Question Paper

Exam Date & Time: 16-Nov-2018 (02:00 PM - 05:00 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

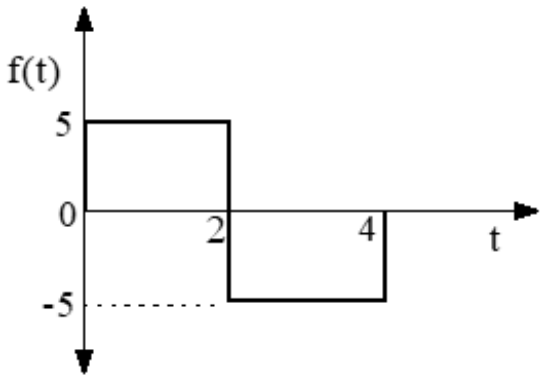
INTERNATIONAL CENTRE FOR APPLIED SCIENCES
THIRD SEMESTER B.Sc. Applied sciences in Engg.
END-SEMESTER THEORY EXAMINATIONS NOVEMBER-2018
LINEAR NETWORKS TRANSIENT ANALYSIS [EE 231]

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

Answer 5 out of 8 questions.

1) Find the Laplace transformation of the periodic signal shown below (8)

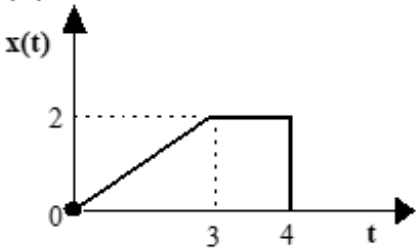
A)



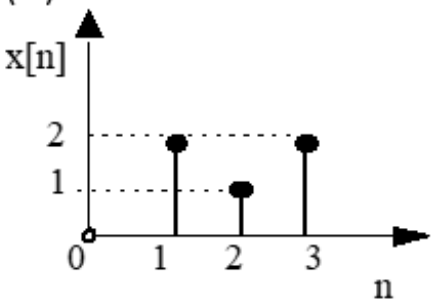
B) Find odd and even components of the following (12)

(i) $x(t) = (2 + t^3)cos^2 5t$

(ii)



(iii)



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

A)

$$i.\quad F(s) = \frac{2(s+5)}{s^2+3s+5}$$

$$ii.\quad F(s) = \frac{1}{s(s+4)(s-4)}$$

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= 2Ω, 4Ω and for R=5Ω. Comment on the results (12)

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

A)

$$F(s) = \frac{5(s^2+4)}{s(s+1)(s+2)}$$

Hence find the residues at poles and f(t)

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

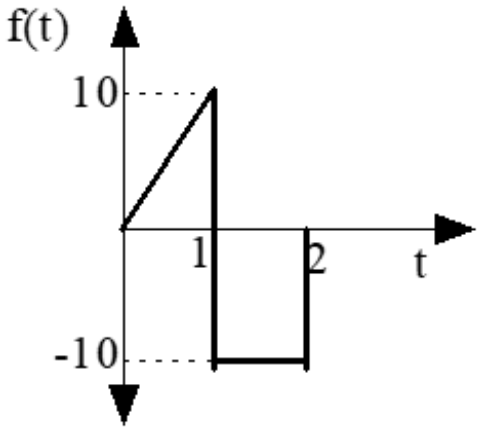
$$i.\quad f(t) = \frac{sinwt}{t}$$
$$ii.\quad f(t) = tsin3wt$$
$$iii.\quad f(t) = tcos3wt$$

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

A)

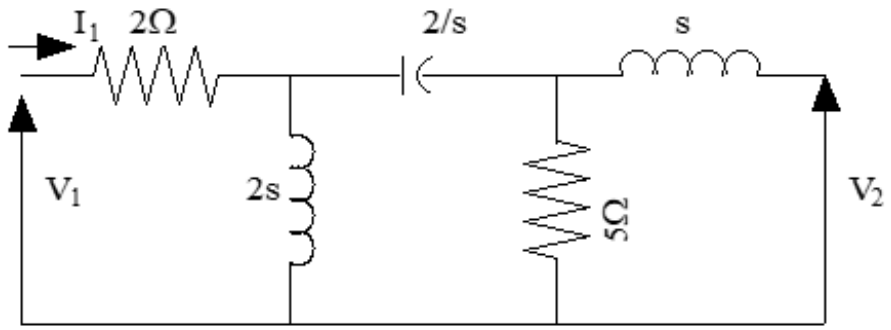
$$i.\ F(s) = \frac{s}{(s+1)(s+2)}$$
$$ii.\ F(s) = \frac{1}{(s-b)^2}$$
$$iii.\ F(s) = \frac{5}{s(s+1)(s+2)}$$

