Reg. No.									

INTERNATIONAL CENTRE FOR APPLIED SCIENCES

(Manipal University)

III SEMESTER B.S. DEGREE EXAMINATION – APRIL / MAY 2017

SUBJECT: LINEAR NETWORK TRANSIENT ANALYSIS (EE 231)

(BRANCH: E&E and E&C)

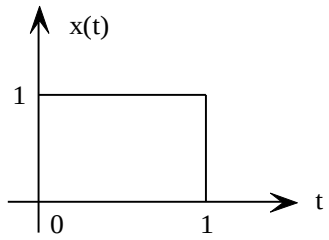
Saturday, 13 May 2017

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

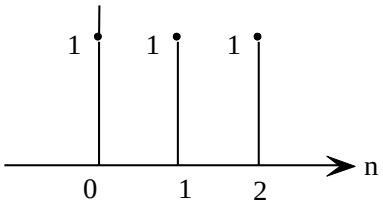
- ✓ **Answer ANY FIVE full Questions.**
- ✓ **Missing data, if any, may be suitably assumed**

1A. Find the odd and even components of the following.

i)



ii)



iii) $x(t)=(1+t^3)\cos^3 10\,t$

1B. Find the laplace transformation of the periodic rectified sine wave with period T and peak value of A. **(10+10)**

2A. Find the initial and final values of the function whose laplace transform is

$$F(s)=\frac{(2S+1)}{(6S^2+11S+6)} \quad \text{and} \quad F(s)=\frac{10}{S(S^2+2S+4)}$$

2B. A step voltage of E volts is applied to a series RLC circuit with L=1H, C=$\frac{1}{4}F$.

Find the voltage across the capacitor for the following values of resistance.
R=2 Ω, R=4 Ω and R=5 Ω. Comment on the results. **(8+12)**

3A. The voltage V(s) of a network is $V(s)=\frac{3s}{(s+2)(s^2+2s+2)}$. Draw the pole zero diagram & determine the residues of poles.

3B. Find the laplace transform of the following functions.

i) $f(t)=\cos^2 t$ ii) $f(t)=t\sin\omega t$ iii) $f(t)=\frac{(1-e^{-t})}{t}$ iv) $(t+1)^2e^t$ **(8+12)**

4A. Using convolution theorem evaluate the inverse laplace transform of the following.

i) $\frac{1}{(s+a)^2}$ ii) $\frac{1}{s(s+a)}$ iii) $\frac{1}{(s^2+1)^2}$

4B. V=50 sin 10 t is applied to a series R-C circuit. R=2Ω and C=0.25F. Find the equation for the current in the circuit. Assume zero initial conditions **(10+10)**

5A In the network shown in Fig 5A, the switch is moved from a to b, at t=0, find V(t).

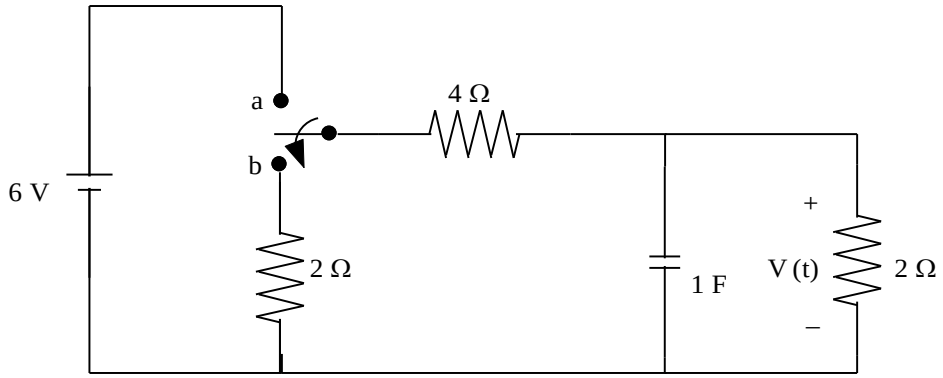


Fig 5A

5B Find the laplace transform of the trapezoidal pulse shown in Fig 5B. **(10+10)**

