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BTECH
(SEM V) THEORY EXAMINATION 2024-25
POWER SYSTEM - I

TIME: 3 HRS

M.MARKS: 100

Note: Attempt all Sections. In case of any missing data; choose suitably.

SECTION A

1. Attempt all questions in brief.

2 x 10 = 20

Q no.	Question	CO	Level
a.	Discuss power system network including various levels of voltages distributed over the entire system.	1	K2
b.	What is meant by Transmission and Distribution system for any power system?	1	K2
c.	Describe the advantages of Bundled Conductors used in transmission systems.	2	K2
d.	What are the advantages of high transmission voltage?	2	K2
e.	Explain the different types of insulators and their applications in power transmission lines.	3	K2
f.	Give advantages of vibration dampers.	3	K1
g.	Describe the role of GMD and GMR in calculation of line parameters.	4	K2
h.	Write the advantages of double-circuit transmission lines.	4	K1
i.	Write important properties of insulating materials used in underground cables.	5	K1
j.	Compare overhead lines to underground cables.	5	K3

SECTION B

2. Attempt any three of the following:

10 x 3 = 30

Q no.	Question	C O	Level
a.	Explain the layout and working of hydro-electric power plants with suitable diagrams and their site selection criterions.	1	K3
b.	Compare 3-Phase 4 wire Supply System with 2 Wire DC System. Give the Diagram for each System.	2	K5
c.	Explain the methods of equalizing the potential across string and insulators string efficiency.	3	K4
d.	Explain the inductance calculation procedure of three phase lines with unsymmetrical spacing.	4	K4
e.	Write short notes on grading of cables.	5	K3

SECTION C

3. Attempt any one part of the following:

10 x 1 = 10

Q no.	Question	C O	Level
a.	Construct the layout and examine the working of different types of Cogeneration CHP systems.	1	K3
b.	Discuss with suitable example and diagram the load sharing between base load and peak load plant in power system.	1	K3



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4. Attempt any *one* part of the following: 10 x 1 = 10

Q no.	Question	C O	Level
a.	Explain “skin effect” and “proximity effect” when referred to overhead power transmission lines.	2	K3
b.	Elaborate the Formation process of Corona Effect and List the Factors affecting the formation of corona effect in transmission lines.	2	K3

5. Attempt any *one* part of the following: 10 x 1 = 10

Q no.	Question	CO	Level
a.	Explain the sag-templates with the help of diagrams. Explain how this is useful for location of towers and stringing of power conductors.	3	K3
b.	Determine and explain the expression for catenary curve in power transmission line.	3	K3

6. Attempt any *one* part of the following: 10 x 1 = 10

Q no.	Question	CO	Level
a.	A 3 phase transmission line has its conductor at the corners of an equilateral triangle with side 3 m and the diameter of each conductor is 1.63 cm. Find the inductance per phase per km of the line.	4	K4
b.	Derive an expression for the capacitance per km of a single-phase line taking into account the effect of ground.	4	K4

7. Attempt any *one* part of the following: 10 x 1 = 10

Q no.	Question	CO	Level
a.	Summarize with a neat sketch, the construction of a 3-core belted type cable. Also list its advantages.	5	K3
b.	The capacitance of a 3-core lead sheathed cable measured between any two of the conductors with sheath earthed is 0.19 μ F per km. Determine the equivalent star connected capacity and the kVA required to keep 16 kms of the cable charged when connected to 20 kV, 50 Hz supply.	5	K3