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**Hi-Tech Institute of Engineering & Technology**  
**DEPARTMENT OF ELECTRICAL ENGINEERING**  
**Course-B.TECH(EE)- 3<sup>rd</sup> YEAR**  
**PAPER SET-1 -2023-24**

**Subject Code: KEE501**  
**Faculty Name: OMKAR SINGH KARDAM**

**Subject Name: POWER SYSTEM-1**

**Time: 3: 00 Hours**

**Total Marks: 100**

**Note: 1. Attempt all Sections. If require any missing data; then choose suitably.**

**SECTION-A**

**Q.N.1. Attempt all parts in brief.**

**2x10 =20**

(a)	Why the effect of ground on the line capacitance can be neglected?	2	CO4
(b)	Explain skin effect in brief.	2	CO2
(c)	What are advantages of bundled conductor?	2	CO2
(d)	What is the role of load diversity in power system economy?	2	CO1
(e)	Give reason why ACSR conductors are preferred for transmission and distribution.	2	CO2
(f)	What is Ferranti Effect?	2	CO2
(g)	How are voltage distribution and the string efficiency affected by rain?	2	CO3
(h)	What is the importance of sag in transmission line?	2	CO3
(i)	Differentiate between GMD and GMR.	2	CO4
(j)	Why single core cables are usually not provided with armouring?	2	CO5

**SECTION-B**

**Q.N.2. Attempt any three of the following:**

**3X10 =30**

(a)	What are the conventional and non conventional sources of energy, Explain with examples.	10	CO1
(b)	An overhead line has the following data: Span length 160 metres, conductor dia 0.95 cm, weight per unit length of the conductor 0.65 kg/metre. Ultimate stress 4250 kg/cm <sup>2</sup> , wind pressure 40 kg/m <sup>2</sup> of projected area. Factor of safety 5. Calculate the Sag.	10	CO3
(c)	Explain in detail the nuclear reaction theory and working principle of a nuclear power station with plant layout.	10	CO1
(d)	Define and explain the importance of the following terms in generation: (i) connected Load (ii) Maximum Demand (iii) Diversity Factor (iv) Average Load.	10	CO1
(e)	What do you understand by vibration dampers in overhead transmission line? Describe the different types of dampers used.	10	CO3



### SECTION-C

**Q.N.3. Attempt any one part of the following:**

**1x10 =10**

(a)	What are the main characteristics of an ideal insulator? Describe the main advantages and disadvantages of glass insulator. Explain rating & string efficiency of an insulator.	10	CO3
(b)	Derive the A, B, C, D constants for the transmission line represented by nominal T section of medium transmission line and Draw its phasor diagram.	10	CO2

**Q.N.4. Attempt any one part of the following:**

**1x10 =10**

(a)	Explain thermal power plant in detail. Draw its layout.	10	CO1
(b)	Explain the comparisons between overhead lines versus underground cables.	10	CO2

**Q.N.5. Attempt any one part of the following:**

**1x10 =10**

(a)	Derive the expression for sending end voltage and current in terms of receiving end voltage and current for long transmission lines. What do you understand by characteristics impedance and propagation constant in it?	10	CO2
(b)	Explain in detail types of power cables used in transmission and distribution system.	10	CO5

**Q.N.6. Attempt any one part of the following:**

**1x10 =10**

(a)	Derive expression for the line to neutral capacitance and line to line capacitance of single phase line.	10	CO1
(b)	What is Corona effect? What are the factors affecting Corona?	10	CO2

**Q.N.7. Attempt any one part of the following:**

**1x10 =10**

(a)	Starting from first principles, derive the expression for inductance of a 3-phase unsymmetrical spaced transposed transmission line.	10	CO4
(b)	The three conductors of a 3-phase line are arranged at the corners of a triangle of sides 2m, 2.5m and 4.5m. Calculate the inductance per km of the line when the conductors are regularly transposed. The diameter of each conductor is 1.24 cm.	10	CO4