S.E sem 3 (CBGS) ETRX 12/12/14.

EIM

QP Code :14672

[3 Hours] **[Total Marks:80**

N.B. (1) Question **No. 1** is compulsory.
(2) Attempt any **three** questions from remaining **five** questions.

1. Solve All:—
   (a) Draw and explain the working of practical Q- meter circuit. **20**
   (b) Define the following terms:—
      (i) Accuracy (ii) Resolution
      (iii) Hysteresis (iv) Calibration (v) Sensitivity
   (c) Estimate the bandwidth of CRO if a signal of 12 millisecond rise time is observed as the signal with 15 millisecond rise time.
   (d) Draw and explain the McLeod gauge for pressure measurement.

2. (a) Write short note on "Programmable logic controller". **10**
   (b) Draw and explain the turbine flow meter. **10**

3. (a) Explain the following terms related to thermocouples:— **10**
      (i) Law of intermediate metals.
      (ii) Law of intermediate temperature.
   (b) Draw and explain the block diagram of DSO. **10**

4. (a) Draw and explain the following bridges:— **10**
      (i) Maxwell bridge (ii) Schering bridge.
   (b) What are the types of errors in measurement system? Explain all in detail. **10**

5. (a) How the Lissajeus figure are used for measurement of frequency and phase of the signal using CRO? Explain in detail. **10**
   (b) Draw and explain the construction and working of electronic voltmeter using transistors. **10**

6. Write short notes on:— **20**
   (i) Ultrasonic type level tranducers.
   (ii) Displacement measurement using potentiometers.
   (iii) Data acquisition system.
   (iv) Specification of CRO.

Sem III CBGS Circuit Theory ETRX
08/12 11Q

QP Code :14641

(3 Hours) **[Total Marks : 80]**

N.B. : (1) Question No. 1 is Complusory
(2) Attempt any three quesitons from the remaining
(3) Figures to the right indicate full marks.
(4) Assume suitable data if required
(5) Use Smith Chart For transmission line problem.

1. (a) Test for following polynominal using continued fraction expansion only **20**

Routh Hurwitz

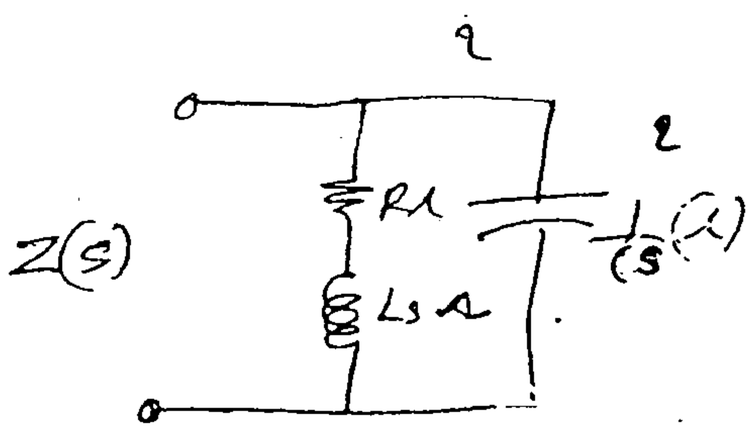
$$P(s) = s^6 + 2s^5 + 3s^4 + 4s^3 + 3s^2 + 2s + 1$$

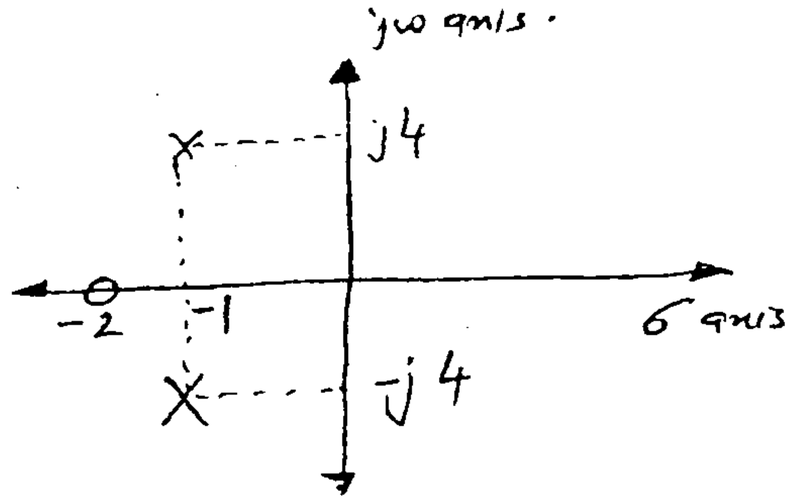
(b) Obtain s-domain equailant model at inductor and capacitor with non-zero intial condition.

(c) The paranelex of a transmission line are G = 2.25 m Ω /km, R = 65 Ω /km, L = 1.6 m H/ km, C=.1 μ F/km find charterstic impedance and the propogation constant of the line at a frequency of 1 KHz.

