1628 **G 1590** (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

Fourth Semester

Branch : Electrical and Electronics Engineering

NETWORK ANALYSIS AND SYNTHESIS (E)

(Old Scheme—Prior to 2010 Admissions)

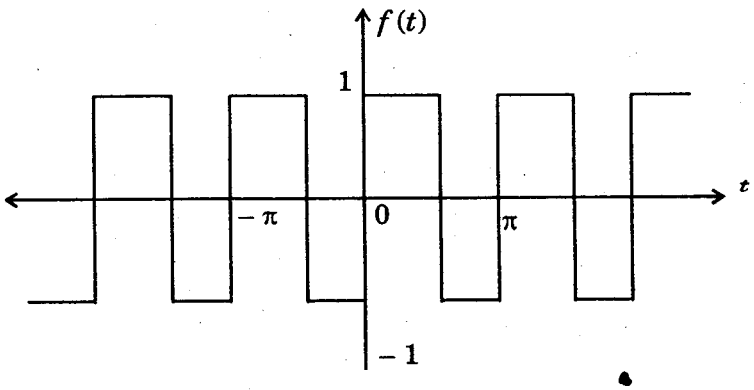
[Supplementary/Mercy Chance]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 4 *marks.*

1. State and explain initial value theorem.
2. Using definite integrals, find $L\{t^2\}$.
3. Illustrate the time shifting property of Fourier transform.
4. Find the complex Fourier coefficient of the following waveform :



5. Explain the procedure to obtain the admittance parameters of a 2-port network.
6. Obtain the relationship between Z and Y parameters.
7. The impedance parameters of a T-network are :

   $Z_{11} = 5\Omega, Z_{12} = Z_{21} = 2.5\Omega, Z_{22} = 10\Omega$. Find the parameters of the network.
8. What are the drawbacks of constant K filters ? How they are overcome ?

Turn over

9. What is meant by positive real functions ? What are their properties ?

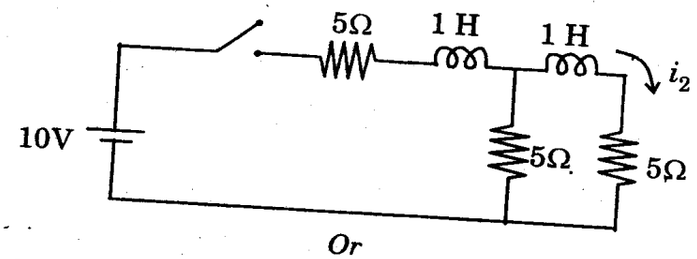
10. What are the necessary and sufficient conditions for a real rational function F (*s*) to be the dri point immittance of LC network ?

(10 × 4 = 40 ma

Part B

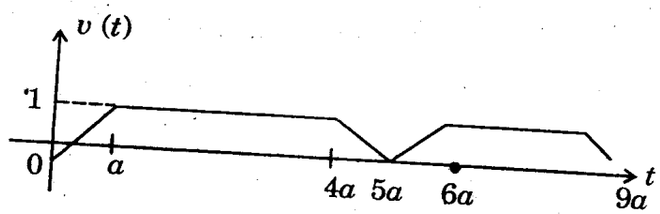
Answer **all** *questions.*
Each full question carries 12 *marks.*

11. Using Laplace transformation technique, find $i_2(t)$, following the switching at $t = 0$ in the circ shown below. Assume zero initial conditions :



Or

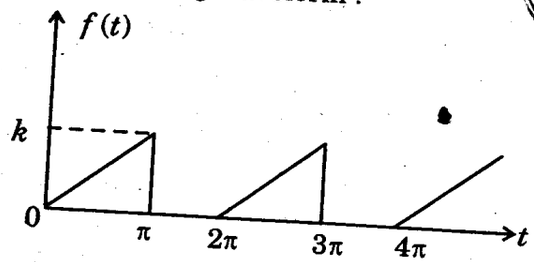
12. (i) Obtain the Laplace transform of the periodic waveform shown below :



(6 marks)

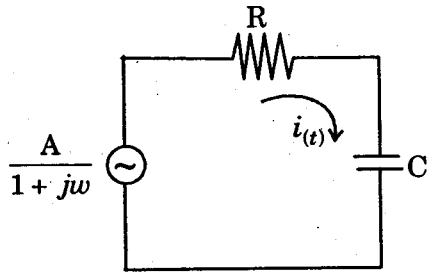
(ii) Find the inverse Laplace transform of $\frac{48}{s^2(s+2)(s+4)}$. (6 marks)

13. Find the Fourier series of the following waveform :



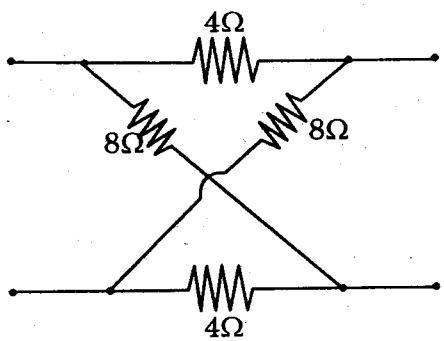
Or

14. Determine the Fourier transform of the exciting voltage $v(t) = \begin{cases} A^{e-t}, & t \geq 0 \\ 0, & t < 0. \end{cases}$



Also sketch the amplitude and phase spectrum. If the above voltage is applied across a series RC circuit, find $i(t)$.

15. Determine the z, h and ABCD parameters of the following lattice network :



Or

16. A symmetrical π network has a series impedance of 10 Ω and shunt arm impedances of 5 Ω. Determine :

    (i) The transmission parameters.

    (ii) The equivalent symmetrical T-network.

17. Design an image parameter based high-pass filter for a 1000 Ω load impedance to cut-off at 10,000 Hz with infinite attenuation at 9000 Hz. Terminate with appropriate end sections.

Or

18. Derive the basic circuit of a constant-K band-pass filter. In terms of the parameters of this circuit, show an m-derived section. Explain the operation of this circuit.

19. Find the Foster network which will respond as follows : Poles at $w_2 = 6000$, $w_4 = 8000$ and infinity zeroes at $w_1 = 5000$, $w_3 = 7000$ and $w_5 = 9000$. Also the input impedance is $-j\,1000$ at $w = 1000$.

Or

20. Realise using Cauer I and Cauer II forms, the driving point impedance $\frac{s^2 + 9s + 18}{s\left(s^2 + 5s + 4\right)}$. Draw the networks.

(6 + 6 = 12 marks)

[5 × 12 = 60 marks]