Bharatiya Vidya Bhavan's

Sardar Patel College of Engineering

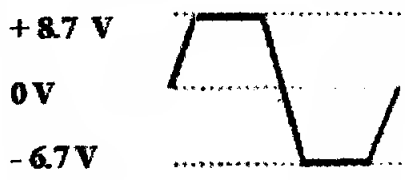
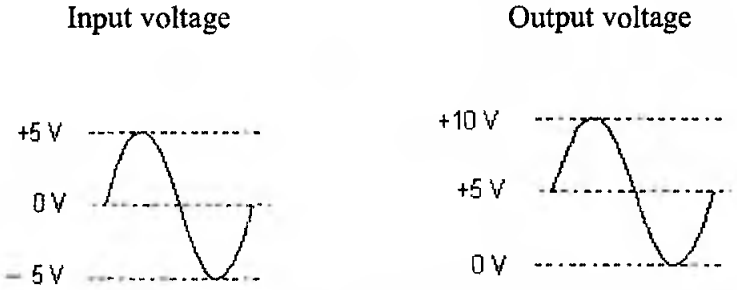
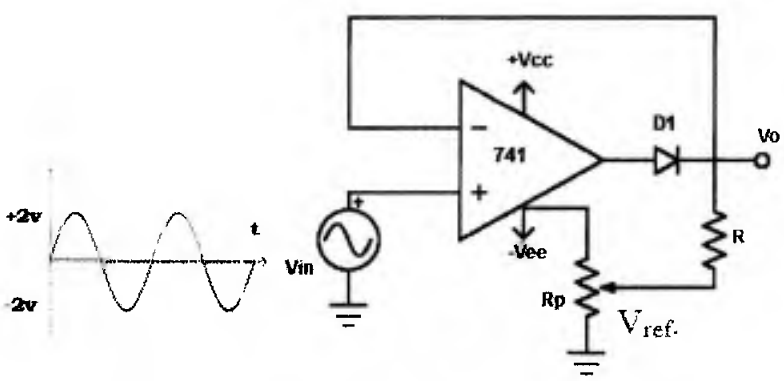
(A Government Aided Autonomous Institute)
Munshi Nagar, Andheri (West), Mumbai – 400058

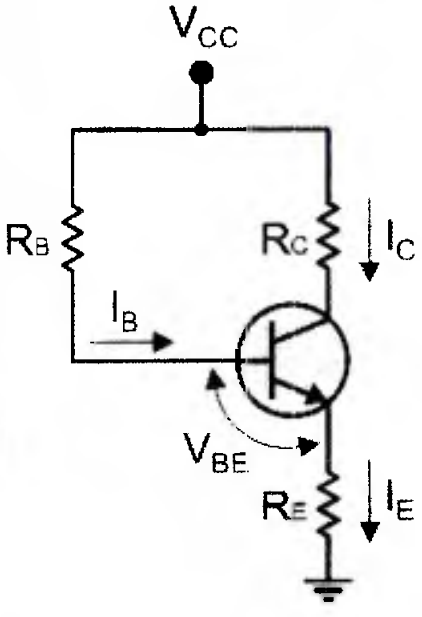
Re Exam June 2019

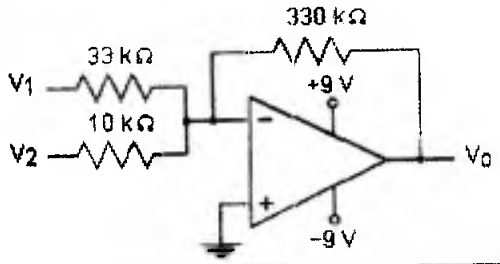
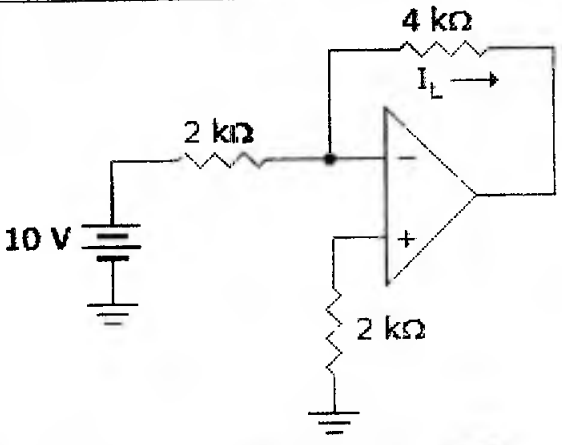
Program: Electrical Engineering
Course code: PC-BTE301
Name of the Course: Electronic Circuits

