BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: BTECH **SEMESTER : VI**
BRANCH: ALL **SESSION : SP/2023**

SUBJECT: EE457 FUNDAMENTALS OF POWER SYSTEM

TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q.1(a)	With the help of suitable diagram, explain the different components in the structure of power system supply. Differentiate between transmission and distribution lines.	[5]	1,2	2,3
Q.1(b)	Enlist the different symbols used in drawing the single line diagram of a power system structure. Draw a single line diagram with following components. Two steam generators, two step up transformers, sending end bus, receiving end bus, long transmission line, two step up transformers at different voltages feeding two different motors at load ends.	[5]	1,2	3,4
Q.2(a)	Give the definition of (1) Demand factor (ii) Load factor (iii) Diversity factor (iv) Plant capacity factor (v) Plant utilization factor.	[5]	1,2	2,3
Q.2(b)	The yearly load duration curve of a power plant is straight line. The maximum load is 500 MW and the minimum load is 400 MW. The capacity of the plant is 750 MW. Find (i) Plant capacity factor (ii) Load factor (iii) Utilization factor (iv) Reserve capacity.	[5]	2,3	3,4
Q.3(a)	What factors affect the transmission efficiency of power in long-distance transmission lines, and how can these factors be mitigated?	[5]	2,3	2,3
Q.3(b)	A 3-phase, 50 Hz, 11 kV transmission line has a length of 2 km and a resistance of 0.2 Ω/km per phase. The inductive reactance is 0.6 Ω/km per phase. Find the sending end voltage and current when the line delivers 5 MW at a power factor of 0.8 lagging.	[5]	2,3	3,4
Q.4(a)	What are the key components of a distribution system in a power system, and what are their roles in ensuring reliable and efficient delivery of electricity to end-users?	[5]	3,4	1,2
Q.4(b)	A distribution transformer has a rating of 10 kVA, a primary voltage of 11 kV, and a secondary voltage of 440 V. If the transformer is fully loaded with a power factor of 0.8 lagging, what is the secondary current?	[5]	3,4	3,4
Q.5(a)	What is the purpose of protection systems in power systems, and what are some of the key components of a protection system?	[5]	3,4,5	1,2
Q.5(b)	Discuss the scheme used for the protection of transformer in power network.	[5]	4,5	2,3

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