) State the adverse effects of instability of power system on consumers (any two).

   (f) State the various types of stability.

   (g) List any two functions of load dispatch center in general.

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

   (a) Explain the relation between Real power flow and frequency.

   (b) Explain with schematic diagram; the Automatic Load Frequency Control (ALFC) & its functioning.

   (c) Explain the concept of load flow studies and its need.

   (d) Develop the following static load flow equation (SLFE) for a simple two bus system

   $$I_{bus} = Y_{bus} \, V_{bus}$$

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

   (a) Draw neat and labelled diagram of Automatic Voltage Control System.

   (b) Explain the importance of ALFC and AGC in operation of power system.

   (c) Determine the Y_{bus} admittance matrix for the power system with following details.

Bus i – k	Z line in PU Z_{ik}	Charging admittance in PU $Y_{ij/z}$
1 – 2	0.2 + j 0.85	j 0.02
2 – 3	0.3 + j 0.88	j 0.03
1 – 3	0.25 + j 1.15	j 0.04

   (d) Differentiate large disturbance and small disturbance in a power system (4 points).

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

   (a) Interpret the characteristics of the SLFE for simple two bus power system.

   (b) State static load flow equation for a two bus system and define it's parameter.

   (c) Explain any two methods that can be adopted for the improvement of Trasient stability condition of a power system.

(d) Differentiate between 'Power System Stability', 'Power System Instability'; 'Stability Limit' and 'Overall Stability'.

(e) List out the factors that governs load shedding refer to power system operation.

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

(a) Derive the equation to prove that the voltage drop across the transmission line is mainly due to Reactive power flow.

(b) Draw a neat labelled diagram of Turbine speed governing system and explain it's functioning.

(c) Explain steady state stability conditions with the help of power angle diagram for the power system.

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

(a) Determine Y_{BUS} for the 3-bus system shown in fig. 6(a).

Neglect the shunt capacitances of the lines and assume zero charging admittances.
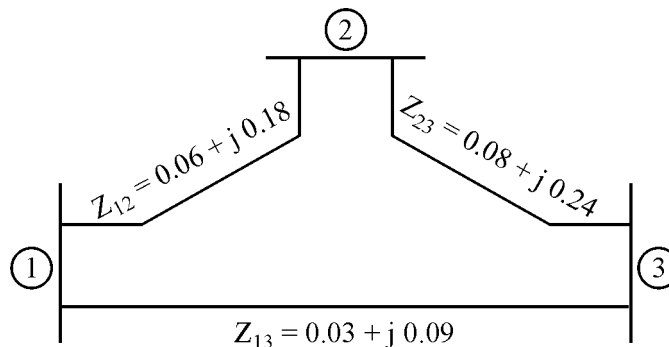

fig. 6(a)

(b) Explain load forecasting based on load curve.

(c) Explain Environmental and Social factors related to load forecasting.

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