B.E. Electronics sem VII (CBGS) May-2014
Sub:- EEM

QP Code : **NP-18752**

9/6/2014.

(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** :– **20**
   (a) Explain the remedies to eliminate the errors in measurement.
   (b) Write the specifications of analog multimeter.
   (c) Discuss the role of delay line in CRO.
   (d) Draw and explain the venturi meter for flow measurement.

2. (a) Write short note on "Data Acquisition System". **10**
   (b) Draw and explain the construction and working of dead weight tester. **10**

3. (a) Explain in detail voltage and frequency measurement using CRO. **10**
   (b) Write short note on "Q-meter". **10**

4. (a) Explain the static and dynamic characteristics of instruments in detail. **10**
   (b) Draw and explain the block diagram of DSO. Also write its applications. **10**

5. (a) Draw and explain the construction and working of linear variable differntial transformer. **10**
   (b) Draw and explain the construction and working of Rotameter. **10**

6. Write short note on :– **20**
   (i) Mega ohm bridge
   (ii) Chop and Alternate mode of CRO
   (iii) Capacitance sensor for displacement measurement
   (iv) Float type method of level measurement.

31/05/2014 Electronics Devices (CBGS) SE ETRX II
31 May 2014

QP Code : NP-18616

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

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

Given Data —

(1) $q = 1.6 \times 10^{-19}$ C
(2) $k = 1.38 \times 10^{-23}$ J/K
(3) $ni = 1.5 \times 10^{10}$ cm^{-3}
(4) $\in si = 11.7 \times 8.854 \times 10^{-14}$

1. (a) What is Non-ideal effects in BJT and hence explain Base width modulation in brief. **5**

1. (b) Justify how phototransistor is more practical than photo diode. **5**

1. (c) Explain in brief TWO Terminal MOS structure. **5**

1. (d) Explain construction and characteristics of UJT. **5**

2. (a) Explain concepts, construction, characteristics and working of Gunn diode. **10**

2. (b) Explain basic principle of operation of BJT with the help of construction, minority carrier distribution and energy band diagrams. **10**

3. (a) Explain structure and operation of MOSFET considering different cases of threshold voltage V_T. **10**

(b) An abrupt PN junciton has dopant concentrations of **10**
$Na = 2 \times 10^{16}$ cm^{-3} and $Nd = 2 \times 10^{15}$ cm^{-3} at T = 300 K
Calculate: (a) Vbi
(b) W at $V_R = 0$ and $V_R = 8V$
(c) E maximum at $V_R = 0$ and $V_R = 8V$

4. (a) What is photovoltaic effect. Explain in detail Solar Cell with working, characteristics and practical applications. **10**

4. (b) For an n-channel MOS transistor with **10**
$\mu n = 600\ cm^2/V.S$, $Cox = 7 \times 10^{-8}\ F/cm^2$,
$W = 20\mu m$, $L = 2\mu m$ and $VTO = 1.0\ V$.
Examine the relationship between the Drain current and terminal voltages.

5. (a) Explain construction, working and characteristics of TRIAC & DIAC. **10**

5. (b) Explain schottky-barrier diode with the help of energy band diagram. **10**

6. (a) What is HBT, Explain construction and energy band diagram of HBT. **10**

6. (a) Explain difference between N-channel and P-channel JFET, Also explain characteristcs (Drain and Transfer) for N-channel JFET. **10**

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S-E. ETRX Sem III CBSJ May

Sub:- Am-III 22/5/14

QP Code : NP-18646

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

N. B. : (1) Question No. **1** (one) is **compulsory**.
(2) Attempt any **3** (three) questions from the remaining questions.
(3) Assume suitable data, if necessary.

1. (a) Evaluate $\int_0^\infty \frac{(\cos 6t - \cos 4t)}{t}\,dt$ **5**

(b) Obtain complex form of fourier series for $f(x) = e^{ax}$ in $(-1,1)$ **5**

(c) Find the work done in moving a particle in a force field given by $\overline{F}=3xy\,\hat{i}-5z\hat{j}+10x\hat{k}$ along the curve $x = t^2 + 1$, $y = 2t^2$, $z = t^3$ from $t = 1$ to $t = 2$. **5**

(d) Find the orthogonal trajectory of the curves $3x^2y + 2x^2 - y^3 - 2y^2 = \alpha$, where α is a constant. **5**

2. (a) Evaluate $\frac{d^2y}{dt^2}+2\frac{dy}{dt} - 3y = \sin t$, $y(o) = 0$, $y'(o) = 0$, by Laplace transform **6**

(b) Show that $J_{5/2}=\sqrt{\frac{2}{\pi x}}\left[\frac{3-x^2}{x^2}\sin x-\frac{3}{x}\cos x\right]$ **6**

(c) (i) Find the constants a, b, c so that **4**
$\overline{F} = (x+2y+az)\hat{i}+(bx-3y-z)\hat{j}+(4x+(y+2z)\hat{k}$ is irrotational.