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



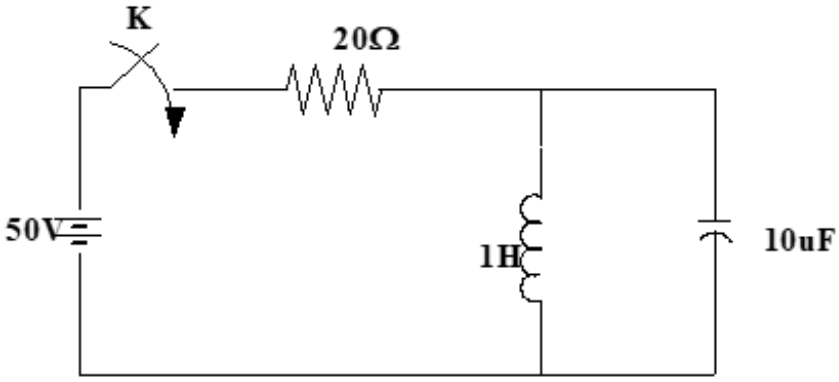
5) (10)

A) Find the network functions V_2/V_1, V_1/I_1 for the network shown below



B) In the circuit shown, the switch K is closed and steady (10)

state is reached . At t=0 the switch is opened, find the expression for the current in the inductor



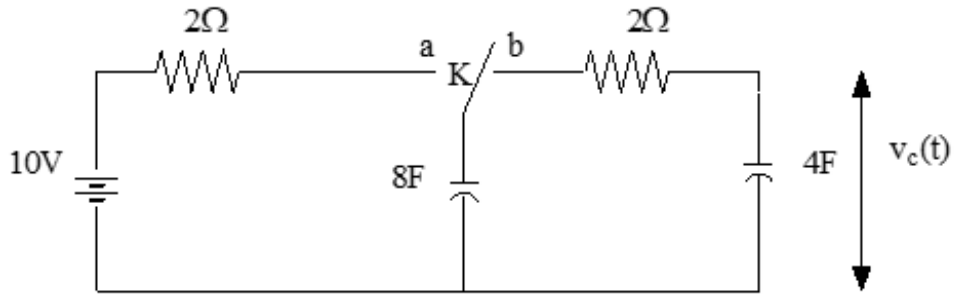
6) V=20sin2t is applied to a series RC circuit with R=10Ω and (10)

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

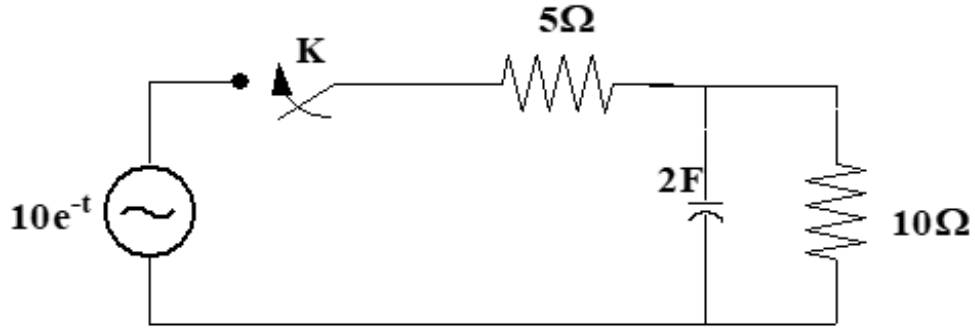
B) Find the current response of a series RL circuit excited by $V=V_m sinwt$ (10)

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

A)



B) Determine the source current when the switch K is closed at t=0.Assume zero initial conditions (10)



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

A)

B) Find the current step and impulse response of the series RC circuit (10)

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