Hall Ticket Number:

Code No. : 22201

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

B.E. II Year (E.E.E.) II-Semester (Main) Examinations, May-2016

Electrical Circuits-II

Time: **3** hours | Max. Marks: **70**

*Note: Answer **ALL** questions in **Part-A** and any **FIVE** from **Part-B***

Part-A (10 × 2 = 20 Marks)

1. The current in an *RLC* circuit is described by: $\frac{d^2i}{dt^2} + 10\frac{di}{dt} + 25i = 0$
   If i(0) = 10 and $\frac{di(0)}{dt} = 0$, find i(t) for t > 0.
2. If $R = 20\ \Omega$, $L = 0.6$ H, what value of C will make an *RLC* series circuit :
   i) Over damped ii) Critically damped
3. Determine the Laplace transform of each of the following functions:
   i) u(t) ii) e^{-at} u(t), $a \geq 0$
4. State and prove initial value theorem.
5. When the input to a system is a unit step function, the response is 10 cos 2t. Obtain the transfer function of the system.
6. Draw the series equivalent circuit of inductor in s-domain.
7. State the differentiation theorem of fourier transform.
8. Find the fourier transform of sinω_0t and cosω_0t.
9. Draw the first cauer form of RL representation.
10. List the properties of LC reactance functions.

Part-B (5 × 10 = 50 Marks)

11. Find i(t) for t > 0 for the circuit shown in fig.1. [10]

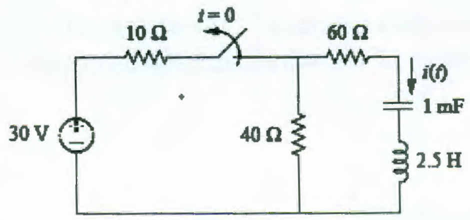
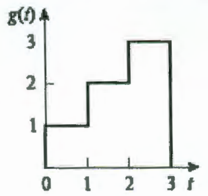


Fig. 1

12. a) State and prove the properties of Laplace transform given below: [5]
    i) Linearity ii) Time shift iii) Time differentiation
    b) Obtain the Laplace transforms of the functions shown in Fig.2 [5]



(a)
Fig. 2

13. a) For the circuit in Fig. 3(a), Find i(t) for t>0 if i(0) = 2A. [5]
    b) Obtain the transfer function H(s)= V_0(s)/I(s) for the circuit of Fig. 3(b) [5]

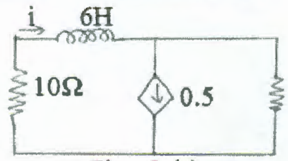


Fig. -3 (a)

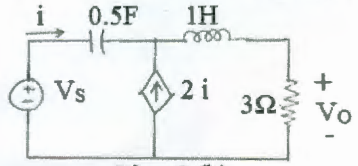


Fig. -3 (b)

14. a) Find the Fourier transform of the function shown in fig.4. [5]

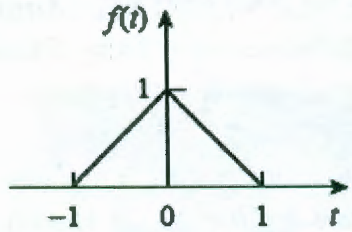


Fig. 4

b) Determine the fourier transform of [5]
i) the double-sided exponential $e^{-a|t|}$ and   ii) the signum function sgn(t).

15. a) Explain the significance of elements in the foster form. [5]
b) Identify whether the following polynomial is Hurwitz. [5]

$$P(s) = s^6 + 4s^5 + 8s^4 + 20s^3 + 19s^2 + 16s + 12$$

16. a) For the circuit in Fig.5, calculate the value of R needed to have a critically damped response. [5]

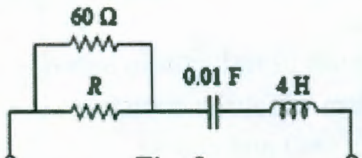


Fig. 5

b) Determine the inverse Laplace Transforms of (i) $\frac{4}{(s+1)(s+3)}$ (ii) $\frac{12}{(s+2)^2(s+4)}$ [5]

17. Answer any **two** of the following:

a) Using Laplace Transforms determine i_x in the circuit of Fig. 6 [5]
b) Determine the Fourier series of the waveform shown in fig. 7 [5]

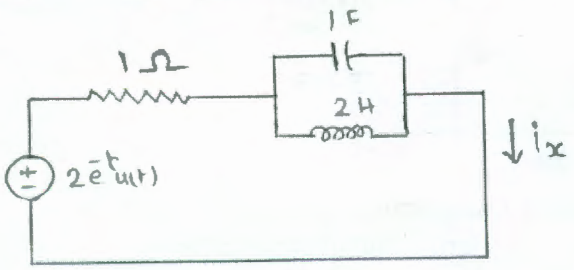


Fig (6)

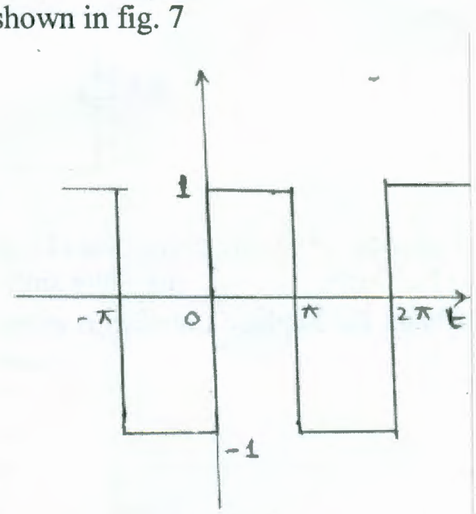


Fig (7)

c) Synthesize: $Z(s)=\frac{2s^5+12s^3+16s}{s^4+4s^2+3}$ using cauer forms. [5]

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