(ii) Prove that the angle between two surfaces $x^2 + y^2 + z^2 = 9$ and $x^2 + y^2 - z = 3$ at the point $(2,-1,2)$ is $\cos^{-1}\left(\frac{8}{3\sqrt{21}}\right)$ **4**

3. (a) Obtain the fourier series of $f(x)$ given by **6**
$$f(x)=\begin{cases} 0 & ,-\pi \le x \le 0 \\ x^2 & 0 \le x \le \pi \end{cases}$$

(b) Find the analytic function $f(z) = u + iv$ where $u = r^2\cos 2\theta - r\cos\theta + 2$ **6**

(c) Find Laplace transform of **8**
(i) $te^{-3t}\cos 2t.\cos 3t$

(ii) $\frac{d}{dt}\left[\frac{\sin 3t}{t}\right]$

Con. 11456-14.

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4. (a) Evaluate $\int J_3(x)dx$ and Express the result in terms of J_0 and J_1 **6**

(b) Find half range sine series for **6**

$f(x) = \pi x - x^2$ in $(0, \pi)$

Hence deduce that $\frac{\pi^3}{32} = \frac{1}{12} - \frac{1}{3^2} + \frac{1}{5^2} - \frac{1}{7^2} + \ldots$

(c) Find inverse Laplace transform of **8**

(i) $\frac{1}{s}\tanh^{-1}(s)$ (ii) $\frac{se^{-2s}}{(s^2+2s+2)}$

5. (a) Under the transformation $w + 2i = z + \frac{1}{z}$, show that the map of the circle $|z| =$ **6**

2 is an ellipse in w-plane.

(b) Find half range cosine series of $f(x) = \sin x$ in $o \le x \le \pi$. **6**

Hence deduce that

$\frac{1}{1.3} + \frac{1}{3.5} + \frac{1}{5.7} + \ldots = \frac{1}{2}$

(c) Verify Green's theorem, for **8**

$\oint_c (3x^2 - 8y^2)\,dx + (4y - 6xy)\,dy$ where c is boundary of the region defined by $x=0$, $y=0$, and $x+y = 1$.

6. (a) Using convolution theorem; evaluate **6**

$L^{-1}\left\{\frac{1}{(s-1)(s^2+4)}\right\}$

(b) Find the bilinear transformation which maps the points **6**

$z = 1, i, -1$ onto $w = 0, i, \infty$

(c) By using the appropriate theorem, Evaluate the following :– **8**

(i) $\int_c \bar{F} \cdot d\bar{r}$ where $\bar{F} = (2x - y)\hat{i} - (yz^2)\hat{j} - (y^2z)\hat{k}$

and c is the boundary of the upper half of the sphere $x^2 + y^2 + z^2 = 4$

(ii) $\iint_s (9x\hat{i} + 6y\hat{j} - 10z\hat{k}) \cdot d\bar{s}$ where s is

the surface of sphere with radius 2 units.

