Question Paper

Exam Date & Time: 09-May-2018 (09:30 AM - 12:30 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

INTERNATIONAL CENTRE FOR APPLIED SCIENCES
III SEMESTER B.S. (ENGG.)
END - SEMESTER THEORY EXAMINATIONS APRIL - 2018
DATE: 09 MAY 2018
TIME: 9:30 AM TO 12:30 PM
LINEAR NETWORKS TRANSIENT ANALYSIS [EE 231]

Marks: 100 **Duration: 180 mins.**

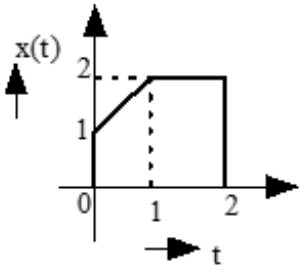
Answer 5 out of 8 questions.

1) Find odd and even components of the following (12)

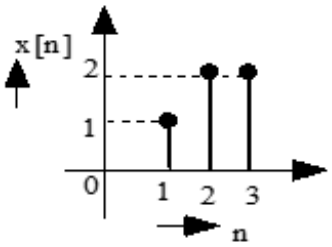
A)

(i) $x(t) = (1 + t^3)sin^3 10t$

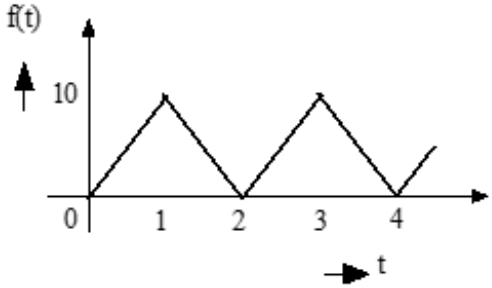
(ii)



(iii)



B) Find the Laplace transformation of the periodic triangular wave shown (8)



2) Find the initial and final values of the functions whose Laplace transform is (8)

A)

(i) $F(s) = \frac{2s+4}{6s^2+3s+3}$

(ii) $F(s) = \frac{1}{s(s+2)(s-2)}$

B) A series RLC circuit is excited by a voltage of E volts by closing the switch. Determine the voltage across the capacitor with L=1H, C=1/4F for the resistance R= 2 Ω,4Ω and for R=5Ω. Comment on the results (12)

3) Plot the pole-zero diagram of the following function (10)

A) $$F(s) = \frac{10(s+2)(s+4)}{(s+1)(s+3)(s+5)}$$

Hence find the residues at poles and f(t)

B) Find the Laplace transform of the following functions (10)

(i) $f(t) = \frac{sinwt}{t}$

(ii) $f(t) = tcos3wt$

(iii) $f(t) = t^2 sinwt$

4) Using convolution integral theorem, find the Laplace inverse of the following (12)

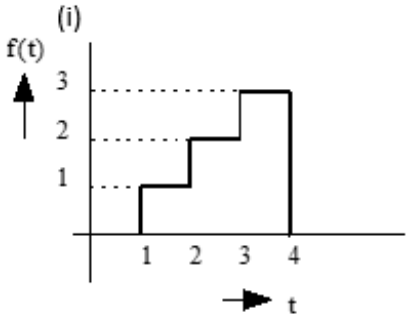
A)

(i) $F(s) = \frac{1}{s(s+1)}$

(ii) $F(s) = \frac{1}{(s-a)^2}$

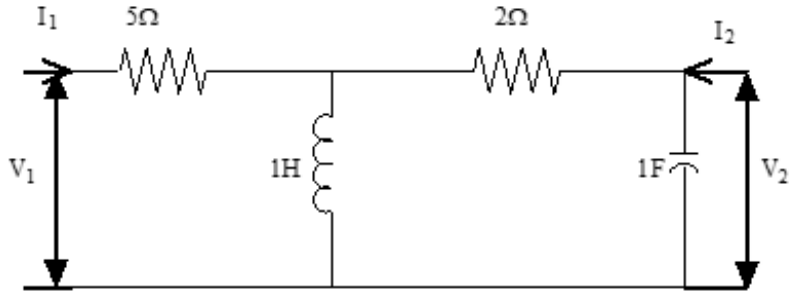
(iii) $F(s) = \frac{1}{s(s+1)(s+2)}$

B) Find the Laplace transform of following signal (8)

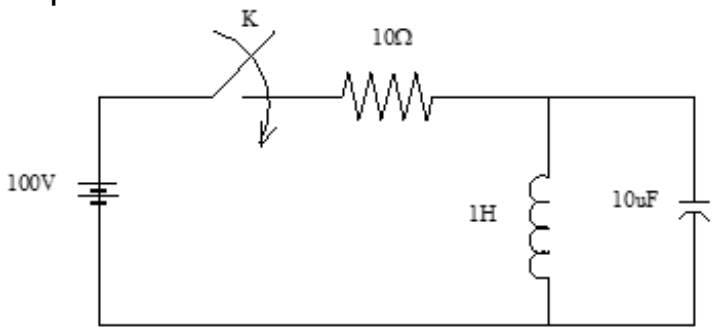


5) (10)

A) Find the network functions $\frac{V_1}{I_1}, \frac{V_2}{V_1}$ for the network shown below



B) In the circuit shown, the switch K is closed and steady state is reached . At t=0 the switch is opened, find the expression for the current in the inductor. (10)



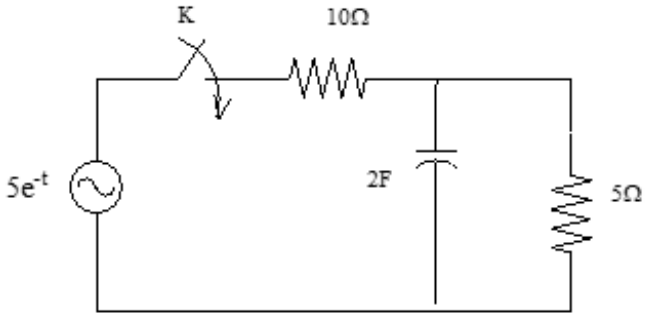
6) V=10sin10t is applied to a series RC circuit with R=5Ω and (10)

A) C=0.5F. Find the equation for current ,assume zero initial conditons.

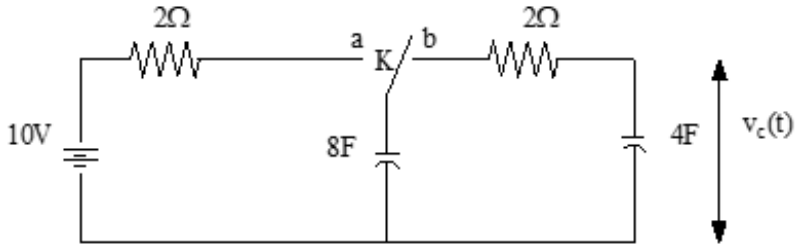
B) Find the current response of a series RL circuit excited by (10)
$V = V_m \sin\ wt$

7) Determine the source current when the switch is closed at (10)

A) t=0.Assume zero initial conditions



B) In the network shown, the switch is moved from a to b at (10)
t=0, Determine $v_c(t)$



8) Find the current step and impulse response of the series RL (10)

A) circuit

B) Find the step response of the voltage across the capacitor (10)
in the network with R=2Ω, L=1H and C=1F all connected in series.

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