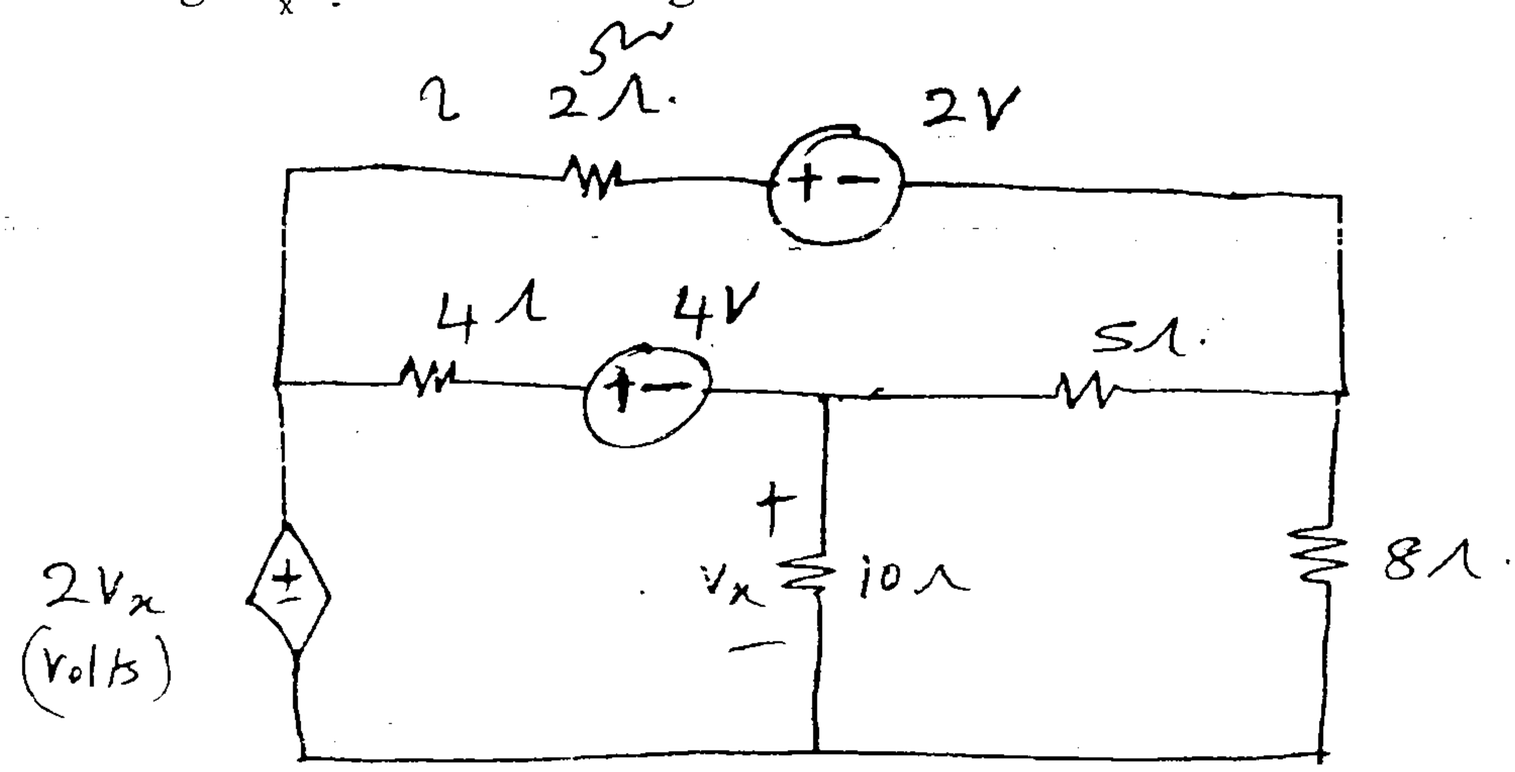
v = rho/ C = 0.1 μF/km

(d) The ploe -zero diagram of driving point impedacne funtion is shown At d.c. the input inpedance is resistive and equal to 2 Ω Determine value of R, Land C.





2. (a) Determine voltage V_x by Source shifting and Source transformation. **8**



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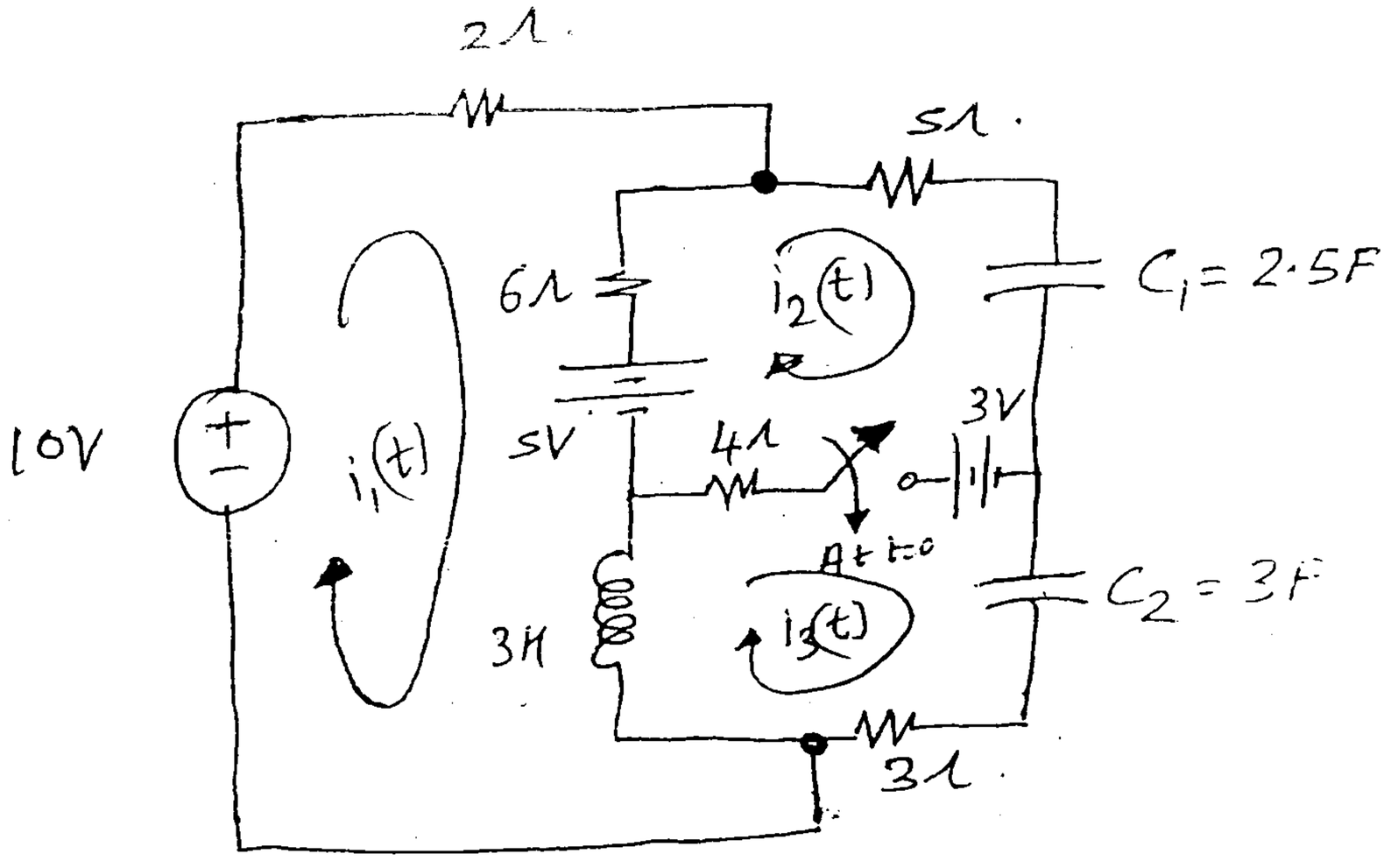
(b) Find $i_1(t)$, $i_2(t)$ and $i_3(t)$ at t= 0⁻ 8