SE | ETRX | III CBGS

DCD. 28|5|14

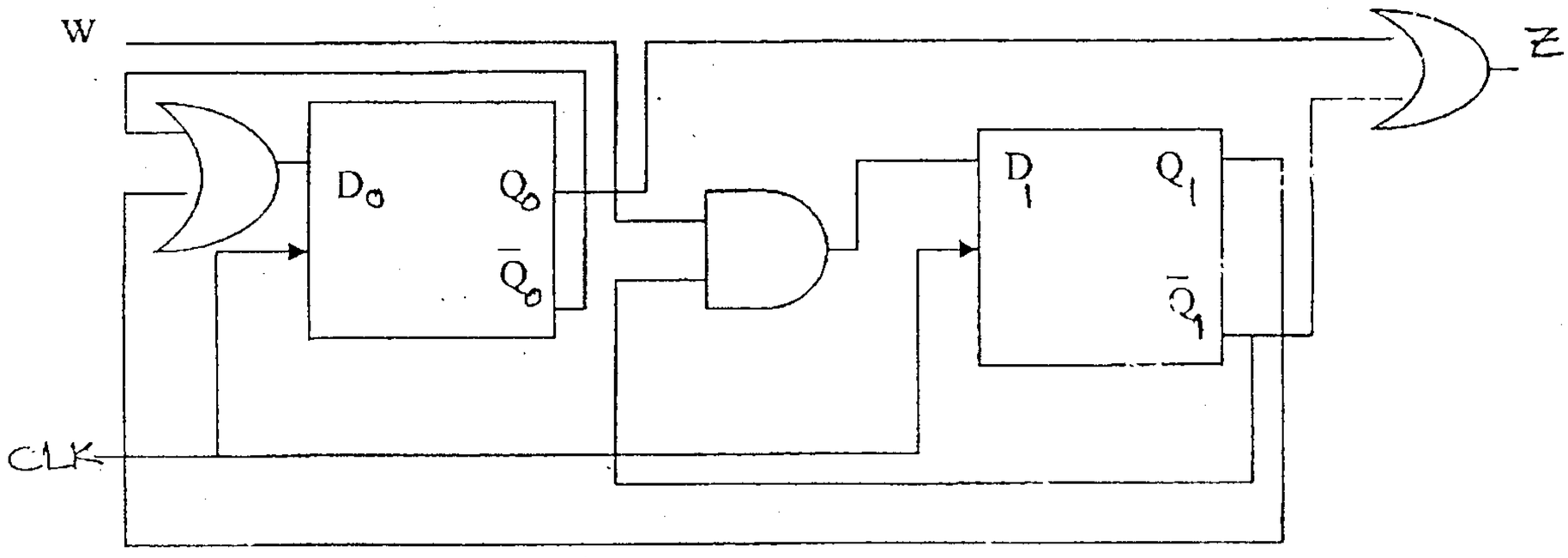
QP Code : NP-18678

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

N.B. : (1) Question No. **1** is **compulsory**.
(2) Solve any **three** from remaining **5** questions.
(3) Draw **neat** diagrams wherever **necessary**.

1. **(A)** Implement the following function using NOR gates only (after reduction using K map) **10**
F = π M (1,2,4,7,11,13) . d (9,15)
(B) Design a MOD 6 asynchronous counter and explain glitch problem. **10**

2. **(A)** Analyze the clocked synchronous machine given below. Write excitation equations, excitation/transition table and state /output table (Use state names A - D for Q1-Q2=00–11). Also draw the state diagram. **10**



(B) Design a 1 digit BCD adder using IC 7483 and explain the operation for **$(0111)_{BCD} + (1001)_{BCD}$**. **10**

3. **(A)** Write a VHDL code for 8:1 Multiplexer with active low enable input. **10**

(B) Design a mealy sequence detector to detect a sequence ----1101----using D flip-flops and logic gates. **10**

4. **(A)** Design a circuit with optimum utilization of PLA to implement the following functions **10**
$F1 = \sum m (1, 2, 3, 6, 9, 11)$
$F2 = \sum m (0, 1, 6, 8, 9)$
$F3 = \sum m (2, 3, 8, 9, 11)$

(B) Implement following function using 4:1 line MUX and NAND gates. **10**
$F (A, B, C, D) = \sum m (1, 2, 6, 7, 10, 12, 13)$

5. **(A)** Design a 8 bit binary up counter using MSI counter IC 74163, draw a circuit diagram and explain working. **10**

(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	F	1
C	F	E	0
D	B	G	1
E	F	C	0
F	E	D	0
G	F	G	0

6. Write short notes on (Any THREE): **20**
1. XC 4000 FPGA Architecture
2. Stuck at '0' and stuck at '1' fault
3. Master Slave JK flip flop
4. 2 input TTL NAND gate

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Con. 11974-14.

SE/E7RX/III CBGS 3/6/2014

CT

QP Code : **NP-18717**

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

N. B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **three** questions from **remaining** questions.
(3) Use **Smith chart** wherever **required**.
(4) **Assume** suitable **data if required.**
(5) **Attempt every question in a group and not randomly.**