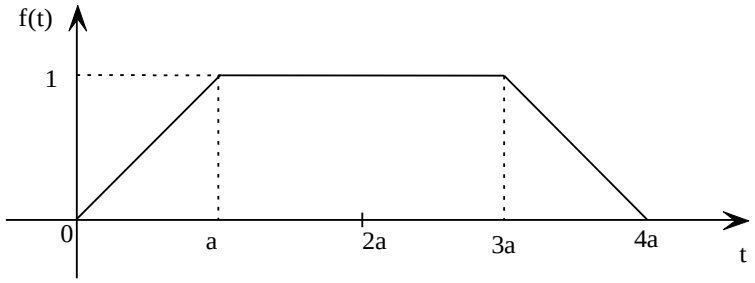


Fig 5B

6A determine the voltage transfer functions $\frac{V_2}{V_1}$ for the network (Fig 6A)

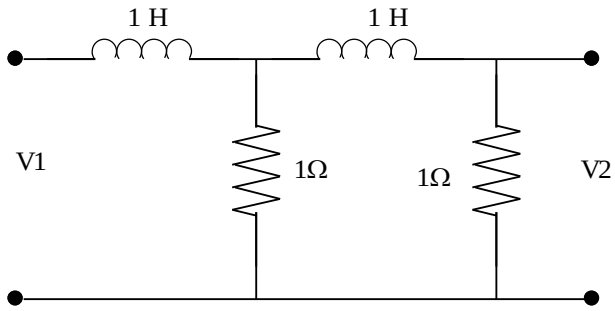


Fig 6A

6B. In the network shown in Fig 6B, the switch is closed at t=0, the steady state having been reached at t=0. Determine the current through the inductor of 3H. **(10+10)**

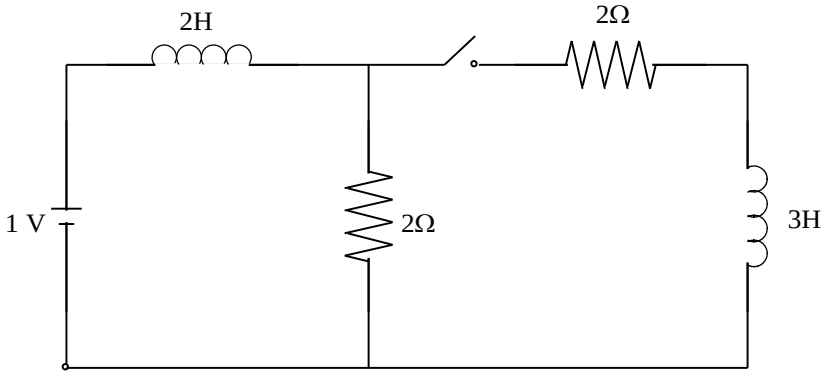


Fig 6B

7A. In the network shown in Fig 7A, the switch is moved from a to b at t=0, determine $V_c(t)$.

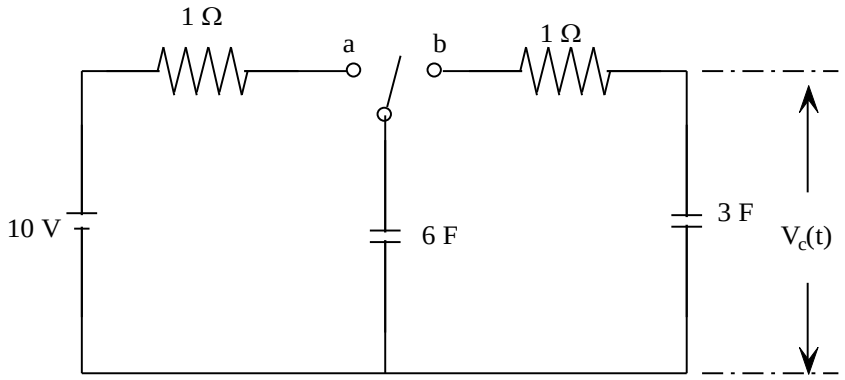


Fig 7A

7B. Find the current response of a series R-L circuit excited by $V=V_m$ Sin ωt. **(10+10)**

8A. A series RLC circuit with R= 3 **Ω**, L= 1 H and C=0.5 F is connected to a step voltage of 10 V. Assuming zero initial conditions find the current for t >0.

8B. Find the current response of a series R-L circuit with R=10 **Ω** and L= 5 H, when the voltage applied V(t)=10 sin 5t. **(10+10)**