

17643

21718

3 Hours / 100 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
 - (2) Answer each next main Question on a new page.
 - (3) Assume suitable data, if necessary.
 - (4) Use of Non-programmable Electronic Pocket Calculator is permissible.

Marks

1. (A) Attempt any THREE : **12**

- (a) State and explain different types of bases with reference to power system.
- (b) State the reason for consumers demand for constant frequency supply.
- (c) Define the 'driving point admittance' and 'transfer admittance'.
- (d) Explain with example 'large disturbances' and small disturbances' referred to power system stability.

(B) Attempt any ONE : **06**

- (a) State the data required for load flow studies.
- (b) Define 'Steady state stability' 'Transient state stability' and 'Overall stability' of power system.

2. Attempt any FOUR :**16**

- (a) Derive the relation between real power and frequency in a single two bus power system.
- (b) State the types of reactive power compensating equipments used for 'loads' and 'transmission lines.'s
- (c) State SLFE for simple two bus system and define it's parameters.
- (d) State the information that can be obtained from Load flow studies.
- (e) State and explain base load equation and line-flow equations.
- (f) State the adverse effects of instability on power system.

3. Attempt any FOUR :**16**

- (a) Why do consumers demand electrical supply at constant voltage ?
- (b) State the advantages of reactive power compensation in power system operation.
- (c) State the significance of study of load flow analysis.
- (d) Write Y_{bus} matrix for 3-bus system and list out its characteristics.
- (e) Draw neat & labelled power angle diagram of a power system.
 - (i) Considering losses in the line.
 - (ii) Neglecting losses in the line.
- (f) State the factory that affect transient stability condition of power system. (any four)

4. (A) Attempt any THREE : 12

- (a) Explain steady state stability condition with the help of power angle diagram for power system.
- (b) Draw neat & labelled diagram of Automatic voltage control system.
- (c) List the methods of voltage control using transformers.
- (d) List out the functions of National Load dispatch centre.

(B) Attempt any ONE : 06

- (a) Explain the method of voltage control by reactive power injection.
- (b) State how social factors affect load forecasting of power system.

5. Attempt any FOUR : 16

- (a) Draw a neat & labelled schematic diagram of 'Automatic Load Frequency Control' system.
- (b) State the functions of the following in Turbine : speed governing system- Hydraulic amplifier-speed governor.
- (c) State the need of load forecasting in power system operation.
- (d) State and explain the different planning tools used for power system operation.
- (e) Draw Input-Output curve of a generating unit and explain its nature.

- (f) The incremental cost curve of two generating units are

$$dF_1/dP_1 = 0.3 P_1 + 50 \text{ Rs/MWh}$$

$$df_2/dP_2 = 0.4 P_2 + 40 \text{ Rs/MWh}$$

Determine economical load distribution between the two units, if power load on power plant is 1200 MW.

6. **Attempt any FOUR :**

16

- (a) Determine the Y_{bus} admittance matrix for the power system with following details :

Bus	Z_{line} in pu	Charging admittance in pu
1 – 2	$0.2 + j 0.85$	$j 0.02$
2 – 3	$0.3 + j 0.88$	$j 0.03$
1 – 3	$0.25 + j 1.15$	$j 0.04$

- (b) Give the advantages of Y_{bus} representation in Load flow studies.
- (c) Write swing equation and define its parameters.
- (d) Explain single area load frequency control concept.
- (e) State the importance of ALFC and AGC in operation of power system.
- (f) State the factors that govern the load shedding pattern in a power system.
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