1. (a) Check for Hurwitz polynominal **20**

$Q(s) = s^5 + s^3 + s^1$

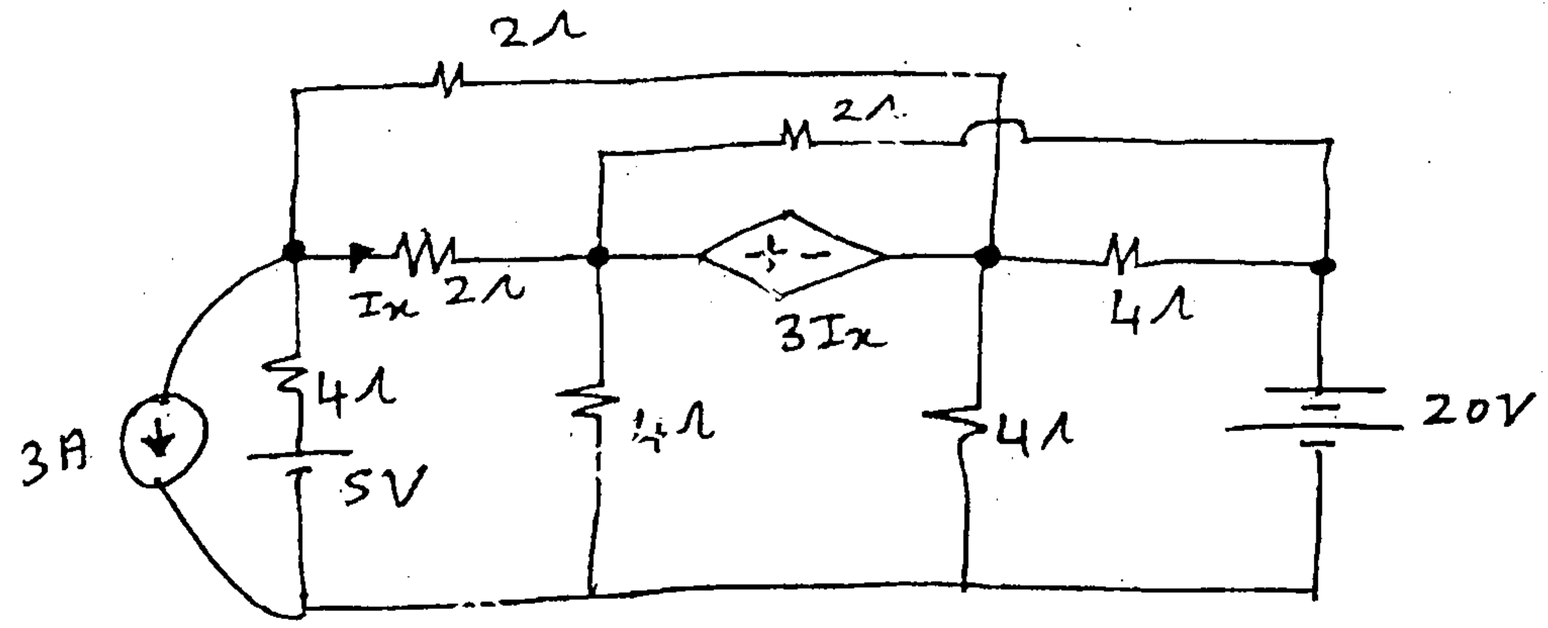
$Q(s) = s^4 + 6s^3 + 8s^2 + 10$

(b) Obtain s-domain (Laplace Transform) equivalent circuit diagram of an inductor and capacitor with initial conditions.

(c) Obtain Transmission parameters in terms of 'z' parameters.

(d) List the types of damping in a series R-L-C circuit and mention the condition for each damping.

2. (a) Obtain pover supplied by dependent voltage source **10**



(b) Compare and obtain Foster form I and form II using a example of RC ckt. **10**

$$Z(s) = \frac{(s+1)(S+6)}{s(s+4)(s+8)}$$

Also give a example of L-C and R-L ckt.

