17643

16172

3 Hours / 100 Marks Seat No. | | | | | | | | |

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 the difference between 'Generator bus' and 'slack bus'.

(b) State the concept of reactive power compensation. Name any two reactive power compensating equipments.

(c) Define the following terms.

– Power system stability.

– Power system instability

– Power system stability limit

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

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

(a) State the importance of load flow analysis in operation of power system.

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

2. Attempt any FOUR : **16**

(a) Why power utilities maintain the fluctuation in frequency within the tolerance limit ?

(b) Derive the relation between real power and frequency considering a simple two bus system.

(c) State the data required for load flow, analysis about –

Transformer, Triline, Generator and Bus.

(d) Write general form of SLFE considering two-bus system.

(e) State and explain Bus-loading and Line-flow equations refer to power system.

(f) Develop a Y_{bus} matrix for the following 3-bus system.

Bus code	**Line Impedance Pu**	**Bus code**	**Line-charging admittance Pu**
2–3	0.04 + j 0.08	1	j 0.01
3–1	0.055+j 0.6	2	j 0.00
1–2	0.09+j 0.35	3	j 0.00

3. Attempt any FOUR: **16**

(a) State the comparison between shunt and series compensating equipments. (any four factors)

(b) Why consumers demand constant voltage supply ?

(c) List out the informations that can be collected from load flow studies.

(d) State the significance of Y_{bus} matrix in loud flow studies.

(e) When we can say that the power system is in 'transient stability condition' or in steady state stability condition ?

(f) List out the factors that affects the transient stability condition of a power system.

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

(a) Draw neat labelled schematic diagram of a 'turbine speed governing system'.

(b) Explain the functioning of each component of 'turbine speed governing system'.

(c) Draw a neat labelled following curves and write the expressions.

– Input output curve

– Incremental fuel cost curve.

(d) With reference to Indian Power system, state the types of LDCs and their locations.

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

(a) State and explain any three conventional techniques used to improve transient stability condition.

(b) State and explain any four planning tools used for load forecasting in power system operation.

5. Attempt any FOUR : **16**

(a) Derive the expression for max steady state power in a simple two bus system. Neglect the losses in the system.

(b) Write swing equation and state significance of power angle.

(c) Draw a schematic diagram of Automatic voltage control at generators. Explain its functioning.

(d) Explain the load frequency control refer to single area case.

(e) State the need of load forecasting for power system operation.

(f) List out the functions of LDC. (Any four)

P.T.O.

6. Attempt any FOUR : **16**

(a) State the advantages of ALFC and AVC systems.

(b) With the help of diagram, explain ALFC of synchronous generator.

(c) Explain the different methods of voltage control by using transformer.

(d) How the voltage level can be controlled in power system by injecting reactive power in the tr. Line ?

(e) List out the environmental factors that affects the load forecasting.

(f) Why social activities are important for power system operation ?