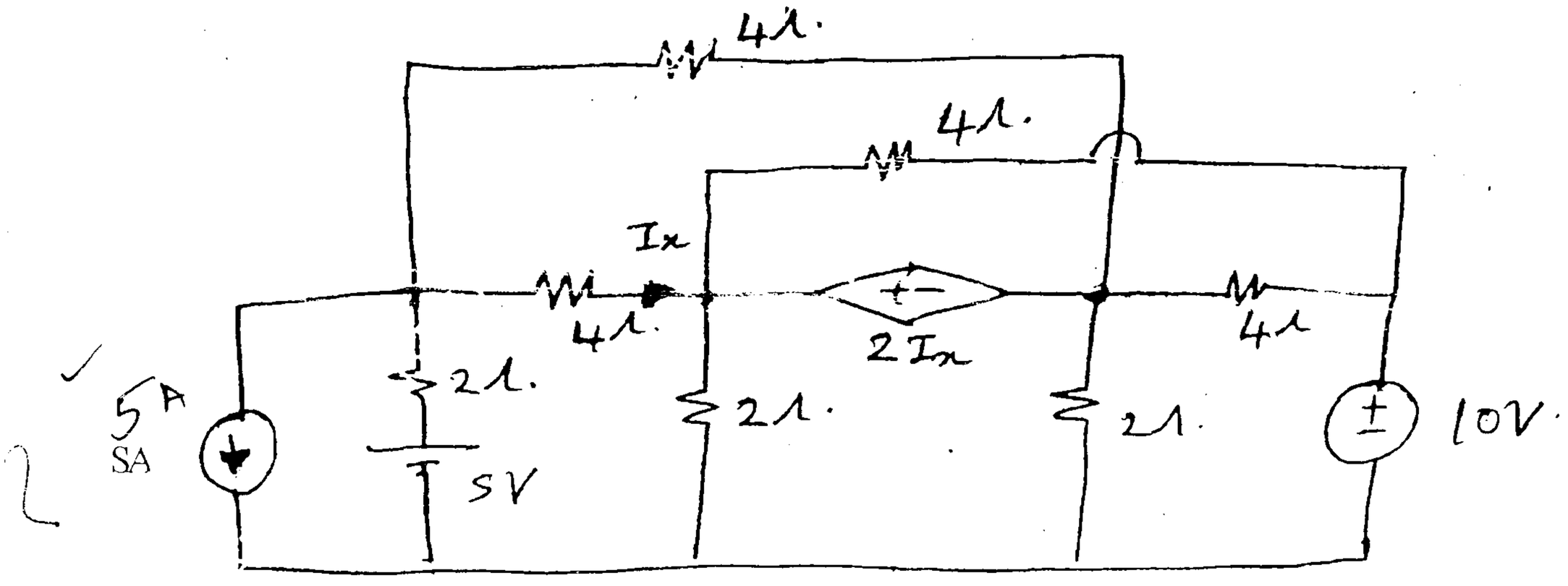


(c) Compare Foster form I and Foster Form II of an LC N/W 4

$$z(s) = \frac{6s(s^2+4)}{(s^2+1)(s^2+64)}$$

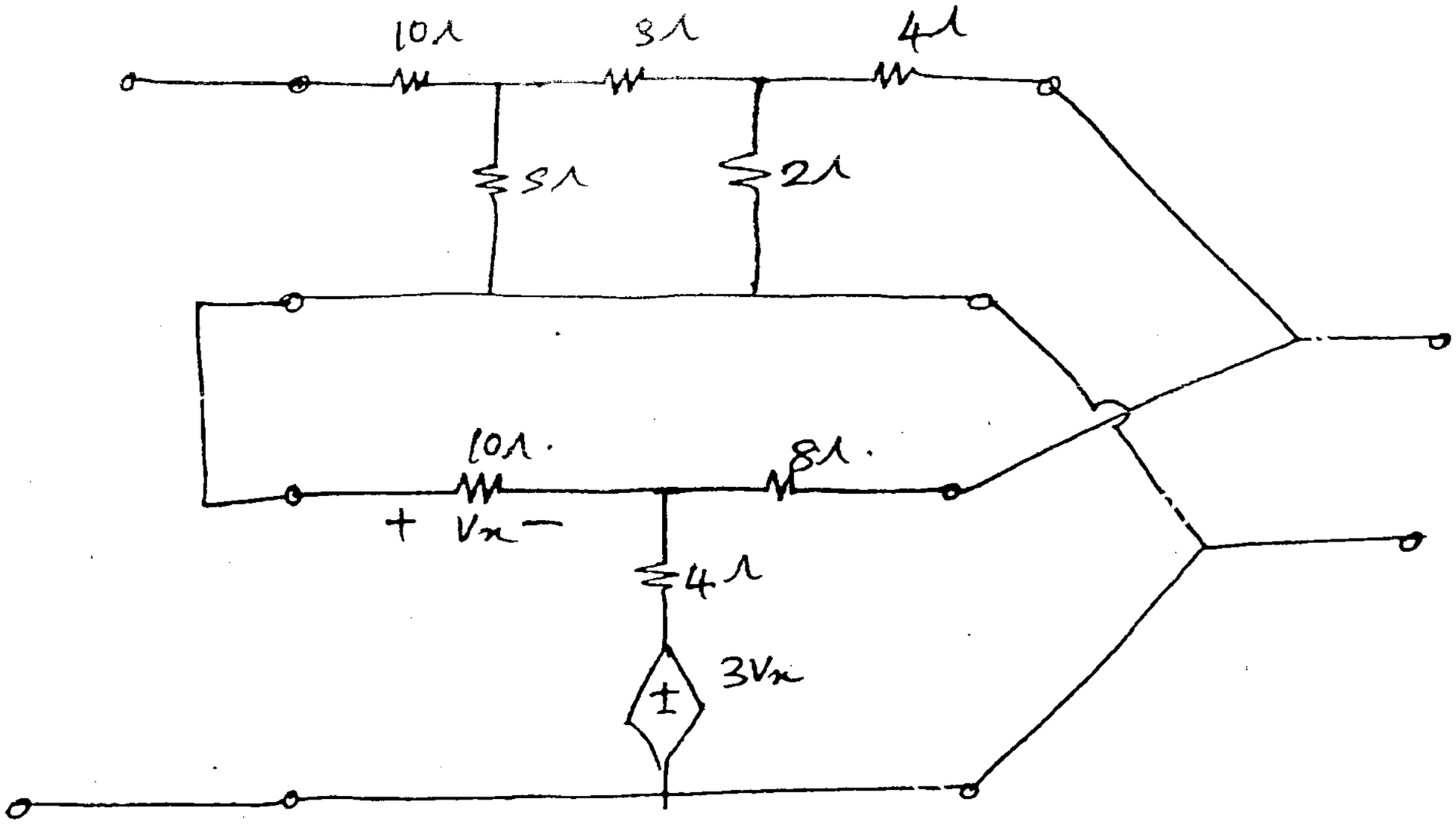
3. (a) Design a short circuit shunt stub match for $Z_L = 150\text{-}200j\ (\Omega)$ for a line of $z_0 = 100\,\Omega$ and frequency at f = 20 mHz use Smith chart. 8

(b) Obtain Power associated with dependent voltage source by using Nodal analysis. 8