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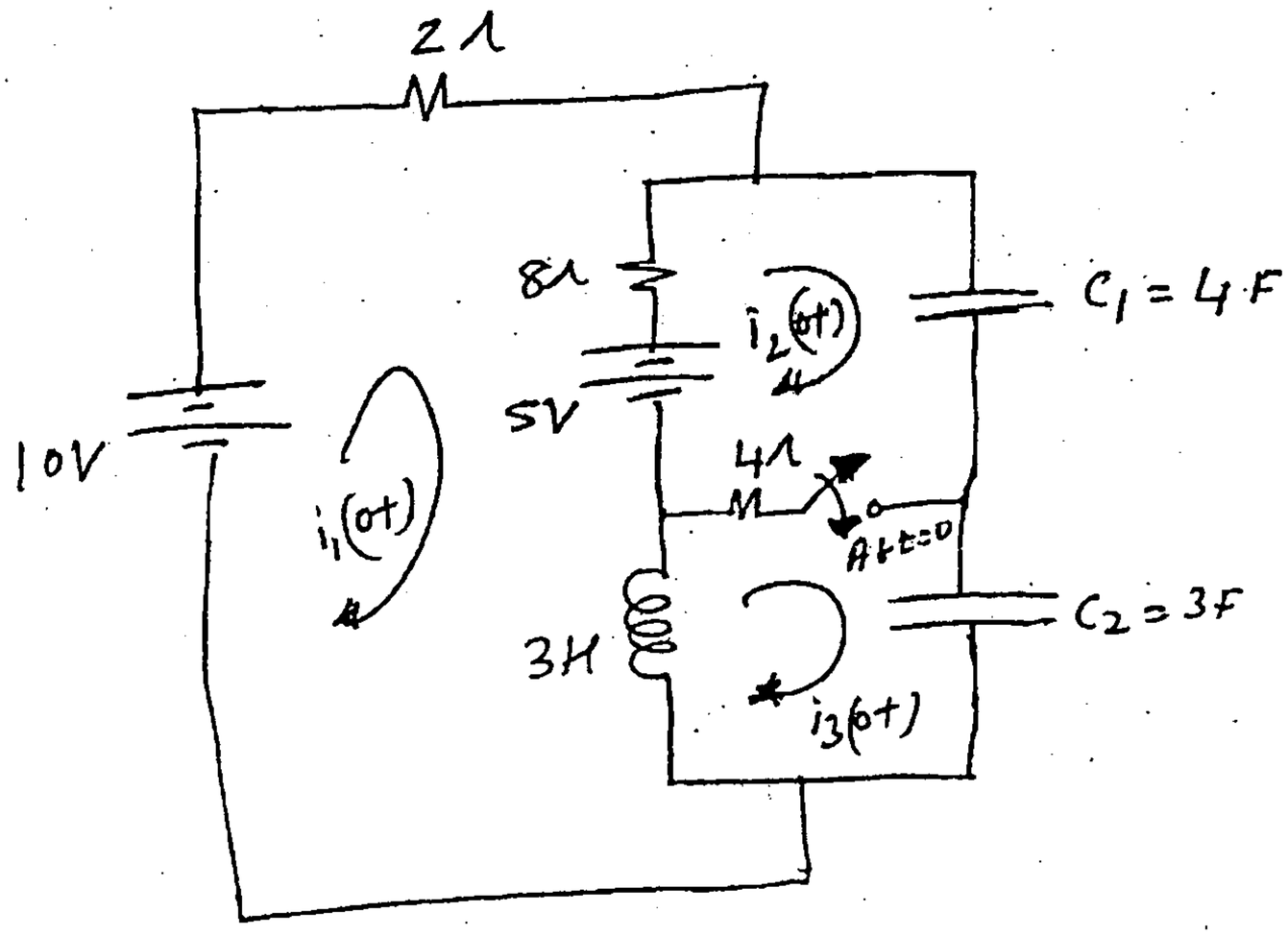
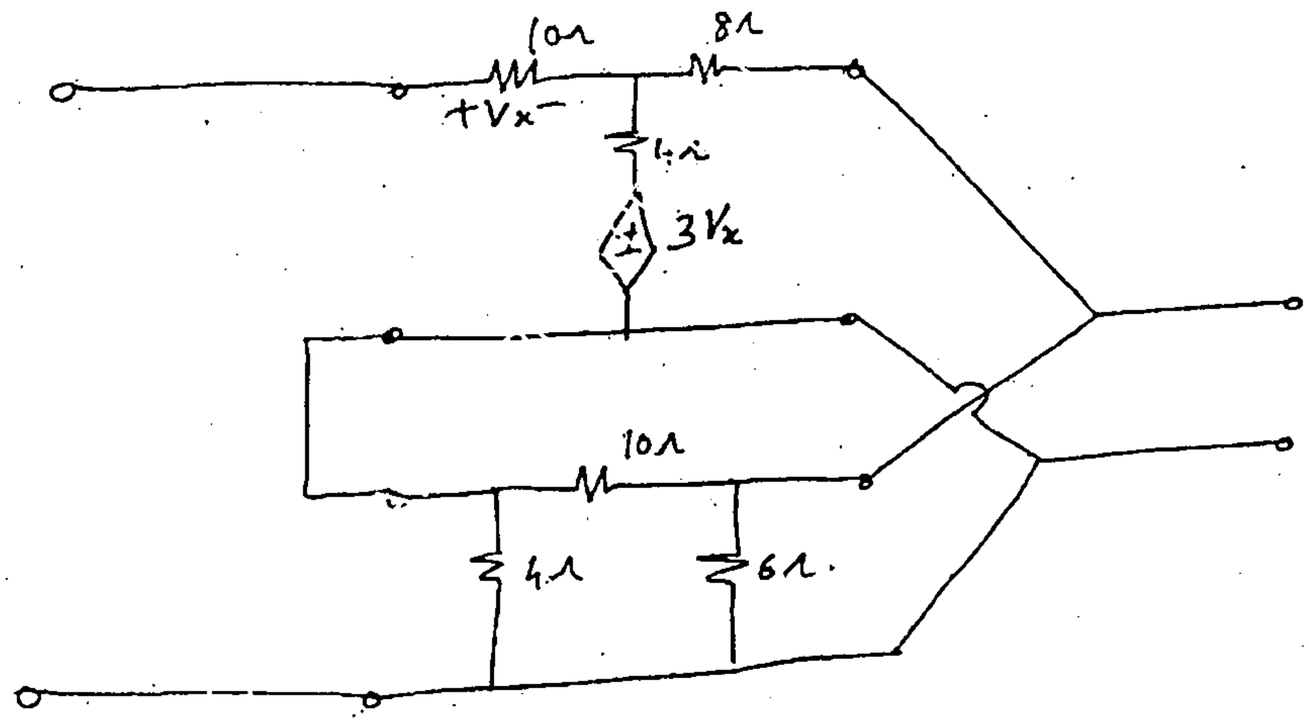
3. (a) Obtain $i_1(o+)$, $i_2(o+)$ and $i_3(o+)$ **10**



