Reg. No.									

INTERNATIONAL CENTRE FOR APPLIED SCIENCES

(Manipal University)

III SEMESTER B.S. DEGREE EXAMINATION – NOV. 2017

SUBJECT: LINEAR NETWORK TRANSIENT ANALYSIS (EE 231)

(BRANCH: E & E, E & C, CE, BM)

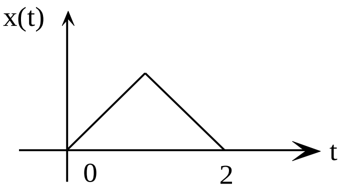
Wednesday, 8 November 2017

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

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

1A. Find the even and odd part of the signal.

i) $x(t)=(1 + t + 3t^2 + 5t^3 + 9t^4)$ ii)



(06)

1B. A series RLC circuit is excited by a DC voltage of E volts by closing the switch, determine the voltage across the capacitor for the following cases with L= 1H; C= $\frac{1}{4}F$ and

i) R = 2 Ω ii) R = 3 Ω iii) R = 5Ω

Comment on results. **(14)**

2A. Find the function V(t) using the pole-zero plot of following function.

$$V(s)=\frac{(s+2)(s+6)}{(s+1)(s+5)}$$

(06)

2B. Using convolution theorem evaluate the inverse laplace transform of the following.

i) $\frac{1}{s(s+a)}$ ii) $\frac{1}{s(s+a)^2}$ **(08)**

2C. Find the even and odd part of the discrete time signal x(n) shown in Fig 2C.

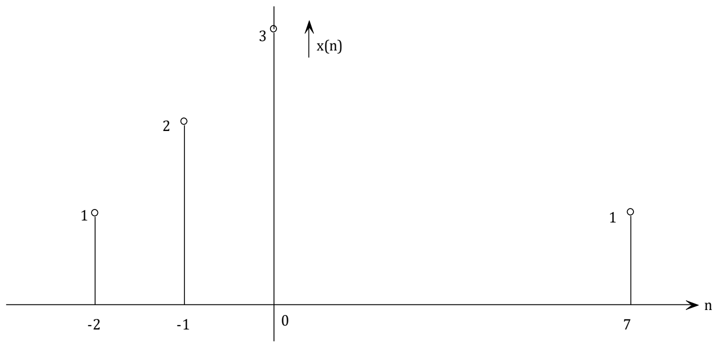
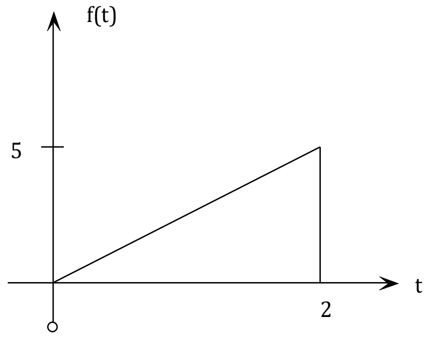


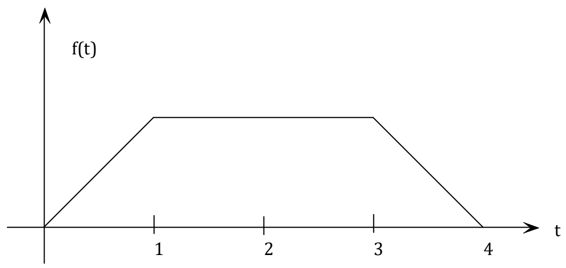
Fig 2C. **(06)**

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

i) $x(t)=t\,\cos at$ ii) $\frac{(1-e^{-t})}{t}$ **(08)**

3B. Find the laplace transform of the following non-periodic functions.





(12)

4A. Find the laplace transform of the periodic waveform shown in Fig 4A.

