

Power System Operation and Control (315336)

MSBTE Diploma · K-Scheme · Model Question Paper — Set B

Time: 3 Hours

Max. Marks: 70

Instructions:

1. All questions are compulsory.
2. Answer each next main question on a new page.
3. Illustrate your answers with neat sketches wherever necessary.
4. Figures to the right indicate full marks.
5. Assume suitable data, if necessary.
6. Use of Non-programmable Electronic Pocket Calculator is permissible.
7. Mobile phone, pager and any other electronic communication devices are not permissible in the examination hall.

Q.1 Attempt any FIVE of the following:

10

- a) Define per unit impedance and base impedance.
- b) State the main components of a power system. (Any four)
- c) State any two effects of low voltage on consumer equipment.
- d) State the functions of automatic load frequency control (ALFC).
- e) Define: i) Transient stability ii) Dynamic stability.
- f) Compare small disturbance and large disturbance in a power system. (Any two points)
- g) State the significance of load forecasting in a power system.

Q.2 Attempt any THREE of the following:

12

- a) Draw the impedance diagram and the reactance diagram for the power system shown below. State the assumptions made in drawing the reactance diagram.

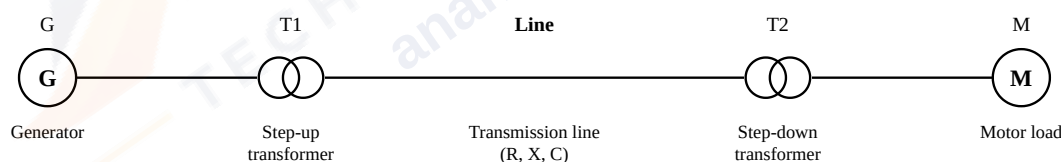


Fig. for Q.2 (a)

- b) Explain the impact of variation in frequency on consumers and supply agencies (generating plants).
- c) Draw the block diagram of automatic load frequency control (ALFC) and explain it.
- d) Explain the electro-hydraulic (digital) governor with a block diagram. State the meaning of RGMO and FGMO.

Q.3 Attempt any THREE of the following:

12

- Explain any four advantages of the per unit system in power system analysis.
- Explain the static synchronous series compensator (SSSC) with a neat diagram.
- Draw a labelled schematic diagram of automatic voltage control (AVC) and explain its working.
- Define the following terms: i) Instability ii) Power system stability iii) Overall stability iv) Stability limit.

Q.4 Attempt any THREE of the following:

12

- Draw the per unit reactance diagram for the power system shown below, taking the rating of transformer T1 as base (15 MVA, 11 kV on its LV side).

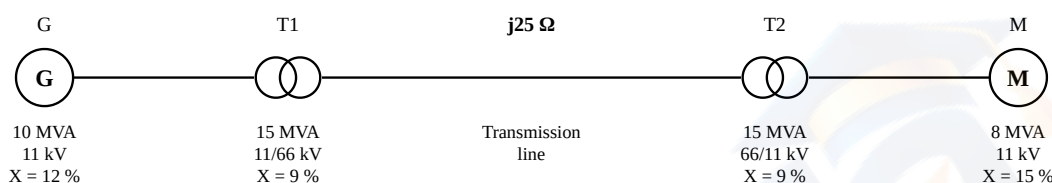


Fig. for Q.4 (a)

- Explain the relation between real power flow and frequency. Two generators 200 MW (speed regulation 4 %) and 300 MW (speed regulation 5 %) operate in parallel at 50 Hz. If the load increases by 60 MW, find the drop in frequency and the additional load taken by each generator (governor action only).
- Explain the environmental and social factors in load forecasting.
- State the methods of improving the steady state stability of a power system.
- State the types of load dispatch centres in India and their functions.

Q.5 Attempt any TWO of the following:

12

- State the concept of reactive power compensation. Explain shunt compensation and series compensation of a transmission line.
- Draw the schematic diagram of automatic generation control (AGC) for a generating system and explain its working.
- Differentiate between steady state stability and transient stability. (Any six points)

Q.6 Attempt any TWO of the following:

12

- Explain the relation between reactive power balance and voltage of a power system.
- Describe the working of the turbine speed governing system with a labelled schematic diagram. State the function of the speed changer.
- Describe various methods of improving the transient stability of a power system.

Note: This is a **model question paper prepared by Ananda Technologies** only for practice and exam preparation, based on the pattern of previous MSBTE question papers and the K-scheme syllabus. It is **not an official MSBTE paper**, and it does **not** mean that these questions will come in the exam. Answers follow standard textbook points; marks shown are indicative. Free for students — anandatechnologies.in