Duration: 3 Hour
Maximum Marks: 100
Semester: III

Solve any five questions out of seven

Q.No.		Points	CO	BL	PI
1A (i)	Design the circuit to get the output as shown if the input voltage is 10 sin 2000πt. Write clearly the assumptions made about diode used. 	05	1	6	1.4.1
(ii)	Select the proper components and draw the circuit diagram for the input and output waveforms shown. Explain the same. 	05	1	6	1.4.1
1 B	Find the output waveform and Explain the same. V_{in} is as shown. V_{ref} is derived from $-V_{EE}$ such that its value is -1V	10	1,4	3	1.3.1
					

2A (i)	The following specifications are given for the dual input, balanced-output differential amplifier : $R_C = 5\ k\Omega$, $R_B = 100\Omega$, $R_E = 500\ \Omega$, $+V_{CC} = 10V$, $-V_{EE} = -10\ V$, $h_{ie} = 2\ k\Omega$, $h_{fe} = 50$, $h_{oe} = 5\mu S$. Determine CMRR in dB.	**05**	**3**	**3**	**1.3.1**
(ii)	With respect to differential amplifier explain the role of current mirror circuit.	**05**	**3**	**2**	**1.3.1**
B (i)	Determine the quiescent operating point (I_{CQ} & V_{CEQ}) and $V_{CE\ Cut\text{-}off}$ & $I_{C\ Saturation}$ for the circuit shown below. Given : $\beta = 180$, $V_{CC} = 16\ V$, $R_B = 330K\ \Omega$, $R_C = 1100\ \Omega$, $R_E = 550\ \Omega$  	**05**	**2**	**3**	**2.1.3**
(ii)	In a certain JFET amplifier, $R_D = 1K$, $R_s = 560$, $V_{DD} = 10V$, $g_m = 4500\mu S$,. If the source resistor is completely bypassed, determine the voltage gain. State the assumption made if any.	**05**	**2**	**3**	**1.3.1**
3	State whether the following statements are true/false. Justify the same.				
A	The input impedance of a MOSFET is of the order of several MΩ	**05**	**2**	**5**	**1.3.1**
B	An integrator works as high pass filter.	**05**	**4**	**5**	**1.3.1**
C	Voltage follower is used as buffer for impedance matching.	**05**	**4**	**5**	**1.3.1**
D	Opamp is suitable for amplification of d.c. signals.	**05**	**4**	**5**	**1.3.1**
4A	Explain following terms with respect to FET (i) Pinch off voltage (ii) Transconductance (iii) Drain resistance	**10**	**2**	**2**	**1.3.1**
B	Draw block diagram of opamp and explain each block.	**10**	**4**	**2**	

5A (i)	Calculate the output voltage if $V_1 = V_2 = 0.15$ V. 	5	4	3	1.4.1
(ii)	Calculate I_L for the circuit shown below 	5	4	3	1.4.1
B	Explain how to calculate h parameters from BJT characteristics.	10	2	2	1.3.1
6A	Explain the OPAMP as a Schmitt Trigger. Draw corresponding waveforms. What is UTP and LTP?	10	4	2	1.4.1
B	With respect to proper circuit diagram and waveforms explain FWR using opamp.	10	4	2	2.1.3
7A	With neat circuit diagram explain successive approximation type ADC.	10	3	2	1.4.1
B	Explain the practical limitations of the Binary weighted resistor type DAC. How are they overcome?	10	3	2	1.4.1

