ANNA UNIVERSITY COIMBATORE

B.E. / B.TECH. DEGREE EXAMINATIONS : JUNE 2009

REGULATIONS : 2007

FOURTH SEMESTER – ELECTRICAL & ELECTRONICS ENGG.

070280025 - NETWORK ANALYSIS AND SYNTHESIS

TIME : 3 Hours **Max.Marks : 100**

PART – A

(20 x 2 = 40 MARKS)

ANSWER ALL QUESTIONS

1. What is transient period?
2. For the circuit shown in the figure 1 determine the current i(t) when the switch is closed at t = 0 assume that the initial current in the inductor is zero.

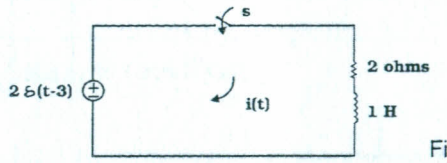

Fig 1

3. An impedance function has the poles at s = 0 and s = - 2. Zeros at s = - 1 and s = - 3.Find the impedance function if z (-4) = 3/8.
4. Define poles and zeroes.
5. When a network is said to be reciprocal?
6. What are image and iterative impedances?
7. What are constant K – filters.
8. What are the ideal filter characteristics?
9. Define positive real functions.

10. What the conditions to be satisfied for the polynomial p(s) to Hurwitz?
11. What is meant by natural response?
12. What is meant by active and passive ports?
13. State the term 'stop band'
14. What is called band pass filter?
15. For the network shown in figure 2, determine the transfer impedance

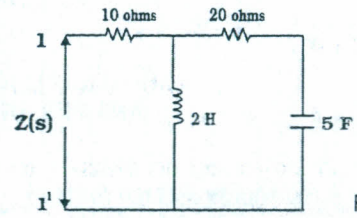

Fig.2

16. Determine the image parameters of the T network shown in the figure 3

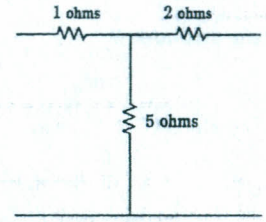

Fig.3

17. Check the positive realness of the given function

$$z(s) = \frac{(s+3)}{(s+1)}$$

18. Design a low pass filter having a cut-off frequency of 2 KHz to operate with a terminated load resistance of 500 ohms

19. Check whether the given polynomial is Hurwitz or not

$F(s)= s^4+s^3+2s^2+3s+2$

20. Prove that the function $z(s) = \frac{(s+4)(s+2)}{(s+1)(s+3)}$ is positive real

PART – B

(5 x 12 = 60 MARKS)

ANSWER ANY FIVE QUESTIONS

21. A rectangular voltage pulse of unit height and T seconds duration is applied to a series R-C combination at t=0 as shown in figure 4. Determine the current in the capacitor as a function of time. Assume the capacitor to be initially uncharged. (12)

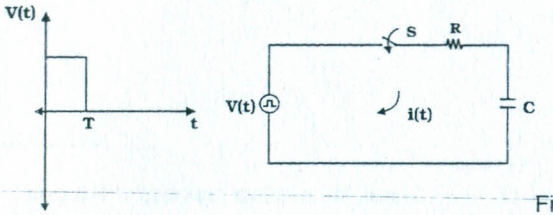

Fig.4

22. Plot the bode plot for the given transfer function (12)

$$G(s) = \frac{k(1+0.5s)}{s(1+0.2s)(1+0.1s)}$$

23. Find the fourier series expansion and the frequency spectrum of the rectangular wave shown in figure 5. (12)

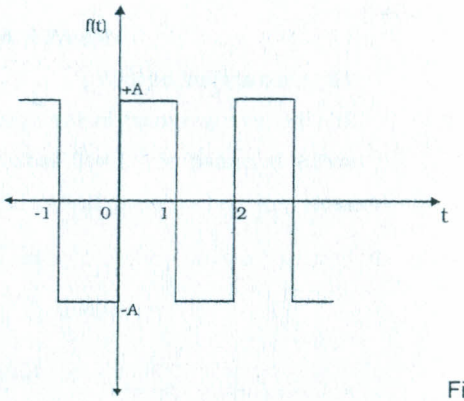

Fig. 5

24. (a) Find the ABCD parameters of the network (Fig.6) (6)

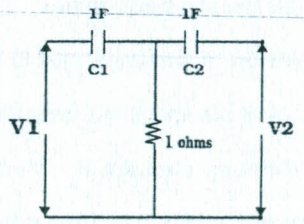

Fig.6

24 (b) For the network shown in figure 7, determine the transfer functions. $G_{21}(s)$ and $Z_{21}(s)$, also find the driving point impedance $z_{11}(s)$

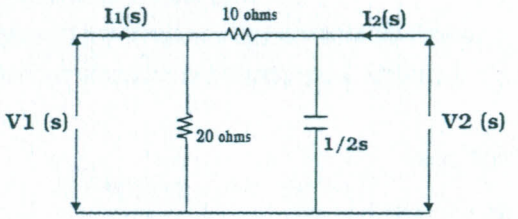

Fig.(7) (6)

25. Design a band elimination filter having a design impedance of 600 ohms and cut-off frequencies f_1= 2khz and f_2= 6KHz (12)

26. Design a m-derived low pass filter having cut-off frequency of 1 KHz. Design impedance of 400 ohms and the resonant frequency 1100Hz (12)

27. Realize the network in foster form I and II. Given (12)

$$z(s) = \frac{s(s^2 + 4)}{(s^2 + 1)(s^2 + 9)}$$

28. Realize the one port network whose driving point impedance is given by (12)

$$z(s) = \frac{10\ s^4 + 12\ s^2 + 1}{(2\ s^3 + 2\ s)}$$

*****THE END*****