ROLL NO. _____

Code: DE57 **Subject: NETWORKS & TRANSMISSION LINES**

DipIETE – ET

Time: 3 Hours **JUNE 2017** **Max. Marks: 100**

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE: There are 9 Questions in all.

- **Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.**
- **The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.**
- **Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.**
- **Any required data not explicitly given, may be suitably assumed and stated.**

Q.1 Choose the correct or the best alternative in the following: (2×10)

a. In two port network if forward transfer admittance is same to reverse transfer admittance the circuit is
(A) Symmetrical **(B)** Symmetrical & reciprocal
(C) Inverse **(D)** Reciprocal or Bilateral

b. Bridged T-network can be used as
(A) Attenuator **(B)** Low pass filter
(C) High pass filter **(D)** Band pass filter

c. Neper is equal to
(A) 0.8686 dB **(B)** 8.686 × attenuation in dB
(C) 0.1151 × attenuation in dB **(D)** 86.86 dB

d. Reciprocity theorem is applicable in
(A) Linear and Non-linear network **(B)** Any Network
(C) Linear and Bilateral network **(D)** Active Network

e. A series RLC circuit has R=80Ω, L=100μH and C=300pF, V=20V, the current at resonance will be
(A) 0.25 A **(B)** 1.25 A
(C) 0.125 A **(D)** 5A

f. Laplace transform of $\frac{1}{t} f(t)$ is

(A) $\frac{dF(s)}{ds}$ **(B)** $-\frac{dF(s)}{ds}$

(C) $\int_s^\infty F(s)ds$ **(D)** $\int_0^\infty F(s)ds$

g. A band pass filter may be obtained by using a high pass filter followed by a
(A) Low pass filter **(B)** High pass filter
(C) RC filter **(D)** None of these

h. The pass band of HPF is
(A) above DC **(B)** above 5 kHz
(C) below 5 kHz **(D)** between 5-10 kHz

i. Propagation constant in loss-less line is given by
(A) L/C **(B)** LC
(C) $j\omega\sqrt{LC}$ **(D)** $\frac{1}{\sqrt{LC}}$

j. Transmission line can be treated as
(A) Band pass filter **(B)** High pass filter
(C) Low pass filter **(D)** None of these

Answer any Five Questions out of Eight Questions.
Each Question carries 16 marks.

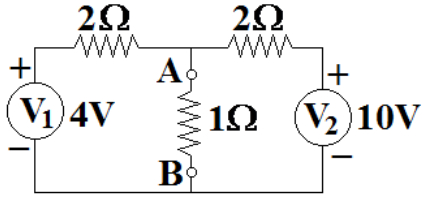
Q.2 a. Explain with diagram Ideal voltage source and Ideal current source. **(4+4)**

b. A resistance of 21Ω, an Inductance of 0.15H and a Capacitor of 100μF are connected in series across a 130V, 50Hz supply. Calculate **(2+2+2+2)**
(i) impedance (ii) current
(iii) phase angle between current and supply voltage
(iv) Power factor

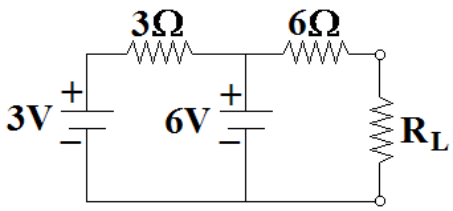
Q.3 a. Determine the characteristic impedance of symmetrical T-section. **(8)**

b. Evaluate ABCD parameters in terms of z-parameters. **(8)**

Q.4 a. Find out the current through the terminal resistance 1Ω at A & B terminals using Thevenin's theorem. **(8)**

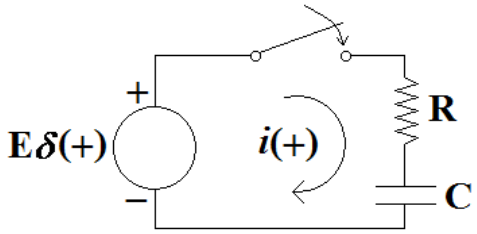


b. Calculate the value of R_L which will be drawing maximum power from the circuit of figure shown. Also find the maximum power. **(8)**



Q.5 a. Explain the Laplace transform of sinusoidal function sin(ωt) and Ramp function. **(4+4)**

b. Explain the Impulse response of series RC Network. **(8)**



Q.6 a. Explain the characteristic impedance of a uniform transmission line. **(8)**

b. Discuss the relation between VSWR (Voltage Standing Wave Ratio) and K(Reflection Co-efficient). **(8)**

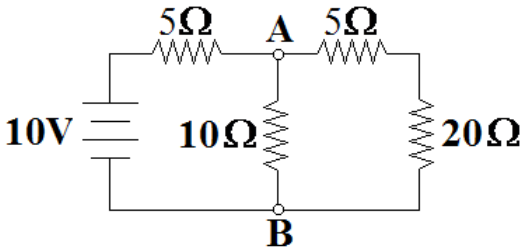
Q.7 a. The values of primary constants of an open wire line per loop km are : R=15Ω, L=4mH, C=0.008μF and G=0.5μmho for a signal of frequency 1000Hz. Determine the characteristic impedance, propagation constant, attenuation, phase constant, wavelength and phase velocity. **(2+2+2+2)**

b. Explain single stub and double stub matching. **(4+4)**

Q.8 a. Design a constant k-high pass filter having f_c = 4kHz and design impedance R_o=600Ω (π-section) **(8)**

b. Discuss the analysis of symmetrical Bridged T-type Attenuator. **(8)**

Q.9 a. Using Norton's theorem, find the value of current in 10 Ω resistance in the network shown in the figure. **(8)**



b. Find the current through 5Ω resistance of the circuit shown in figure by using Superposition theorem? **(8)**