(b) Design a short circuit stub match for $Z_L = 450 - 600\ j(\Omega)$ **10**
for a line of $Z_O = 300\ (\Omega)$
and f = 20 MHz
use Smith charts.

4. (a) Obtain hybrid parameters of the intercorrected 'Two' 2-port networks **8**



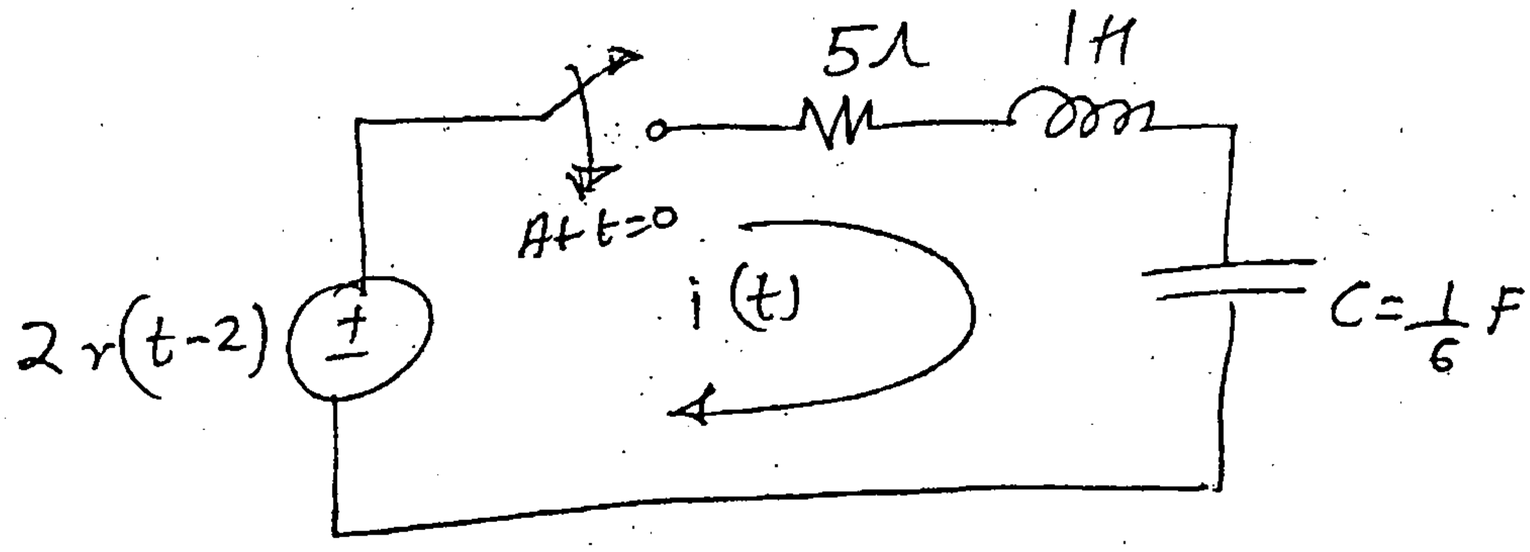
(b) Check for p.r.f. test **6**