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Munshi Nagar, Andheri (W) Mumbai - 400058

Re-Examinations- May 2019

Program: Electrical Engineering

Course Code: BS-BTE301

Course Name: Applied Mathematics III

Duration: 3 hours

Maximum Points: 100

Semester: III

Instructions:

1. Question No 1 is compulsory.
2. Attempt any four questions out of remaining six questions.

Q.No.	Questions	Points	CO	BL	PI
Q.1					
(a)	Find Fourier Series Expansion of $f(x)=x^2,\ 0\le x\le 2\pi$	6	2	ii, iii	1.3.1
(b)	Evaluate $L^{-1}\left\{\frac{1}{s^4+4}\right\}$	6	1	iv, v	2.4.1
(c)	Find Eigen values and corresponding Eigen vectors of A^3, where $A=\begin{bmatrix}2&2&1\\1&3&1\\1&2&2\end{bmatrix}$	8	3	ii, v	2.4.1
Q.2					
(a)	For the following matrix A, find two non-singular matrices P and Q such that PAQ is in the normal form, where $A=\begin{bmatrix}2&1&-3&-9\\3&-3&1&3\\1&1&1&-3\end{bmatrix}$	6	3	i, ii	2.3.1
(b)	If $f(z)=u(x,y)+v(x,y)$ is analytic, then prove that $\left(\frac{\partial^2}{\partial x^2}+\frac{\partial^2}{\partial y^2}\right)\lvert f(z)\rvert^2=4\lvert f'(z)\rvert^2$	6	2	i, iii	1.1.1

(c)	Using Convolution theorem, evaluate $L^{-1}\left\{\frac{(s+2)^2}{\left(s^2+4s+8\right)^2}\right\}$	8	1	ii, iii	1.1 .1
Q.3					
(a)	Show that the set $S=\left\{1,\ x,\ \frac{3x^2-1}{2}\right\}$ is Orthogonal over $[-1,1]$	6	2	i, ii	2.4 .1
(b)	If $L\{f(t)\}=\frac{s}{2s^2-3s-4}$ find $L\left\{e^{-4t}f\left(\frac{t}{3}\right)\right\}$	6	1	ii, iv	2.4 .1
(c)	Using Cayley Hamilton Theorem, Find $A^5+3A^3+7A^2-2A$ where $A=\begin{bmatrix}2 & -1 & 1\\ 1 & 2 & -1\\ 1 & -1 & 2\end{bmatrix}$	8	3	iv, v	1.1 .1
Q.4					
(a)	Find an analytic function $f(z)=u(x,y)+iv(x,y)$ whose imaginary part is $v=\frac{x}{x^2+y^2}+\cosh x\cdot\cos y$	6	2	i, ii	1.1 .1
(b)	Reduce the following matrix to normal form and find its rank $A=\begin{bmatrix}-1 & -3 & 3 & -1\\ 1 & 1 & -1 & 0\\ 2 & -5 & 2 & -3\\ 3 & -6 & 3 & -4\end{bmatrix}$	6	3	iv, v	2.4 .1
(c)	Using method of Laplace Transforms solve following differential equation $\frac{d^2y}{dt^2}+\frac{dy}{dt}-2y=3\cos 3t-11\sin 2t,$ where $y(0)=0,\ y'(0)=6$	8	1	ii, iii	2.4 .1