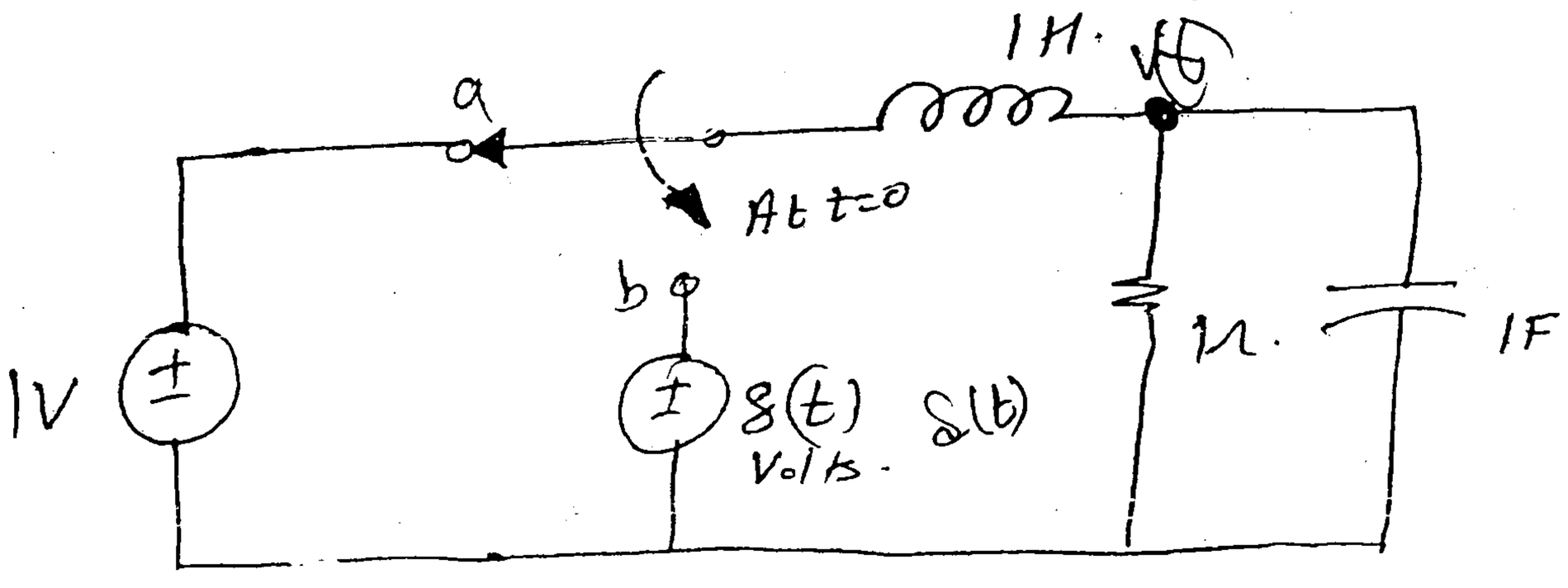


(c) Explain various types of filter's 4

4. (a) Obtain hyprid parameter of the inter connected network. 10



(b) Obatin v(t) for t ≥ o Use Laplace Transform method. 10

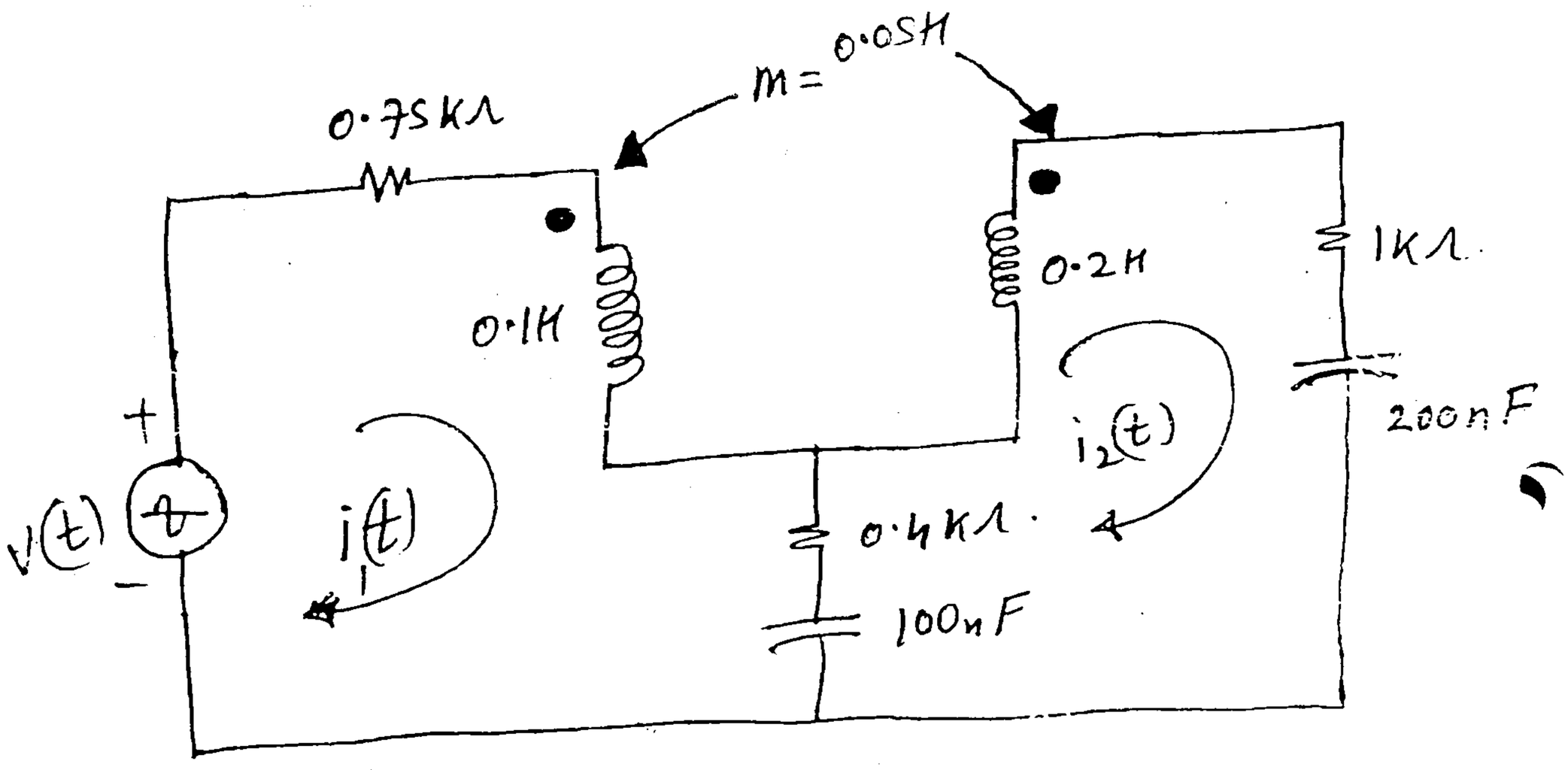


5. (a) Check for p.r.f. 8

