

Power Plant Engineering (315374)

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) Classify power plants according to the nature of load. Give one example of each.
- b) State the types of fuels used in conventional power plants.
- c) Name any four equipment used in the out-plant handling of coal.
- d) State the function of the compressor and the combustion chamber in a gas turbine power plant.
- e) Define average load and peak load.
- f) Name the regulating agencies for nuclear power plants.
- g) Define captive power plant.

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

- a) State the advantages and disadvantages of a steam power plant (any four each).
- b) Explain the principle of a circulating fluidized bed combustion (CFBC) boiler with a neat sketch. State its advantages.
- c) Explain the need of co-generation with a suitable example.
- d) Explain the National Mission for Enhanced Energy Efficiency (NMEEE) and its four initiatives.

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

- a) Explain with a neat sketch the intercooling method used to improve the performance of an open cycle gas turbine plant.
- b) Explain with a neat sketch the general arrangement (layout) of a nuclear power plant.
- c) Explain the cooling water circuit of a steam power plant. Draw a natural draught cooling tower and an induced draught cooling tower.
- d) Explain the types of nuclear waste and methods of their disposal.

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

- a) Mention the factors to be considered while selecting the site for a steam power plant.
- b) Draw the schematic diagram of the boiler feed water (drum level) control system and state its importance in a thermal power plant.
- c) State any four advantages and four applications of gas turbine power plants.
- d) Compare Boiling Water Reactor (BWR) and Pressurised Water Reactor (PWR) on any four points.
- e) Define demand factor and diversity factor. Give their mathematical expressions and explain why diversity factor is always more than one.

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

- a) Draw a neat line diagram of coal handling and indicate the equipment used at different stages.
- b) Compare gas turbine, steam turbine and hydro-electric power plants (any six points). Draw a neat layout of a hydro-electric power plant.
- c) Explain with a neat sketch the working of a closed cycle gas turbine power plant. State its advantages.

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

- a) Explain with a neat sketch the working of an electrostatic precipitator. State its advantages.
- b) The daily load on a power station is: 0–5 h: 25 MW; 5–9 h: 45 MW; 9–13 h: 65 MW; 13–17 h: 55 MW; 17–21 h: 85 MW; 21–24 h: 35 MW. The installed capacity is 100 MW and the connected load is 150 MW. Draw the load curve and the load duration curve and find: (i) energy generated per day (ii) load factor (iii) plant capacity factor (iv) demand factor (v) reserve capacity.
- c) A power station has a maximum demand of 40 MW. Capital cost is ₹ 240 crore; interest and depreciation 12 % per year; fixed O&M cost ₹ 8 crore per year; fuel cost ₹ 2.80 per kWh and variable O&M cost ₹ 0.20 per kWh. Find the cost of generation per kWh at an annual load factor of (i) 50 % (ii) 80 %. Comment on the result.

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