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.

(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

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

(a) State adverse effect of real power imbalance in power system.

(b) Define load flow studies referred to power system operation.

(c) State the need of constant frequency control.

(d) State the significance of load forecasting.

(e) Define the terms :

    (i) Dynamic stability

    (ii) Transient state stability

(f) Suggest two type of reactive power compensation equipment for the transmission line of a power system.

(g) Compare between small disturbance and large disturbance in a power system (any two points).

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

    (a)   State the effect of change in voltage on consumers and supply agencies.

    (b)   Draw schematic diagram of Turbo generator speed control and state its functioning.

    (c)   List out the information obtained from load flow studies.

    (d)   State the adverse effects of instability of power system.

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

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

    (b)   Derive relation between real power balance and frequency of the power system.

    (c)   Referred to Indian scenario state different types of load dispatch centres and their locations.

    (d)   Develop the Static Load Flow Equation (SLFE) for a simple two bus power system.

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

    (a)   Define the following term :

        (i)   Power system stability

        (ii)   Instability

        (iii) Overall stability

        (iv) Steady state stability

    (b)   List significant features of the Y_{bus} matrix.

    (c)   Explain environmental and social factors in load forecasting.

    (d)   Explain any one method for voltage control of alternator using diagram.

    (e)   Define load shedding and explain its governing factors.

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

    (a)   Explain any two methods of improving steady state stability condition for the power system.

    (b)   Draw schematic diagram of the Automatic Load Frequency Control (ALFC) for the given type of generator, and explain its functioning.

    (c)   Explain in details the role of load dispatch center in Power System Operation.

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

    (a)   (i)   State the significance of load flow analysis in a power system.

           (ii)   State the data required for load flow studies related to

                (1)   Transformer

                (2)   Bus

    (b)   Explain any two conventional methods of improving transient state stability condition for the given power system.

    (c)   The impedance data for a sample power system is shown in following table : Find the admittance matrix of the system in bus frame of reference.

Bus Code	Impedance	Line charging admittance
1 – 2	0.08 + j 0.24	0.0
1 – 3	0.02 + j 0.06	0.0
2 – 3	0.06 + j 0.18	0.0

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