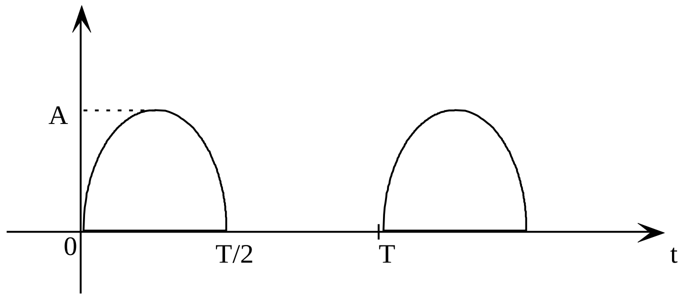


Fig 4A. **(10)**

4B. Find the initial and final values of the function whose laplace transform is

i) $F(s)=\dfrac{(2S+1)}{(s^3+6S^2+11S+6)}$ ii) $F(s)=\dfrac{(s+6)}{S(S+3)}$ **(10)**

5A Find the network functions $\dfrac{V_1}{I_1}, \dfrac{V_2}{V_1}$ for the network shown in Fig 5A.

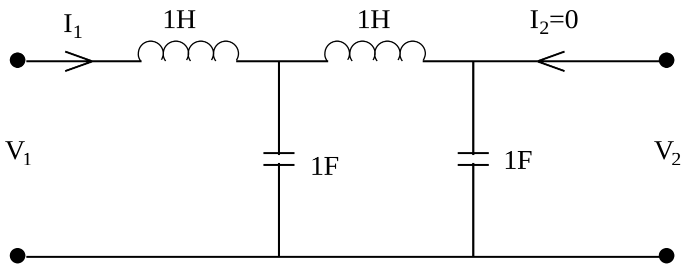


Fig 5A **(10)**

5B Determine the source current when the switch is closed at t=0. (Fig 5B) Assume zero initial conditions.

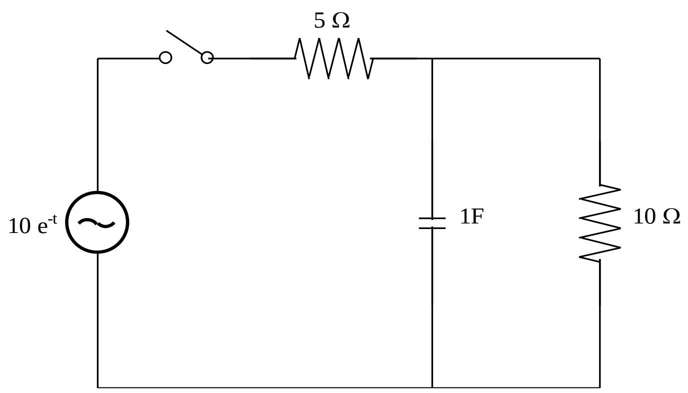


Fig 5B. **(10)**

6A The network shown in fig 6A is in steady state with S1 closed and s2 open. At t=0, S1 is opened & S2 is closed.
Find the current through the capacitor.

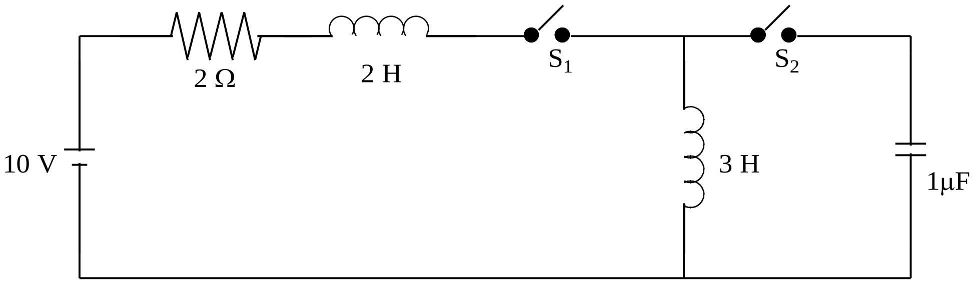


Fig 6A **(10)**

6B. V=50 sin 10 t is applied to a series R-C circuit with R=2 Ω and C=0.25 F. Find the equation for current. Assume zero initial conditions **(10)**

7A. Find the complete response for t > 0 for an RLC circuit with R=6 Ω, L= 1 H and C= $\frac{1}{9}F$ with initial capacitor voltage = 2V.
The circuit is excited with V(t)= 2 cos 4t. **(12)**

7B. Find the laplace transform of the periodic saw-tooth waveform as shown in fig 7B.

