

Electrical Power Generation, Transmission and Distribution (313333)

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

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. 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) Name one thermal and one hydro power station in Maharashtra with their installed capacity.
- b) Define: i) Cold reserve ii) Spinning reserve.
- c) State the standard voltage levels used in India for: i) Generation ii) Primary transmission iii) Secondary transmission.
- d) List any four types of overhead line supports.
- e) Name any two HVDC transmission lines in India with their voltage level.
- f) State the need of transposition of conductors.
- g) State the methods of wireless transmission of electrical power.

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

- a) Draw a neat schematic layout of a coal fired thermal power plant and label: i) Boiler ii) Turbine iii) Economiser iv) Condenser.
- b) Define: i) Load factor ii) Demand factor iii) Diversity factor iv) Plant capacity factor.
- c) A single phase overhead line 25 km long delivers 1200 kW at 11 kV and 0.8 p.f. lagging. The resistance and reactance of the line (go and return) are $0.24 \Omega/\text{km}$ and $0.36 \Omega/\text{km}$ respectively. Calculate: i) Sending end voltage ii) Line losses iii) Transmission efficiency iv) Voltage regulation.
- d) Draw a neat layout of bipolar HVDC transmission system and state any two merits of it.

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

- a) State any four factors to be considered while selecting the site for a thermal power plant.
- b) A generating station has the following daily load cycle:

Time (h)	0–6	6–10	10–14	14–18	18–22	22–24
Load (MW)	30	60	80	70	90	40

Draw the load curve and find: i) Maximum demand ii) Units generated per day
iii) Average load iv) Load factor.

- Explain the effect of unsymmetrical spacing of conductors and the need of transposition with a neat diagram.
- Draw the single line diagram (layout) of a 33/11 kV substation and label: i) Power transformer ii) Isolator iii) Circuit breaker iv) Lightning arrester.

Q.4 Attempt any THREE of the following:

12

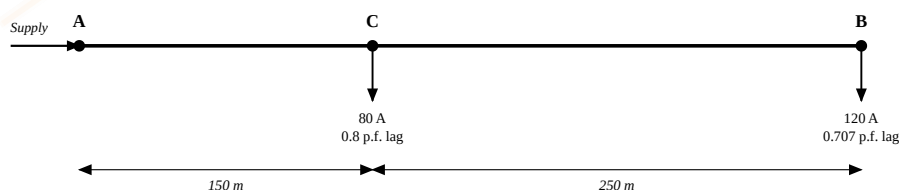
- Draw a neat layout of a hydro-electric power plant and state the function of: i) Surge tank ii) Penstock.
- Explain the concepts of state grid and national grid. Differentiate between blackout and brownout.
- Draw neat sketches of pin type and suspension type insulators and state the application of each.
- Explain Ferranti effect with equivalent circuit and phasor diagram.
- Give the classification of distribution substations on the basis of: i) Service requirement ii) Constructional features.

Q.5 Attempt any TWO of the following:

12

- Explain the phenomenon of corona. State its advantages, disadvantages and methods to reduce corona.
- A single phase AC distributor AB, 400 m long, is fed from end A and is loaded as shown in Fig. 1: 80 A at 0.8 p.f. lagging at point C (150 m from A) and 120 A at 0.707 p.f. lagging at end B. The resistance and reactance of the distributor (go and return) are 0.2 Ω /km and 0.1 Ω /km. The power factors are referred to the voltage at the far end B, which is 230 V. Calculate the total voltage drop in the distributor and the sending end voltage.

Fig. 1



- Draw the cross-section of a 3-core belted underground cable and explain the function of each part.

Q.6 Attempt any TWO of the following:

12

- State any six safe practices to be followed in a thermal power plant.

- b) Draw the circuit diagram and phasor diagram of nominal π method of representing a medium transmission line. Derive the expression for sending end voltage and current.
- c) Explain radial and ring main distribution systems with neat diagrams. Write any two advantages of each.

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