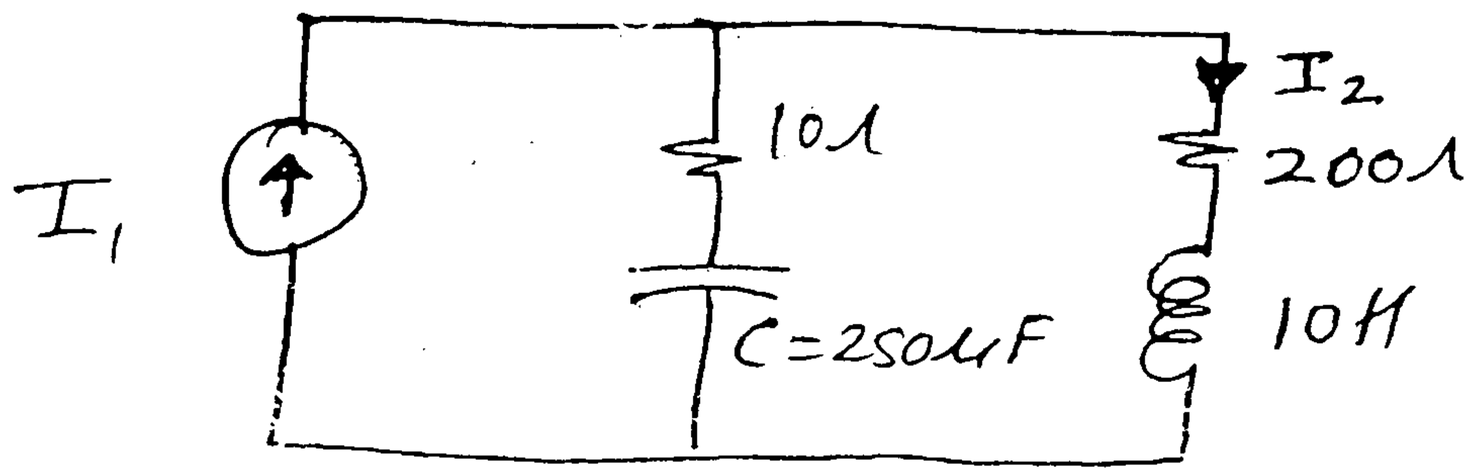
a) $F(s) = \frac{2s^2 + 2s + 1}{s^3 + 2s^2 + s + 2}$

b) $F(s) = \frac{s^2 + 2s + 1}{s^3 + 2s^2 + 2s + 3}$

(b) Find current flowing in both coils. If applied input voltage is v (t)= 230 $\sqrt{2}$ sin [5000 t-30^0]



