Code No.: 4339/N

FACULTY OF ENGINEERING

B.E. II/IV Year (ECE) II Semester (Main) Examination, April/May 2008

(New)

NETWORKS AND TRANSMISSION LINES

Time : 3 Hours] [Max. Marks : 75

Answer **all** *questions of* Part A.

Answer **five** questions from Part B.

Smith charts can be used.

Part A – (Marks : 25)

1. Derive the condition for reciprocity in terms of ABCD parameters. 3

2. Find π network for T network shown in fig. 1. 3

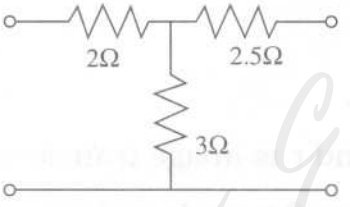

fig. 1

3. Show the two two port networks connected in series and in cascade. 2

4. Define insertion loss for the two port network. 2

5. 25Ω line is terminated by 100Ω load. What will be VSWR and reflection coefficient on the line? 3

6. Sketch the input reactance of a short circuited line for $0 < l < \lambda$ as a function of βl. 3

7. Find the Z_0 for filter section shown in fig. 2. 3

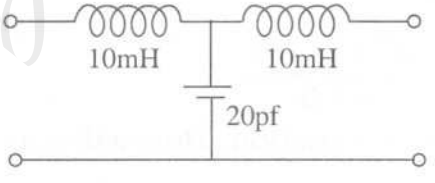

fig. 2

8. By sketching the reactance of series and shunt arms as a function of frequency, find the filter type and cut off frequency for fig. 2. 2

9. What do you understand by loading of line? What is the purpose of loading? 2

10. Explain the use of short and open stubs. 2

[P.T.O.

Part B – (Marks : 5 × 10 = 50)

11. Find the γ parameters of network in fig. 3. 10

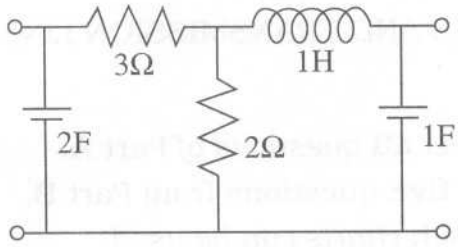

fig. 3

12. (a) Show that ABCD matrices multiply to find overall ABCD matrix when networks are connected in cascade. 5

(b) Design symmetrical T attenuator for R_0 = 600Ω and attenuation of 20dB. 5

13. (a) For a two port network show that .

$$Z_0 = \sqrt{Z_{sc} Z_{oc}} \text{ and Tan hr} = \sqrt{\frac{Z_{sc}}{Z_{oc}}}$$

Where Z_0 is charac. impedance and r is image transfer constant. 6

(b) For network of fig 4 find expression for cos h r where r is α + jβ. 4

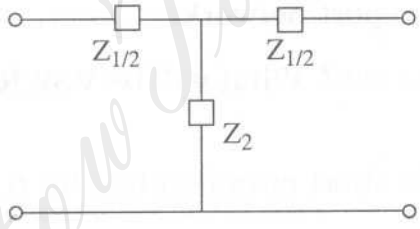

fig. 4

14. Design composite filter for R_0 = 600Ω, f_c = 1000kHz and f_∞ = 1200kHz. Filter should have low pass T sections. Sketch approx. attenuation characteristics for each section. 10

15. (a) Synthesize the function $Z(s) = \frac{s^2 + 2s + 6}{s + 3}$. 5

(b) List the properties of positive real function. How will you test Hurwitz polynomial? 5

16. (a) Show that for open circuited line of length l, propagation const. β and charac. impedance Z_0 the input impedance is $Z_{oc} = jZ_0 \cot \beta l$. Sketch this function as a function of frequency. 7

(b) Find the length and charac. impedance of quarter wave transformer to match 50Ω line to 200Ω load at 1GHz. 3

17. Write short notes on (any **two**) : 10

(a) Smith chart and its applications

(b) Distortion in transmission lines.

(c) Equalizers.