

LAGOS CITY POLYTECHNIC, IKEJA
SCHOOL OF ENGINEERING AND APPLIED SCIENCE
DEPARTMENT OF ELECTRICAL/ELECTRONICS ENGINEERING
2015/2016 SECOND SEMESTER EXAMINATION

COURSE TITLE:	ELECTRIC CIRCUIT THEORY	NUMBER OF QUESTIONS :	6
COURSE CODE:	EEC 313	TIME ALLOWED:	2 HRS
FOR WHOM:	HND YR I	EE	PT
ANSWER	ANY	INSTRUCTIONS:	FOUR

QUESTIONS

1. (a) Explain the phenomenon of transient
 (b) A $20\mu\text{F}$ capacitor is connected in series with a $50\text{ k}\Omega$ resistor and the circuit is connected to a 20V , d.c. supply. Determine.
 (i) the initial value of the current flowing
 (ii) the time constant of the circuit
 (iii) the value of the current one second after connection
 (iv) the value of the capacitor voltage two seconds after connection, and
 (v) the time after connection when the resistor voltage is 15V .

2. (a) With sketches explain discharging of a capacitor
 (b) At a frequency of 1.5KHz the open-circuit impedance of length of Transmission line is $800 - j50\Omega$ and the short-circuit impedance is $413 - j20\Omega$. Determine the characteristic impedance of the line at this frequency.

3. (a) Derive the equation for the decay of current in an inductive circuit.
 (b) A transmission line has the following primary constants resistance $R = 15\Omega/\text{loopKm}$, inductance $L = 3.4\text{ mH}/\text{loopkm}$; conductance $G = 3\mu\text{S}/\text{km}$ and capacitance $C = 10\mu\text{f}/\text{km}$. Determine the characteristic impedance of the line when frequency is 2kHz .

4. (a) Explain transient in reactive circuits
 (b) Define general termination impedance at a line
 (c) The voltage at the input and the output of a transmission line properly terminated in its characteristic impedance are 8.0V and 2.0V rms respectively. Determine the output voltage if the length of the line is doubled.

5. (a) Define the following terms
 (i) Transmission line (ii) The secondary line constants
 (b) A transmission line has an $4\text{mH}/\text{loop km}$ inductance and a capacitance of $0.004\mu\text{f}/\text{km}$. Determine for frequency of operation of 1KHz .
 (i) Phase delay (ii) Wave length on line
 (iii) Velocity of propagation (m/s) of the signal.

6. (a) Explain the concept of complex frequency
 (b) Explain Bode plots and Locus.
 (c) A parallel-wire air-spaced transmission line operating at 1910Hz has a phase shift of $0.05\text{ rad}/\text{km}$. Determine.