Model Question Paper-1 with effect from 2019-20 (CBCS Scheme)

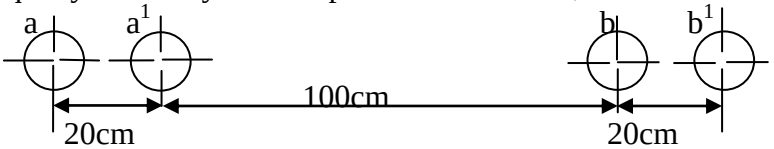
USN | | | | | | | | | | |

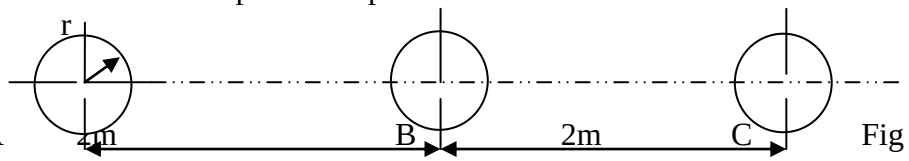
Fourth Semester B.E. Degree Examination

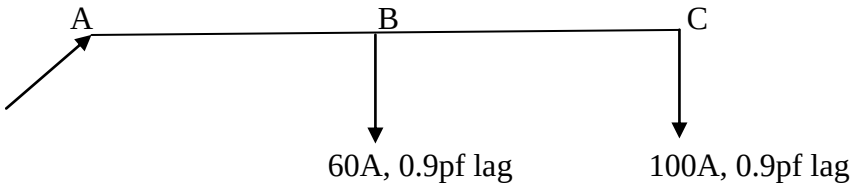
Transmission and Distribution

TIME: 03Hours **Max. Marks: 100**

Note: 01. Answer any **FIVE** full questions, choosing at least **ONE** question from each**MODULE**.
02. Assume any missing data.

		Module -1	*Bloom's Taxonomy Level	Marks
Q.01	a	Draw the single line diagram of a typical transmission and distribution system and indicate standard voltages.	L1	06
	b	Obtain an expression for sag of a line conductor suspended between two unequal supports.	L3	06
	c	In a 33kV 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, calculate: (i) The distribution of voltage over 3 insulators and (ii) String efficiency	L3	08
		OR		
Q.02	a	Explain various properties of an insulator.	L1	06
	b	Briefly explain the following (i) ACSR (ii) TACSR (iii) Bundled conductors	L1	06
	c	The two towers of height 95m and 70m respectively support the line conductor a river crossing. The horizontal distance between the towers is 400m. If the tension in the conductor is 1100kg and its weight is 0.8kg/m, calculate: (i) Sag at lower support (ii) Sag at upper support (iii)Clearance of lowest point on trajectory from water level. Assume bases of towers to be at the water level.	L3	08
		Module-2		
Q. 03	a	Derive an expression for the capacitance of a three phase line with more than one circuit.	L3	08
	b	Compare single circuit and double circuit lines.	L1	04
	c	In a single phase line as shown in fig. 3(c), conductors a and a^1 in parallel form one conductor and conductors b and b^1 in parallel form the return path. Calculate the total inductance of the line per km assuming that current is equally shared by the two parallel conductors; conductor dia 2cm.  fig. 3 (c)	L3	08
		OR		
Q.04	a	Calculate inductance of a conductor due to external flux.	L3	08
	b	Explain the terms self GMD and mutual GMD.	L1	04

	c	A 3- phase, 50 Hz, 66kV overhead line conductors are placed in a horizontal plane as shown in fig. 4 (c). The conductor diameter is 1.25cm. The line length is 100km. Calculate the capacitance per phase and charging current per phase. Assume complete transposition of the lines.  Fig 4(c)	L3	06
Module-3				
Q. 05	a	Derive an expression for A, B, C, D constants of a medium transmission line using nominal π method of analysis. Show that AD – BC = 1	L3	10
	b	A 3-φ, 50 Hz transmission line has the following constants per phase R =28Ω, X = 63Ω, Y = $4x10^{-4}$ mho. If the load at the receiving end is 75MVA at 0.8 pf lag with 132kV between lines, calculate the voltage, current and pf at the sending end.Use nominal π method.	L3	10
OR				
Q. 06	a	Derive an expression for sending end voltage and sending end current of a single phase medium transmission line employing nominal T method with the help of vector diagram.	L3	10
	b	A 3- phase transmission line is 400km long and supplies a load of 450MVA, 0.8 pf lagging at 346kV. The ABCD constants are A=D=$0.8181\angle 1.3^0$, B = $172.2\angle 84.2^0$, C = $1.933 \times 10^{-3}\angle 90.4^0$ mho Calculate Sending end current and percentage voltage drop at full load.Also calculate receiving end line to neutral voltage at no load and sending end line to neutral voltage.	L3	10

		Module-4		
Q. 07	a	What is grading of cable? Briefly explain Capacitance grading.	L3	08
	b	Write a note on thermal rating of a cable.	L1	04
	c	A 3-phase, 50Hz, 132kV transmission line consists of conductors of 1.956 cm dia are built so that corona takes place if the voltage exceeds 210kV (rms). If the value of potential gradient at which ionization occurs can be taken as 30kv per cm, find the spacing between the conductors.	L3	08
		OR		
Q. 08	a	Explain the following terms with reference to corona: (i) Disruptive Critical Voltage (ii) Visual Critical Voltage (iii)Corona Power Loss	L1	06
	b	Explain various factors affecting corona.	L1	06
	c	A single core has a conductor of diameter 1.2cm and its insulation thickness is 1.6cm. the specific resistance of insulating material is 7.5×10^8 M Ω-cm. Calculate the insulation resistance per km of cable. If now this resistance is to be increased by 20%, calculate the thickness of the additional layer of insulation required.	L3	08
		Module-5		
Q. 09	a	What is reliability in distribution system? Discuss.	L3	06
	b	Explain the term MTTF and MTBF.	L1	06
	c	A single phase ring distributor ABC is fed at A. The loads at B and C are 40A at 0.8pf lagging and 60A at 0.6pf lagging respectively. Both pfs expressed are referred to the voltage at point A. the total impedance of section AB, BC and CA are (2 + j1), (2 + j3) and (1 + j2) ohms respectively. Determine current in each section.	L3	08
		OR		
Q. 10	a	Explain various reliability aids.	L1	06
	b	What are the limitations of Distribution system?	L1	06
	c	A two wire distributor 1200m long is loaded as shown in fig 10 (c), B is the midpoint. The power factors at the two load points refer to the voltage at point C. the impedance of each section is (0.1 + j0.2) Ω. Calculate the sending end voltage, current and power factor. The voltage at point C is 220V.  Fig. 10 (c)	L3	06

*Bloom's Taxonomy Level: Indicate as L1, L2, L3, L4, etc. It is also desirable to indicate the COs and POs to be attained by every bit of questions.