5. (C) Obtain pole -zero plot for $\frac{I}{I_1}$ $\eta = \frac{I_2}{I_1}$



6. (a) For the Network shown below determine R_L for maximum power transfer and also determine P_L 8

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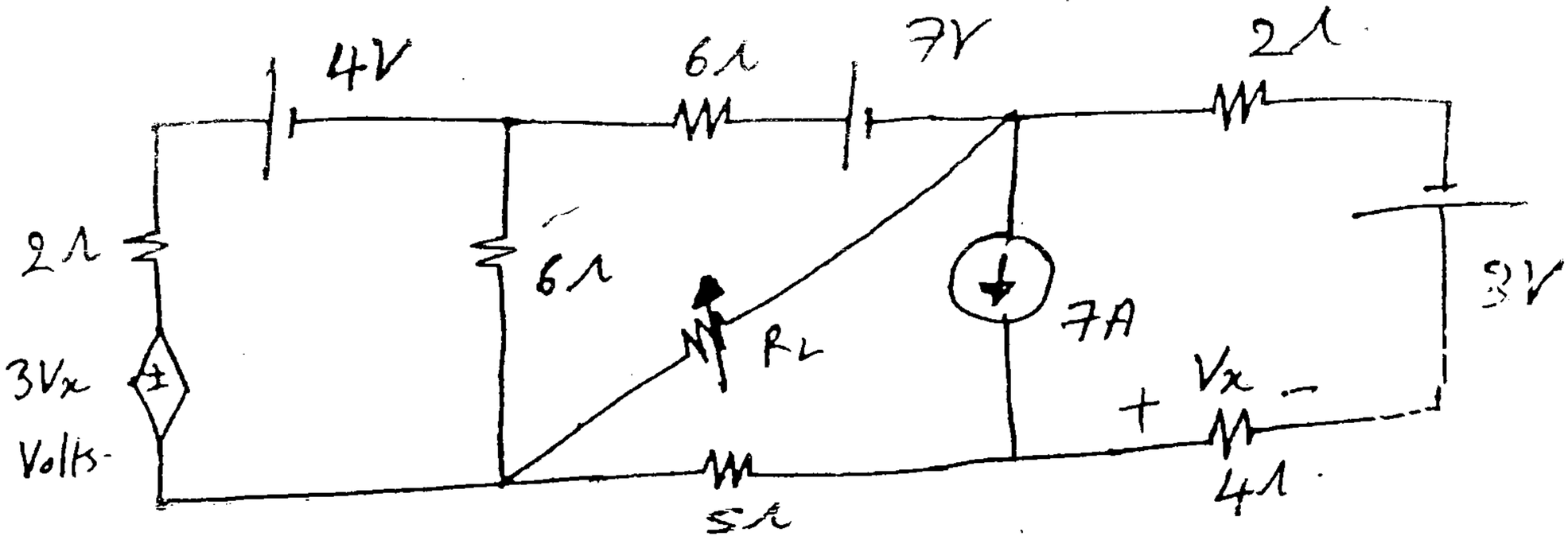
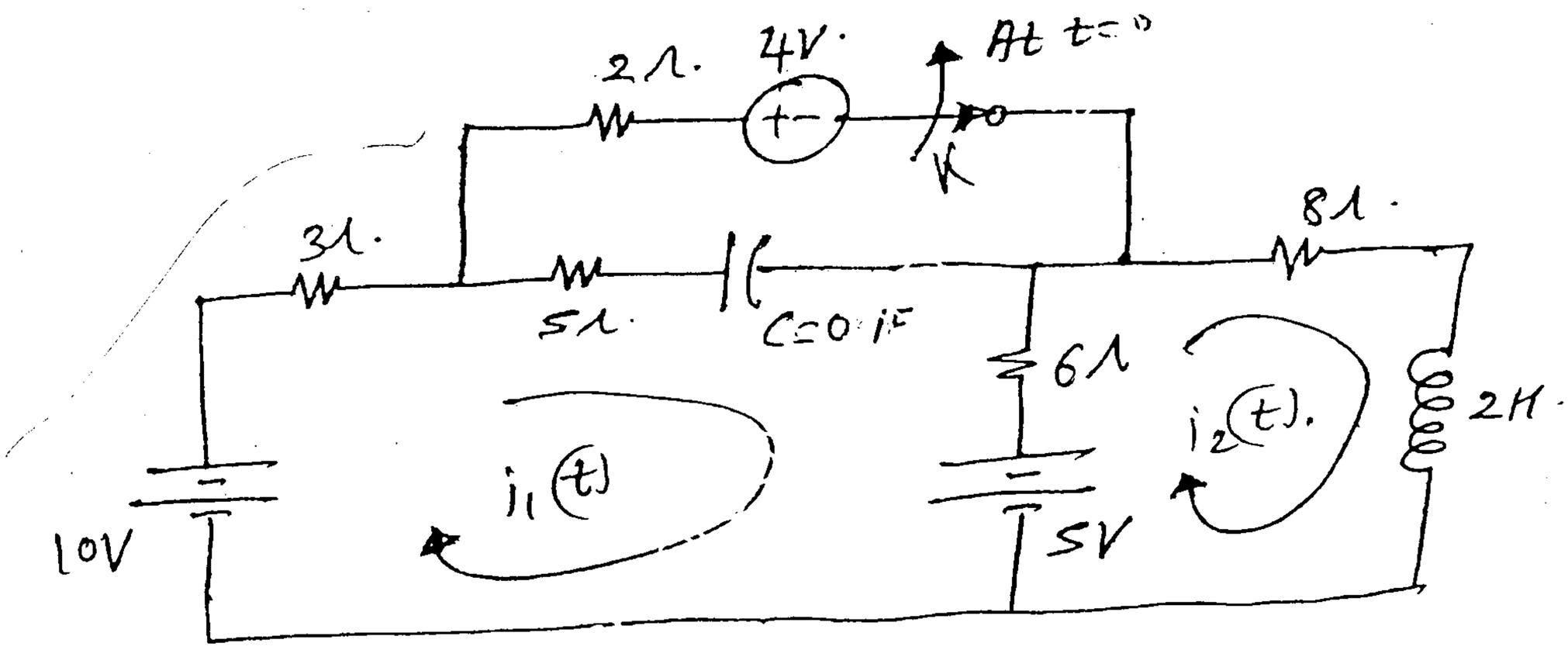


