ROLL NO. _____

Code: DE107 **Subject: NETWORKS & TRANSMISSION LINES**

DipIETE – ET (New Scheme)

Time: 3 Hours **DECEMBER 2018** **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 Z- parameter representation if $Z_{21}=Z_{12}$, the network is:
(A) Bilateral **(B)** Symmetrical
(C) Balanced **(D)** Inverse

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

c. The time constant of a series R-C circuit is:
(A) RC **(B)** R/C
(C) R^2C **(D)** RC^2

d. A resonance curve for a series circuit is a plot of frequency verses
(A) Voltage **(B)** Impedance
(C) Current **(D)** Reactance

e. The Inverse Laplace transform of 2/(s+1) is
(A) $2(t+1)$ **(B)** $2e^{-2t}$
(C) e^{-2t} **(D)** $2e^{-t}$

f. Terminating half sections used in composite filters are built with the following.
(A) m=0.6 **(B)** m=0.8
(C) m=0.3 **(D)** m=1

g. A transmission line works as
(A) Attenuator **(B)** LPF
(C) HPF **(D)** Neither of these

h. Propagation constant in a lossless line in given by
(A) L/C **(B)** LC
(C) $jw\sqrt{LC}$ **(D)** $1/\sqrt{LC}$

i. VSWR in a transmission line lies between
(A) 0 to ∞ **(B)** 1 & ∞
(C) 0 and 1 **(D)** 0 and Z_0

j. The reciprocity theorem applies to only one of the network.
(A) Bilateral n/w only **(B)** Linear as well as non linear
(C) Linear Bilateral **(D)** None of these

Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.

Q.2 a. Explain Millman Theorem with the help of suitable example. **(8)**

b. Find the current in the 1ohm resistor of fig 1 using Norton's theorem. **(8)**

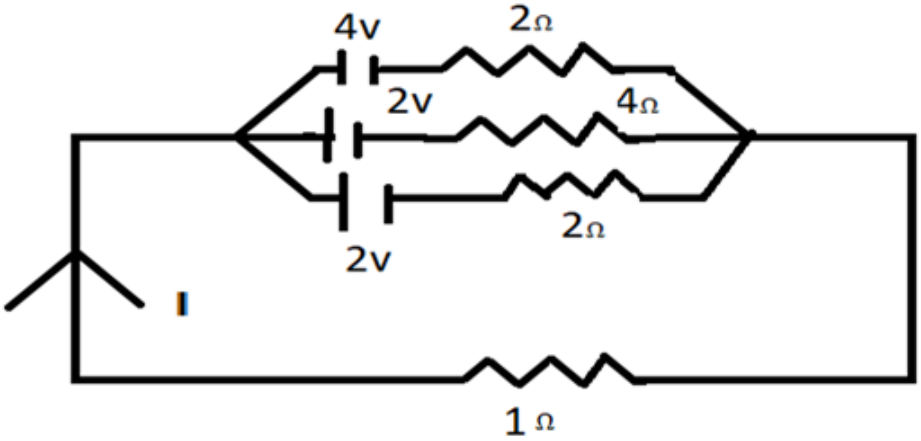

Fig. 1

Q.3 a. Explain the Laplace transform of singularity function with an example? **(8)**

b. Explain initial & final value theorem. **(4)**

c. Explain convolution theorem. **(4)**

Q.4 a. Explain the condition of reciprocity in two port representation. **(8)**

b. In a two port network Z_{11}= 100Ω , Z_{21}=120Ω Z_{12}=120Ω and Z_{22}=50 Ω, compute Y-parameters. **(8)**

Q.5 a. Explain in detail about secondary constants of transmission line. **(8)**

b. A line has following primary constants per km loop
R=26Ω L=16mH C=0.2μF G=5μmho
Find the characteristic impedance at w =7500 rad/sec. **(8)**

Q.6 a. Derive an expression for the input impedance of a lossless line. **(8)**

b. A low loss transmission line has characteristic impedance of 80Ω and is terminated by another impedance of (110-j70)Ω. Find
(i) Reflection Co-efficient
(ii) Standing wave Ratio **(8)**

Q.7 a. Derive a relation between VSWR and reflection co-efficient in ultra high frequency lines. **(8)**

b. What are the advantages of double stub matching over single stub matching? **(8)**

Q.8 a. Explain in detail balanced and unbalanced attenuator with example. **(8)**

b. Design an m-derived T section Low pass filter having cut off frequency f_c=8 kHz , design impedance R_o = 600 Ω and frequency of infinite attenuation f_∞=10 kHz? **(8)**

Q.9 a. Drive expression between resonance frequency and Q in terms of lover and upper frequencies of a series RLC Network. **(8)**

b. A 150 mH inductor with 500 Ω self resistance is in parallel with 5 nF capacitor. Find recourse frequency of the circuit. **(8)**