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

CLASS: B.Tech. **SEMESTER : V/ADD**
BRANCH: EEE **SESSION : MO/2025**

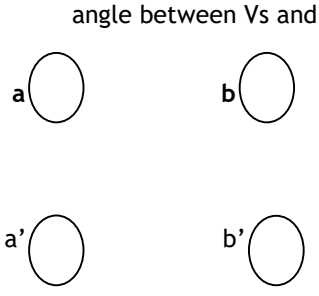
SUBJECT: EE307 ELECTRICAL POWER TRANSMISSION AND DISTRIBUTION

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)	Explain any two from the following (1) Availability-based tariffs (2) Power factor-based three-part tariff (3) Surge impedance loading of transmission line.	[5]	1	1
Q.1(b)	A generating station has a maximum demand of 15 MW and the daily load on the station is as follows : 10 pm to 5 am 2500 KW 1 pm to 4 pm 10,000 kw 5 am to 7 am 3000 KW 4 pm to 6 pm 12,000 kw 7 pm to 11 am 9000 KW 6 pm to 8 pm 15,000 kw 11 am to 1 pm 6000 KW 8 pm to 10 pm 5,000 kw Determine plant load factor, plant capacity factor, plant use factor and reserve capacity of the plant.	[5]	1	2
Q.2(a)	Two conductors of a single-phase line are connected in parallel. As in Fig given at the end, a-a' and b-b' are connected in parallel. a-a' and b-b' form phase connection and return connection, respectively. The distances between a and b(=a'b') and a-a'(=bb') are 25 cm and 100 cm, respectively. Determine the inductance per kilometre of the resulting double-circuit line.	[5]	2	2
Q.2(b)	Derive the expression for the capacitance of three phase unsymmetrical spaced transposed overhead transmission line.	[5]	2	2
Q.3(a)	What is a guard ring, and why is it required in high-voltage transmission systems? For a 33 kV overhead line, there are three units in the string of insulators. If the capacitance between each insulator pin and earth is 11% of self-capacitance of each insulator, find (i) the distribution of voltage over 3 insulators and (ii) string efficiency	[5]	4	3
Q.3(b)	Derive the equations for the length of the conductor and the sag when the conductor is suspended between two supports at same level.	[5]	4	3
Q.4(a)	Derive the ABCD parameter of nominal-π model of medium transmission lines.	[5]	3	2
Q.4(b)	A single-phase overhead transmission line delivers 1.1 MW of power at 33kV at 0.8 pf lagging. The total resistance and inductive reactance of the line are 10 ohm and 15 ohm respectively. Determine the sending end voltage.	[5]	3	3
Q.5(a)	Compare merits and demerits of ring distributor and radial distributor? Differentiate between voltage drop in AC distributors & DC distributors.	[5]	5	2
Q.5(b)	A single phase distributor has a resistance of 0.2 ohm and a reactance of 0.3 ohm. At far end the voltage Vb is 240V and the current is 100A at p.f. 0.8 lagging. At mid point, the current is 100 A at 0.6 lagging p.f. with respect to voltage Va. Find supply voltage and phase angle between Vs and Vb.	[5]	5	2



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