6. (b) Find $i_1(t)$, $i_2(t)$ $\frac{di_1(t)}{dt}$ and $\frac{di_1(t)}{dt}$ and $\frac{di_2(t)}{dt}$ at $t = 0^+$ if switch k is opened at t=0 8



6. (c) Compare Cauer form I and Cauer form II for RC N/W 4

$$z(s) = \frac{4(s+1)(s+3)}{s(s+2)}$$

2

QP Code :14602

(3 Hours) [Total Marks : 80

N.B.: (1) Question No. 1 is Compulsory.

(2) Solve any **Three** from remaining **Five** questions.

(3) Draw **neat** logic diagram and assume suitable data wherever necessary.

Q 1 (a) Interfacing between CMOS and TTL **05**

(b) Convert **T** flip-flop to **D** flip-flop **05**

(c) XC 4000 FPGA architecture block diagram **05**

(d) Draw truth table and logic diagram of Full subtractor **05**

Q 2 (a) Write a VHDL code for Full adder **10**

(b) Design MOD 10 asynchronous counter. **10**

Q 3 (a) Design a mealy sequence detector to detect ---1010--- using D flip-flops and logic gates **10**

(b) Design a circuit with optimum utilization of PLA to implement the following functions **10**

$R = \sum m (0, 2, 5, 7, 11, 12)$

$P = \sum m (1, 3, 8, 9, 11, 13)$

$Q = \sum m (0, 5, 8, 12, 14)$

Q 4 (a) Implement following function using 8:1 MUX and logic gates **10**

$P(X,Y,Z,W) = \sum m (0,3,4,7,8,9,13,14)$

(b) Eliminate redundant states and draw reduced state diagram **10**

PS	NS		O/P
	X=0	X=1	Y
A	B	C	1
B	D	C	0
C	F	E	0
D	E	B	1
E	B	C	1
F	C	E	0
G	F	G	0

Q 5 (a) Use K-map to reduce following function and then implement it by NOR gates. **10**

$F = \pi M (0, 3, 4, 5, 8, 10, 12, 14) + d (2, 9)$

(b) Design 8 bit up counter using IC 74163, draw a circuit diagram and explain its working. **10**

6. Write short notes on any **three** **20**

i) Noise Margins

ii) JTAG and BIST

iii) PAL and PLA

iv) Stuck at '0' and '1' faults

GN-Con.:9117-14.

S.E. ETRX Sem(3) (CBGS) · 20/11/14.
Electronic Devices.

