

17643

11718

3 Hours / 100 Marks

Seat No.

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- 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. (A) Attempt any **THREE** of the following :

12

- (a) Write the effect of change in voltage level on consumers.
- (b) State the data required for load flow studies.
- (c) Define following terms :
 - (i) Transient stability
 - (ii) Power system stability
- (d) State the concept of load frequency control (single area).

(B) Attempt any **ONE** of the following :

6

- (a) Obtain derivation of static load flow equation (S.L.F.E.) $I_{bus} = Y_{bus} V_{bus}$ for simple two bus system.
- (b) State and explain the classification of buses.

2. Attempt any FOUR of the following : 16

- (a) State the concept of dynamic state stability.
- (b) List the functions of load dispatch centre in general.
- (c) Write the swing equation and state the meaning of each term in it.
- (d) Explain the concept of real power flow in power system.
- (e) Draw neat labelled diagram of turbine speed governing system.
- (f) Explain load forecasting based on load curve.

3. Attempt any FOUR of the following : 16

- (a) Derive the relation between real power and frequency for simple two bus system.
- (b) List the information obtained from load flow studies.
- (c) Explain functions and applications of synchronous compensation and series compensation.
- (d) Write need of load flow analysis in power system.
- (e) State the adverse effects of power system instability.
- (f) Explain need of load shedding.

4. (A) Attempt any THREE of the following : 12

- (a) Referred to Indian scenario, state different types of load dispatching centres and their locations.

- (b) Explain method of voltage control by reactive power injection.
- (c) Explain schematic diagram of automatic generation voltage control system.
- (d) Obtain derivation of maximum power flow under steady state condition.

(B) Attempt any ONE of the following :

6

- (a) Develop a Y-bus matrix for the following given 3 bus system.

Bus Code	Line Impedance (P.U.)	Bus code	Line charging admittance (P.U.)
1-2	$0.08 + j0.35$	1	$j0.01$
2-3	$0.05 + j0.065$	2	$j0.04$
1-3	$0.052 + j0.09$	3	$j0.02$

- (b) Derive the relation between reactive power flow and voltage level of the system.

5. Attempt any FOUR of the following :

16

- (a) Explain Environmental and social factors in load forecasting. (any four)
- (b) State and explain Bus loading and line flow equations for formation of Y-bus.
- (c) Derive the SLFE in general form.
- (d) Explain effect of change in frequency on various consumers and utilities.
- (e) List out the advantages of Y_{bus} matrix in load flow analysis.
- (f) Explain factors affecting transient stability.

P.T.O.

6. Attempt any FOUR of the following :

16

- (a) Draw and state significance of power angle diagram.
- (b) The cost curve of two generating units of a power plant are given as

$$\frac{dC_1}{dP_1} = 0.35 P_1 + 60 / \text{MWh}$$

$$\frac{dC_2}{dP_2} = 0.45 P_2 + 50 / \text{MWh}$$

Determine fuel cost of each unit for total load on station to be 1200 MW considering economic load dispatch.

- (c) Explain method of voltage control by Tap changing transformers.
- (d) Draw and explain nature of following curves :
- (i) Incremental curve
 - (ii) Input-output curve
- (e) Draw neat labelled diagram of Automatic load frequency (double loop) system.
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