



R20 Regulation

Subject code: 3P4BE

# TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

**B.Tech IV Semester Supplementary Examinations, December 2025**

## POWER SYSTEMS-I

(EEE)

Maximum Marks: 70

Date: 29.12.2025

Duration: 3 hours

- Note:**
1. This question paper contains two parts A and B.
  2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
  3. Part B consists of 5 Units. Answer any one full question from each unit.
  4. Each question carries 10 marks and may have a, b, c, d as sub questions.

### Part-A

All the following questions carry equal marks (10X2M=20 Marks)		Marks	CO	BTL
1	What is fuel cell?	2M	1	L1
2	What are the types of boilers?	2M	1	L1
3	Define maximum demand.	2M	2	L1
4	What is running cost.	2M	2	L1
5	What are the Types of cables	2M	3	L1
6	What are the types of materials used in cable?	2M	3	L1
7	What is the advantage of bundled conductors?	2M	4	L1
8	Define corona.	2M	4	L1
9	What are the requirements of a distribution system	2M	5	L1
10	What is the importance of load power factors in a.c. distribution?	2M	5	L1

### Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	State the requirements of selection of site for thermal power plants and list the advantages and disadvantages.	10M	1	L2
OR				
12	a) Explain with a neat sketch the various parts of a nuclear reactor. b) What is tidal energy? Explain briefly about tidal energy.	5M 5M	1	L2
13	a) Discuss the effect of load factor and diversity on the cost of electrical energy generated. b) A 100MW power station delivers 100MW for 2 hours, 50MW for 6 hours and is shut down for the rest of the day. It is also shut down for maintenances for 45 days each year. Calculate its annual load factor.	5M 5M	2	L2
OR				
14	a) Explain load curves and selection of generating units. b) A generating station has a maximum demand of 25mw, a load factor of 60%, a plant capacity factor of 50% and a plant use factor of 72%. Find (i) the reserve capacity of the plant (ii) the daily energy produced and (iii) maximum energy that could be produced daily if the plant while running as per schedule, were fully loaded.	5M 5M	2	L2

15	a) What is insulator and explain different types of insulators. b) Explain about different types of insulating materials.	5M 5M	3	L2
OR				
16	a) Derive an expression for the resistances of a single core cable. b) A 3-phase transmission line is being supported by three-disc insulators. The potentials across top unit (i.e., near to the tower) and middle unit are 8 kV and 11 kV respectively. Calculate (i) the ratio of capacitance between pin and earth to the self-capacitance of each unit (ii) the line voltage and (iii) string efficiency.	5M 5M	3	L2
17	a) Find the loop inductance and reactance per kilometer of single-phase overhead line consisting of two conductors, each 1.213 cm diameter. The spacing between conductors is 1.25 meters and the frequency is 50 Hertz. b) Explain in detail interference between power and Communication line	5M 5M	4	L2
OR				
18	a) Calculate the line inductance of conductor. b) Calculate the loop inductance per km of a single-phase overhead line consisting of two conductors each 1 cm diameter and 1.2 m apart.	5M 5M	4	L2
19	a) In a A.C distribution system, calculate power factor referred to respected load voltages. b) Derive an expression for the voltage drop for a concentrated loading distributor fed at both ends.	5M 5M	5	L2
OR				
20	A single phase distributor 2 kilometers long supplies a load of 120 A at 0.8 p.f lagging at its far end and a load of 80 A at 0.9 p.f. lagging at its midpoint. Both power factors are referred to the voltage at the far end. The resistances and reactance per KM (go and return) are 0.05 ohms and 0.1 ohms respectively. If the voltage at the far end is maintained at 230 V, calculate: i) Voltage at the sending end ii) Phase angle between voltages at the two ends	10M	5	L2