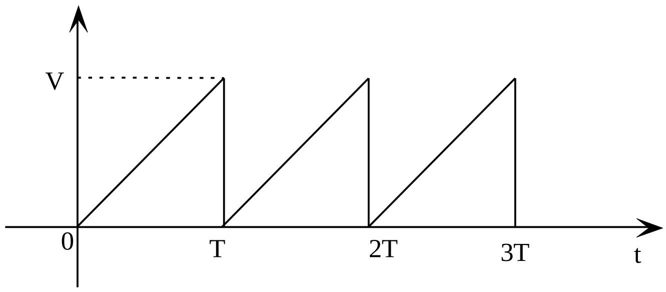


Fig 7B. **(08)**

8A. In the network shown in fig 8A find the currents $i_1(t)$ & $i_2(t)$ for t>0

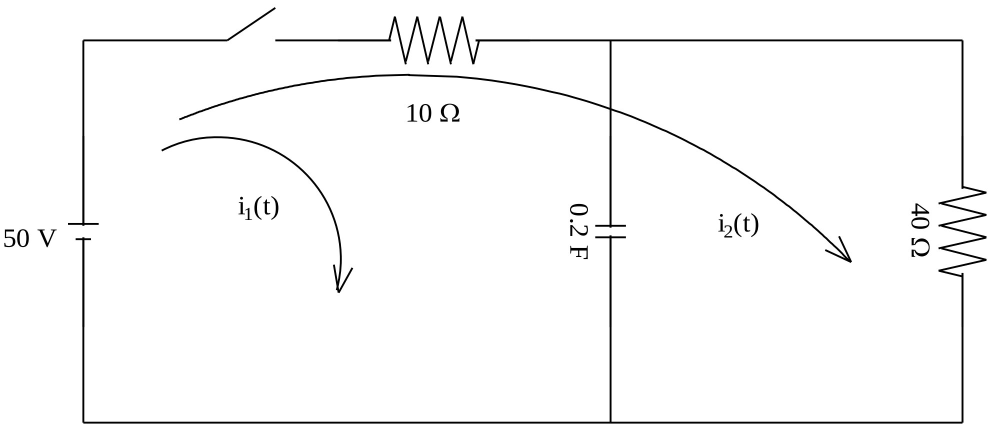


Fig 8A **(10)**

8B. IN the network shown in Fig 8B the switch is opened at t=0, the steady state having been established previously. Find i(t) for t >0

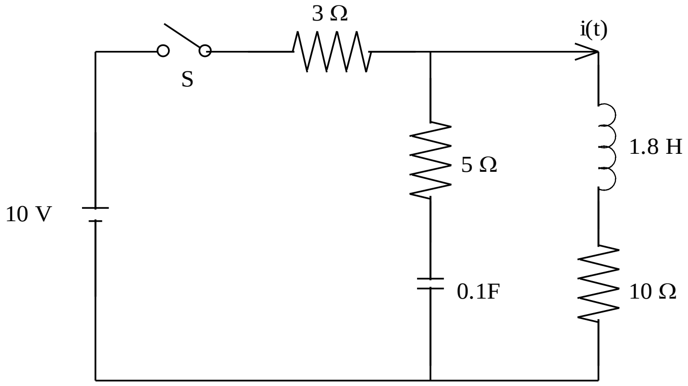


Fig 8B **(10)**