

17643

15116

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**
 - (i) State the concept of real power flow in power system.
 - (ii) List the data required for load flow analysis.
 - (iii) Describe power flow equations in the form of line flow equations.
 - (iv) Define power system stability. Classify power system stability.

- b) **Attempt any ONE of the following:** **6**
 - (i) Derive the relation between real power and frequency for a simple two bus system.
 - (ii) Describe automatic voltage control with the help of neat diagram.

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2. Attempt any FOUR of the following:**16**

- a) Describe the necessity of reactive power compensation.
- b) List the characteristics of SLFE.
- c) State the concept of steady state and transient stability.
- d) Derive the expression for maximum power flow under steady state condition.
- e) List the methods of voltage control.
- f) List the functions of state load dispatch centre.

3. Attempt any FOUR of the following:**16**

- a) "Reactive power compensation can be achieved by controlling bus voltage level". Justify.
- b) Derive static load flow equations for simple two bus system.
- c) Describe the necessity of load flow analysis.
- d) State the methods of improving transient stability.
- e) Derive Y-bus for following system.

Bus	Line Impedance (pu)	Charging admittance (pu)
1 – 2	$0.2 + j 0.8$	$j 0.02$
2 – 3	$0.3 + j 0.9$	$j 0.03$
1 – 3	$0.25 + j 1.0$	$j 0.04$

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

- (i) Distinguish between shunt compensation and synchronous compensation.
- (ii) Describe transient stability with the help of power angle curve.
- (iii) "Static load flow equations are important for analysing power system network". Justify.
- (iv) Describe the necessity of load forecasting.

- b) **Attempt any ONE of the following:** **6**
- (i) Describe the effects of change in supply frequency on:
- 1) consumers and
 - 2) utilities
- (ii) Draw the turbine speed governing system. Describe function of each part.
- 5. Attempt any FOUR of the following:** **16**
- a) List the information obtained from load flow equations.
 - b) Write the expression for swing equation and state the meaning of each term in it.
 - c) List the methods of voltage control.
 - d) Describe load frequency control.
 - e) State the factors governing load shedding.
- 6. Attempt any FOUR of the following:** **16**
- a) Describe concept of economic load dispatch.
 - b) State factors affecting transient stability.
 - c) Describe the method of voltage control using:
 - (i) Online tap changing transformer and
 - (ii) Regulating transformer
 - d) “Environmental factors are important in load forecasting”. Justify with reason.
 - e) The cost curve of two generating units of a power plant are given by

$$dC_1/dP_1 = 0.4 P_1 + 30 \text{ ₹/Mwh}$$

$$dC_2/dP_2 = 0.3 P_1 + 15 \text{ ₹/Mwh}$$

Determine incremental fuel cost of each unit for total load on station to be 300 MW considering economic load dispatch.
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