Power System Operation and Control (315336)

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

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) State any four main components of a power system.

b) Write the formula for converting a per unit impedance from an old base to a new base. Explain the terms.

c) State any two adverse effects of frequency variation on generating plants.

d) List any four effects of reactive power imbalance in a power system.

e) Define power system stability and instability.

f) Give two examples each of small disturbance and large disturbance in a power system.

g) Name the types of load dispatch centres in India.

Q.2 Attempt any THREE of the following: **12**

a) Explain the requirements of stable operation of a power system.

b) Explain the need of constant supply voltage for consumers.

c) Describe the functioning of automatic voltage regulator (AVR) with a neat block diagram.

d) State the adverse effects of power system instability.

Q.3 Attempt any THREE of the following: **12**

a) Derive the relation between real power balance and frequency of a power system.

b) Explain the unified power flow controller (UPFC) and interline power flow controller (IPFC) with diagrams.

c) Explain any four methods of improving the transient stability of a power system.

d) Describe the need of load forecasting in power system operation.

Q.4 Attempt any THREE of the following: **12**

a) State the concept of reactive power compensation. Name any four reactive power compensating equipments.

b) Draw and explain the block diagram of automatic load frequency control (ALFC) with integral control.

c) Define dynamic stability. State the methods to improve the dynamic stability limit.

d) Explain environmental and social factors in load forecasting.

e) State the need and importance of a load dispatch centre.

Q.5 Attempt any TWO of the following: **12**

a) Draw the per unit reactance diagram for the power system shown below. Choose a base of 50 MVA and 220 kV in the transmission line circuit.

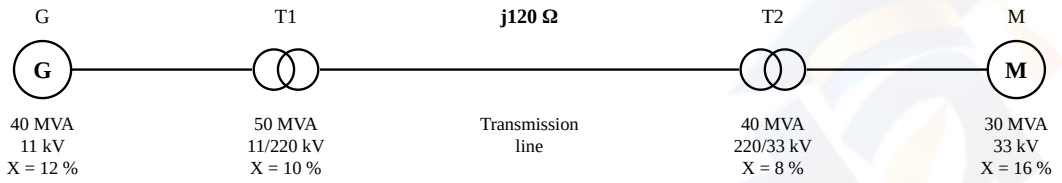

Fig. for Q.5 (a)

b) Explain shunt compensation and series compensation methods of reactive power compensation for a transmission line.

c) Draw the block diagram of automatic generation control (AGC) for a generating system. Name its components and explain its working.

Q.6 Attempt any TWO of the following: **12**

a) Derive the relation between voltage and reactive power flow in a simple two-bus system. A load of 0.6 pu active and 0.3 pu reactive power at 1.0 pu voltage is supplied through a line of reactance 0.3 pu. Find the sending-end voltage and the load angle.

b) Describe the working of the turbine speed governing system for turbo-generator speed control with a labelled schematic diagram.

c) With reference to the Indian power system, state the types of load dispatch centres. Explain the functions of NLDC, RLDC and SLDC.

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