Q. Code: 405314

Reg. No. | | | | | | | | | | | | | |

B.E./ B. TECH.DEGREE EXAMINATIONS, MAY 2024

Third Semester

EE22302 – ELECTRIC POWER SYSTEM

(Electrical and Electronics Engineering)

(Regulation2022)

TIME: 3 HOURS **MAX. MARKS: 100**

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Understand the major components of power system and its practical significance.	**4**
CO 2	Determine transmission line parameters for various conductor configurations.	**5**
CO 3	Model the transmission lines to determine the line performance and analyze the impact of Ferranti and corona effects	**4**
CO 4	Calculate electrical parameters of overhead and underground cables and perform sag calculations	**4**
CO 5	Analyze substation, grounding and distribution systems.	**4**

PART- A(20x2=40Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	What is the need of load dispatch centres? Where the LDC is available in Tamil Nadu?	**1**	**2**
2.	Why the transmission lines are 3 phase 3-wire circuits while distribution lines are 3 phase 4-wire circuits?	**1**	**4**
3.	Identify the applications of HVDC transmission system.	**1**	**2**
4.	Compare Feeder and Distributor.	**1**	**2**
5.	What are the main requirements of the insulating materials used for the cable?	**2**	**2**
6.	List out the advantages of Double circuit lines	**2**	**2**
7.	Discuss how inductance and capacitance of transmission line are affected by the spacing between the conductors.	**2**	**4**
8.	Describe the various methods for reducing corona effect in an overhead transmission line.	**2**	**2**
9.	What do you understand by medium transmission lines? How capacitance effects are taken into account in such lines?	**3**	**2**
10.	Compare shunt and series compensation.	**3**	**2**
11.	How the Overhead Transmission lines are classified?	**3**	**3**
12.	What is the justification in neglecting line capacitance in short transmission lines?	**3**	**2**
13.	Prove that g_{max}/g_{min} in a single-core cable is equal to D/d.	**4**	**3**

14.	Show that in a string of suspension insulators, the disc nearest to the conductor has the highest voltage across it.	**4**		**2**
15.	Why are suspension insulators preferred for high voltage power transmission?	**4**		**2**
16.	Draw the sketch of a single-core low tension cable and label the various parts.	**4**		**2**
17.	What are the reasons for pole-mounted sub-stations being popular?	**5**		**2**
18.	Why is ground wire used in equipment grounding?	**5**		**4**
19.	How will you determine the economic transmission voltage?	**5**		**3**
20.	Identify the different methods of DSM.	**5**		**2**

PART- B (5x 10=50Marks)

			Marks	CO	RBT LEVEL
21. (a)	**(i)**	Enumerate the salient features of the Indian Electricity (IE) Rules and Acts?	**(5)**	**1**	**3**
	(ii)	Explain why EHV transmission is preferred? What are the problems involved in EHV AC transmission?	**(5)**	**1**	**3**
		(OR)			
(b)		Elaborate the need of renewable energy. Explain the energy generation using (i) Solar Power (ii) Wind Power in detail.	**(10)**	**1**	**3**
22. (a)		Calculate the inductance per phase per metre for a three-phase double-circuit line whose phase conductors have a radius of 5·3 cm with the horizontal conductor arrangement as shown in Figure 1.	**(10)**	**2**	**3**

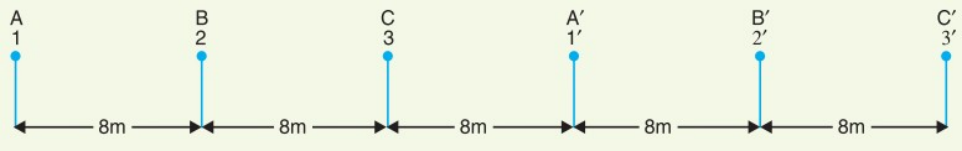

Figure 1

(OR)

(b)	Derive Capacitance of a 3-phase symmetrical line whose conductors are placed at the corners of an equilateral triangle.	**(10)**	**2**	**3**
23. (a)	Drive the generalized circuit constants for medium line nominal-T method?	**(10)**	**3**	**3**

(OR)

(b)	A 3-phase overhead transmission line has a total series impedance per phase of 20.0 ∠80º ohms and a total shunt admittance of 0.0013 ∠90º Siemen per phase. The line delivers a load of 80 MW at 0·8 p.f. lagging and 220 kV between the lines. Determine the sending end line voltage and current by rigorous method.	**(10)**	**3**	**3**
24. (a)	With neat diagram, explain the various methods of grading of Underground Cables.	**(10)**	**4**	**3**
	(OR)			
(b)	A 3-phase transmission line is being supported by three disc insulators. The potentials across top unit (i.e., near to the tower) and middle unit are 8 kV and 11 kV respectively. Calculate (i) the ratio of capacitance between pin and earth to the self-capacitance of each unit (ii) the line voltage and (iii) string efficiency.	**(10)**	**4**	**3**
25. (a)	**(i)** Critically analyze the operation of the major equipments with symbols used in substation.	**(5)**	**5**	**4**
	(ii) Critically examine the measures and setbacks for controlling electricity theft in India.	**(5)**	**5**	**4**
	(OR)			
(b)	Analyze the Bus bar arrangement of 110 kV Sub-Station with necessary diagram.	**(10)**	**5**	**4**

PART- C (1x 10=10Marks)

(Q.No.26 is compulsory)

		Marks	CO	RBT LEVEL
26.	An overhead line at a river crossing is supported from two towers of heights 30 metres and 90 metres above water level with a span of 300 metres. The weight of the conductor is 1 kg/metre and the working tension is 2000 kg. Estimate the minimum clearance needed between the conductor and the water level mid-way between the towers.	**(10)**	**4**	**5**

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