Subject Code: BEE501

PAPER ID-310129

Roll No: | | | | | | | | | | | | | |

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

TIME: 3 HRS **M.MARKS: 70**

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

SECTION A

1. Attempt *all* questions in brief. **2 x 07 = 14**

Q no.	Question	CO	Level
a.	Describe the renewable and non-renewable energy resources.	CO1	K1
b.	Define these terms: (i) Demand Factor (ii) Diversity Factor,	CO1	K2
c.	What do you understand by single line diagram in power system.	CO2	K2
d.	Define the term per unit system and also explain their significance	CO2	K3
e.	Describe the factors affecting sag of an overhead transmission lines.	CO3	K2
f.	What do you mean by self GMD & mutual GMD?	CO4	K2
g.	Explain the term insulation and also explain the types of insulating materials.	CO5	K2

SECTION B

2. Attempt any *three* of the following: **07 x 3 = 21**

Q no.	Question	CO	Level
a.	Explain the basic structure of smart grid and also explain the importance of IT equipment in the power system.	CO1	K2
b.	What are corona effects? Explain the factors which affects the corona loss and how it is reduced?	CO2	K2
c.	Each conductor of a three-phase overhead line is suspended from a cross arm of steel tower by a string of 4 suspension insulators. The voltage across the second unit is 14.2 KV and across the third 20 KV. Find the voltage between the conductors and the string efficiency.	CO3	K4
d.	Derive an expression for capacitance of a symmetrical three phase lines.	CO4	K3
e.	Draw the layout and explain the oil-filled cables.	CO5	K2

SECTION C

3. Attempt any *one* part of the following: **07 x 1 = 07**

Q no.	Question	CO	Level
a.	The yearly load duration curve of a power plant is a straight line. The maximum load is 500 MW, and the minimum load is 400 MW. The capacity of the plant is 750 MW. Find (a) Plant Capacity factor (b) Load Factor (c) Utilization factor (d) Reserve Capacity.	CO1	K4
b.	Draw the block diagram and explain the working of thermal power plants.	CO1	K2

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4. Attempt any *one* part of the following: 07 x 1 = 07

Q no.	Question	CO	Level
a.	Compare the volume of conductor materialrequired for a d.c. 3-wire system and 3-phase, 3-wire system on the basis of equalmaximum potential difference between one conductor and earth. Make suitable assumptions	CO2	K3
b.	Sketch the T & π model of medium transmission lines and explain their parameters.	CO2	K3

5. Attempt any *one* part of the following: 07 x 1 = 07

Q no.	Question	CO	Level
a.	Explain the methods of calculating sag and tension of overhead transmission lines at unequal level of ground.	CO3	K4
b.	What are insulators? Explain their types and applications with neat and clean diagram.	CO3	K3

6. Attempt any *one* part of the following: 07 x 1 = 07

Q no.	Question	CO	Level
a.	A three phase 50 Hz line consists of three conductors each of diameter 21 mm. The spacing between the conductors is as follows: A-B = 3 m, B-C = 5 m, C-A = 3.6 m. Find the inductance and inductive reactance per phase per km of the line.	CO4	K4
b.	Derive an expression for the inductance of symmetrical three phase line. What is meant by the term equivalent spacing? State its significance.	CO4	K3

7. Attempt any *one* part of the following: 07 x 1 = 07

Q no.	Question	CO	Level
a.	Explain in detail grading of the overhead cables.	CO5	K2
b.	Determine the overall diameter of a single core cable and its most economical diameter when working on a 3 phase 275 KV system. The maximum permissible stress in the dielectric is not to exceed 15 KV/ mm	CO5	K4