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

(c) Compare Cauer Form I and Cauer Form II of a LC Network. **6**

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

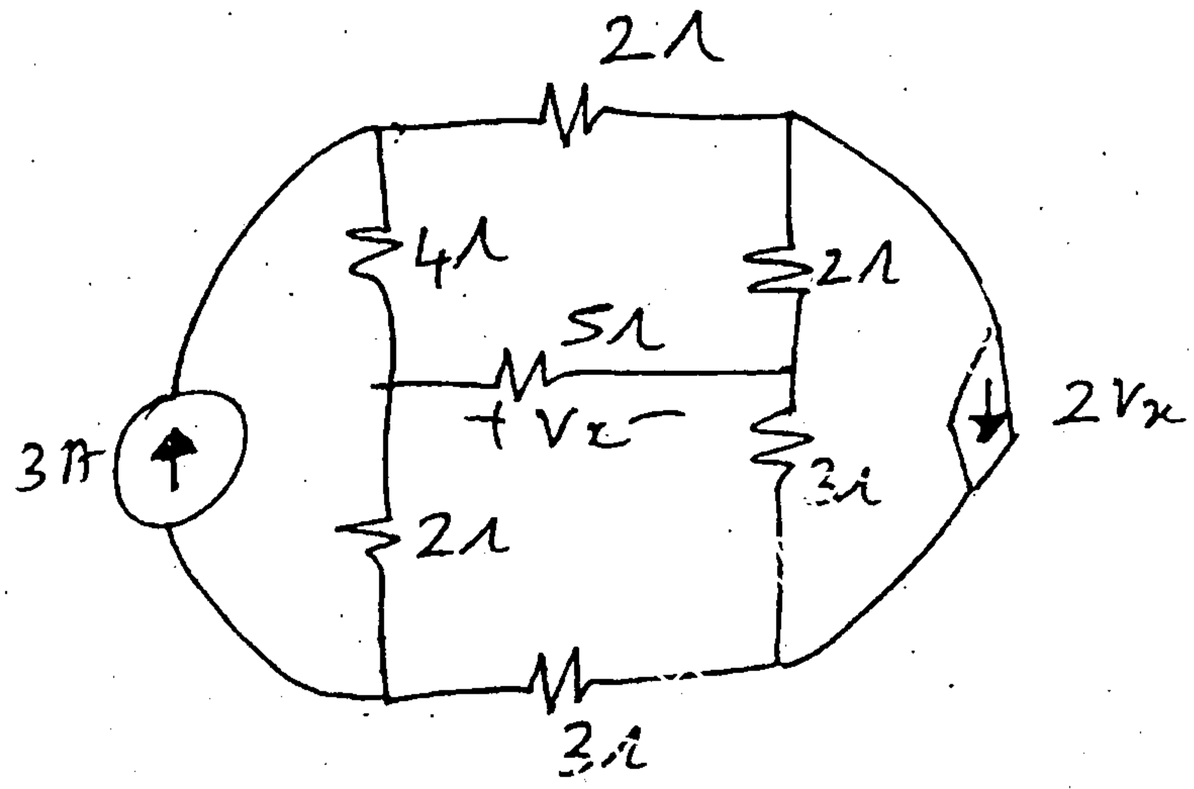
5. (a) Obtain i(t) for t > 0 **8**



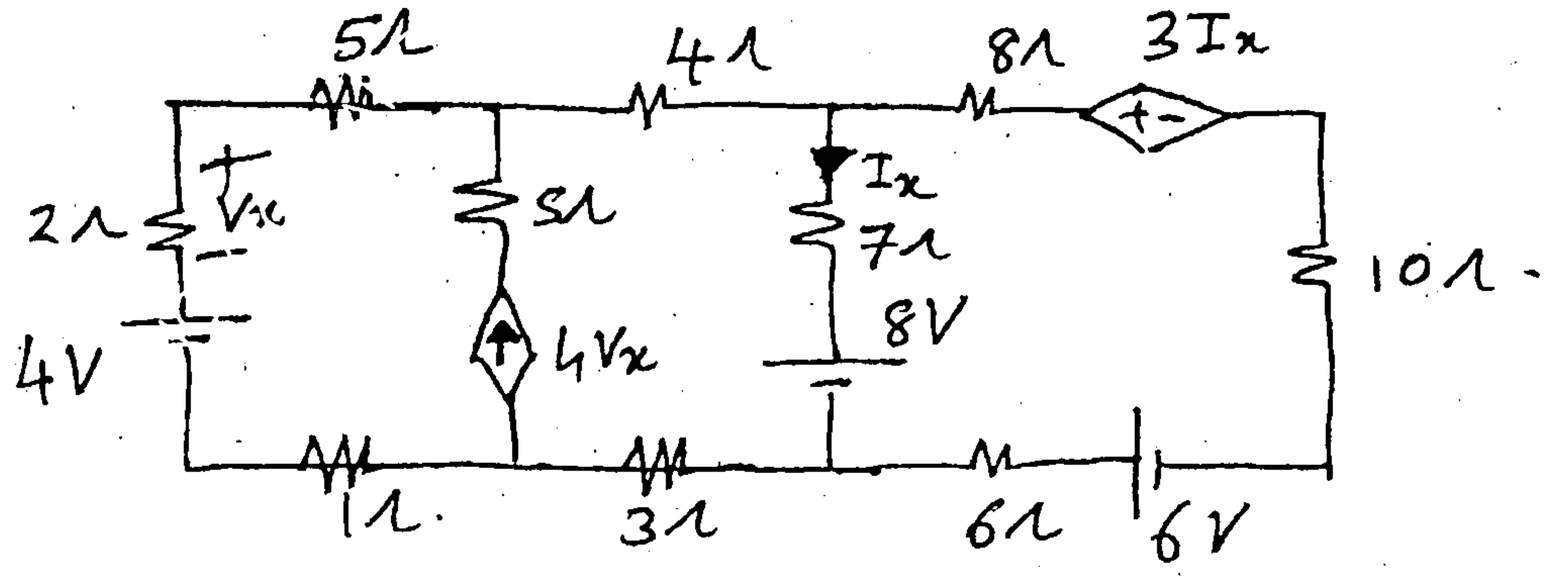
Where r(t) is a ramp signal.

