R18 Regulation *Subject code:* 2P5BA

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech V Semester Supplementary Examinations, June 2022

POWER SYSTEMS-I

(ELECTRICAL AND ELECTRONICS ENGINEERING)

Maximum Marks: 70 Date:02.07.2022 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)**

1	What is the main use of boilers in thermal plants?	[2M]
2	What is Nuclear Fission?	[2M]
3	What is battery energy storage systems?	[2M]
4	What are the disadvantages of fuel cells?	[2M]
5	What are the design considerations in distribution system?	[2M]
6	What is the importance of load power factors in a.c. distribution?	[2M]
7	List out the advantages of a gas insulated substation?	[2M]
8	What is Indoor & Outdoor substations?	[2M]
9	What is the importance of the diversity factor?	[2M]
10	What are the different types of power factor tariff methods?	[2M]

Part-B

Answer All the following questions. **(10M X 5=50Marks)**

11 Discuss in detail about the thermal power station components (TPS) with neat sketch? [10M]

OR

12 a) Explain in detail about the principle operation of gas power station with neat sketch? [5M]

b) Explain in detail about the classification of turbines in hydroelectric power stations? [5M]

13 a) Explain in detail about the solar power generation Systems with neat sketch? [5M]

b) Explain in detail about the hybrid power system configurations? [5M]

OR

14 a) Why are micro-grids important explain in detail? [5M]

b) Explain in detail about the working of fuel cell and their applications. [5M]

15 a) Give the comparison between DC and A.C systems of transmission and distribution? [5M]

b) A two-wire D.C distributor cable 1000 m long is loaded with 0·5 A/m. Resistance of each conductor is 0·05 Ω/km. Calculate the maximum voltage drop if the distributor is fed from both ends with equal voltages of 220 V. What is the minimum voltage and where it occurs? [5M]

OR

16 a) Why ring main distributor system is preferred to a radial system? Explain in detail. [4M]

b) A single-phase ac distributor AB 300m long is fed from end A and is loaded under
(i) 100A at 0.707 power factor lagging 200m from point A
(ii) 200A at 0.8 power factor lagging 300m from point A
The load resistance and reactance of the distributor is 0.2 ohms and 0.1 ohms per kilometer. Calculate the total voltage drop in the distributor. The load power factors refer to the voltage at far end. [6M]

17 a) Explain in detail about the main equipment in a sub-station. Draw layout of a sub- station. [5M]

b) Draw the key diagram of a typical 11kV/ 400V indoor substation. [5M]

OR

18 a) Explain in detail about the different types of gas insulated substations with neat sketches? [5M]

b) A single core cable has a conductor diameter of 1 cm and internal sheath diameter of 1.8cm. If impregnated paper of relative permittivity 4 is used as the insulation. Calculate capacitance for 1 km length of the cable. [5M]

19 a) Define the following with respect to the economic aspects power generation:
i) load factor ii) Utilization factor. [5M]

a) b) A generation station of 1MW supplied a region which has the following demands:

S.No	From	To	Demand(kW)
1.	Midnight	5am	100
2.	5 am	6 pm	No-load
3.	6 pm	7 pm	800
4.	7 pm	9 pm	900
5.	9 pm	Midnight	400

Neglect transmission line losses and find the following:
1) Plot the daily load curve, 2.) Diversity factor 3) plant capacity factor. [5M]

OR

20 a) Discuss the objectives and requirements of tariff methods. [5M]

b) A consumer has a maximum demand of 300 kW at 35% load factor. If the tariff is Rs. 125 per kW of maximum demand plus 15 paise per kWh, calculate the overall cost per kWh. [5M]