QP Code : 14541

(3 Hours) **[Total Marks : 80**

N.B. : (1) question **No. 1** is **compulsary** and solve any **Three** questions from remaining questions.
(2) Assume suitable data if necessary.
(3) Draw neat and clean figures.

1. Answer any **five** :
   (a) For the diodes, define forward voltage drop, maximum forward current, dynamic resistance, reverse saturation current & reverse brakdown voltage. **5**
   (b) Draw characteistics of Pn junction in thermal equilibrium? Explain. **5**
   (c) Define the contributing factors forwards the low frequency common base current gain of BJT. **5**
   (d) Define internal pinchoff voltage, pinchoff voltage & drain to source saturation voltage fo JFET, **5**
   (e) What are types of MOSFET? Explain. **5**
   (f) Explain consturction working & characeristics of UJT. **5**

2. (a) What is space charge width? Derive an expression for it, when the diode is forward biased and reverse biased. **10**
   (b) List the ideal conditions of BJT and explain the non-ideal effects. **10**

3. (a) Draw Ebers - Moll equivalent circuit of BJT & derive necessary expressions for current and voltages. **10**
   (b) Compare BJT, JFET & MESFET. **10**

(4) (a) What is channel length modulation in MOSFET? Derive necessary expression for the same. **10**
   (b) Explain construction, working & characeristics ot Tunnle diode - **10**

5. (a) What is HBT ? Explain construction & energy band diagram of the same. **10**

   (b) for an n - channel MOS transistor with $\mu n = 600\ cm^2/vs$, $C_{ox} = 7 \times 10^{-8}\ F/cm^2$, W = 20 μm, L = 2 μm and $V_{TO} = 1.0V$ Examine the relationship between the drain current & terminal voltages. **10**

6. Write short notes **20**
   (a) SCR
   (b) Solar Cell
   (c) Photo diode
   (d) IGBT

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S.E. Sem III (CBGS) 26/11/14.
ETRx and EXTC.
App. Maths – III

QP Code : 14571

(3 Hours) **[Total Marks : 80**

N.B. (1) Question No.1 is compulsory.
(2) Attempt any three questions out of the remaining five questions.
(3) Figures to right indicate full marks.

1. (a) Prove that $f(z)=x^2-y^2+2ixy$ is analytic and find $f'(z)$ 5
(b) Find the Fourier series expansion for $f(x)=|x|,\ in\ (-\pi,\pi)$ 5
(c) Using laplace transform solve the following differential equation with given condition $\frac{d^2y}{dt^2}+y=t,\ given\ that\ y(0)=1\ \&\ y'(0)=0$ 5
(d) If $\overline{A}=\nabla(xy+yz+zx)$, *find* $\nabla\cdot\overline{A}$ *and* $\nabla\times\overline{A}$ 5

2. (a) If $L[J_0(t)]=\frac{1}{\sqrt{s^2+1}}$, prove that $\int_0^\infty e^{-6t}t\,J_0(4t)\,dt=3/500$ 6
(b) Find the directional derivative of $\phi=x^4+y^4+z^4$ *at* $A(1,-2,1)$ in the direction of AB where B *is* $(2,6,-1)$. Also find the maximum directional derivative of ϕ at $(1,-2,1)$. 6
(c) Find the Fourier series expansion for $f(x)=4-x^2$, *in* $(0,2)$
Hence deduce that $\frac{\pi^2}{6}=\frac{1}{1^2}+\frac{1}{2^2}+\frac{1}{3^2}\cdots\cdots$ 8

3. (a) Prove that $J_{1/2}(x)=\sqrt{\frac{2}{\pi x}}\sin x$ 6
(b) Using Green's theorem evaluate $\int_C (2x^2-y^2)\,dx+(x^2+y^2)\,dy$ where 'c' is the boundary of the surface enclosed by the lines $x=0,\ y=0,\ x=2,\ y=2$. 6
(c) i) Find Laplace Transform of $e^{-3t}\int_0^t u\sin 3u\,du$
ii) Find the Laplace transform of $\frac{d}{dt}\left(\frac{1-\cos 2t}{t}\right)$ 8

4. (a) Obtain complex form of Fourier series for the functions $f(x)=\sin ax\ \ in\ \ (-\pi,\pi)$, where a is not an integer. 6
(b) Find the analytic function whose imaginary part is $v=\frac{x}{x^2+y^2}+\cosh y\cdot\cos x$ 6
(c) Find inverse Laplace Transform of following
i) $\log\left(\frac{s^2+a^2}{\sqrt{s+b}}\right)$ ii) $\frac{1}{s^3(s-1)}$ 8

5. (a) Obtain half-range cosine series for $f(x)=x(2-x)\ \ in\ \ 0<x<2$ 6
(b) Prove that $\overline{F}=\frac{\overline{r}}{r^3}$ is both irrotational and solenoidal 6
(c) Show that the function $u=\sin x\cosh y+2\cos x\sinh y+x^2-y^2+4xy$ satisfies

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Laplace's equation and find it corresponding analytic function 8

6. (a) Evaluate by Stoke's theorem $\int_C (x\,y\,dx + x\,y^2\,dy)$ where C is the square in the xy-plane with vertices $(1,0), (0,1), (-1,0), and\ (0,-1)$ 6

(b) Find the bilinear transformation, which maps the points $z = -1, 1, \infty$ onto the points $w = -i, -1, i$. 6

(c) Show that the general solution of $\frac{d^2y}{dx^2} + 4x^2y = 0$ is

$y = \sqrt{x}\left[A\,J_{1/4}(x^2) + B\,J_{-1/4}(x^2)\right]$ where A and B are constants. 8