(b) Derive an expression for characteristic equation of a transmission line. Also obtain α, β and γ of the line. **6**

(c) Obtain V_x using some shifting and source transformation technique. **6**



6. (a) Obtain Thevenin's equivalent circuit :- **8**



Hence find current flowing through 10Ω load.

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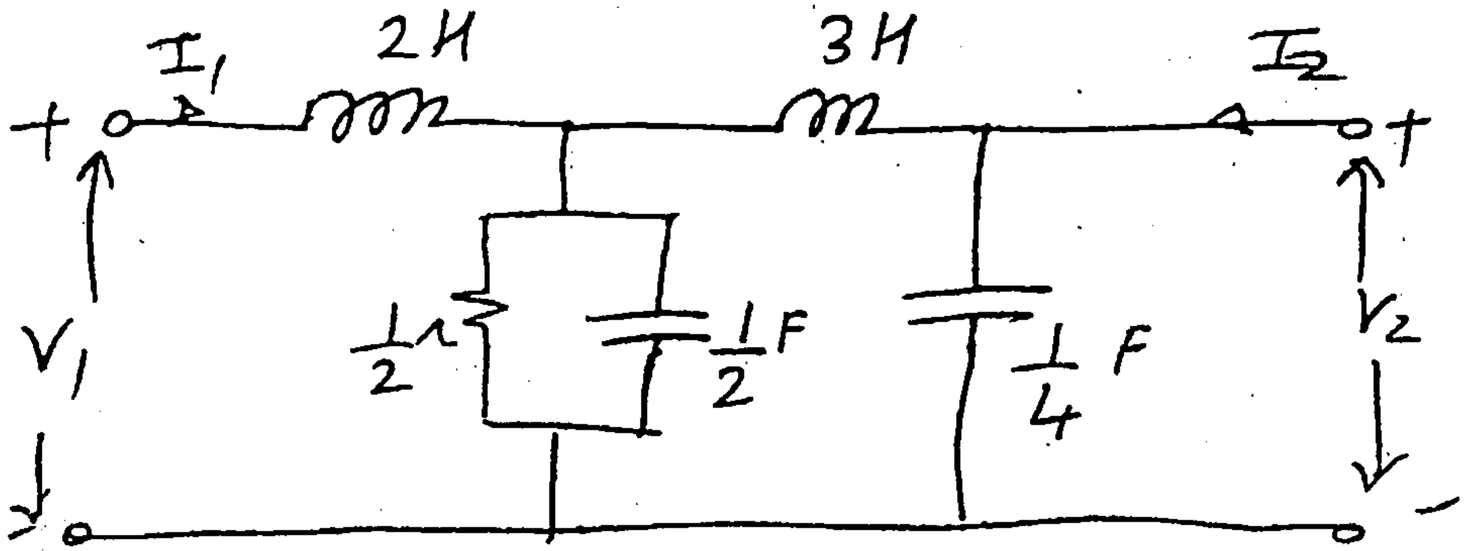
(b) Obtain $Z_{11}(s)$, $Z_{21}(s)$, $G_{21}(s)$ for the Laddar Network 8



(c) Explain various types of filters. 4