5(a)	Determine constants a,b,c if $A=\frac{1}{3}\begin{bmatrix}1 & 2 & a\\ 2 & 1 & b\\ 2 & -2 & c\end{bmatrix}$ is orthogonal	6	3	i, ii	2.4 .1
(b)	Evaluate $L^{-1}\left\{\frac{7s-11}{(s+1)(s-2)^2}\right\}$	6	1	ii, iii	2.4 .1
(c)	Prove that the transformation $w=\frac{iz+2}{4z+i}$ transforms the real axis in the z-plane into a circle in the w-plane. Find the center and radius of that circle.	8	2	iv, v	1.1 .1
Q.6					
(a)	Evaluate $L\left\{te^{-2t}\sqrt{1+\sin 2t}\right\}$	6	1	ii, v	1.1 .1
(b)	Obtain half range Fourier cosine series expansion of $f(x)=Lx-x^2,\quad 0<x<L$	6	2	iv, v	2.4 .1
(c)	Test the consistency of the following equations and solve them if they are consistent $4x-2y+6z=8$ $x+y-3z=-1$ $15x-3y+9z=21$	8	3	i, ii	1.1 .1
Q.7					
(a)	If $\int_0^{\infty} e^{-2t}\sin(t+\alpha)\cdot\cos(t-\alpha)dt=\frac{3}{8}$, find the value of α (Use Laplace Transforms)	6	1	i, ii	1.1 .1
(b)	Find fixed points of $w=\frac{-2+(2+i)z}{i+z}$	6	2	ii, iii	2.4 .1
(c)	Find Fourier Series Expansion of $f(x)=\begin{cases}x-\pi & -\pi\le x\le 0\\ \pi-x, & 0\le x\le\pi\end{cases}$	8	3	ii, v	1.1 .1

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Munshi Nagar, Andheri (W) Mumbai – 400058

RE Exam – June 2019 Examinations

Program: Electrical
Course Code: PC-BTE303
Course Name: Digital Electronics

Duration: 3 hours
Maximum Points: 100
Semester: III

- Attempt **any 5** out of 7 questions
- Make suitable assumptions wherever necessary

Q.No.	Questions	Points	CO	BL	PI
1a.	Reduce the following using K-maps and implement the circuit $F(A,B,C,D,E) = \sum m(0,1,4,5,6,7,9,15,17,21,22,24,25,29,31)$	10	2	3	2.4.1
1b.	Design binary to gray code converter.	10	2	6	4.2.1
2a.	Perform the following i. $(1011011)_2 = (?)_8$ ii. $(F0C4)_{16} = (?)_{10}$ iii. $(10011)_2 - (11001)_2$ using 1's compliment method iv. $(46)_{10} = (?)_{XS-3}$ v. $(101)_2 * (101)_2$	10	1	2	1.2.1
2b.	Design a 5 bit comparator using a single IC 7485.	10	2	6	4.2.2
3a.	Design a 4 bit subtractor using IC 7483 and explain the working of the same.	10	2	6	4.2.1
3b.	Design a ripple mod 6 up counter using T flip flop having –ve edge triggered clock.	10	3	6	4.2.2
4a.	Explain the working of TTL NOR gate.	10	4	2	1.4.1
4b.	Implement 16:1 DeMux using 4:1 DeMux and additional gates (if required).	10	2	3	2.1.3
5a.	Explain working of JK flip flop with Preset and Clear inputs.	10	3	2	1.4.1
5b.	Do the following conversion: i. S-R flip flop to D flip flop ii. J-K flip flop to T flip flop	10	3	3	2.1.3

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RE Exam – June 2019 Examinations

6a.	Implement the following $f(A,B,C,D) = \sum m(0,1,3,5,7,8,9,10,12,13,15)$ using single 4:1 Mux	10	2	3	2.1.3
6b.	Suppose the receiver receives hamming code data as 1011111. Find out if there is any error or not and correct it if error is present.	10	1	4	2.4.1
7a.	Explain the right and left shift registers	10	3	2	1.4.1
7b.	Write Short note on i. Memories ii. Ring Counter iii. Non weighted codes	10	2,3,4	2	1.4.1

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ODD SEM JUNE 2019 RE-EXAMINATIONS

Program: S. Y. B.Tech Electrical
Course Code: PC-BTE 304
Course Name: Electrical Machine-I

Duration: 3 Hours
Maximum Points: 100
Semester: III

Notes: 1. Question No 1 is compulsory.

2. Attempt any four questions out of remaining six.

3. Figures to the right indicate full marks and Assume suitable data if necessary.

Q.No.	Questions	Points	CO	BL	PI
Q. 1.	Explain the following. **(Any Four)** (a) Visualization of magnetic field produced by Bar Magnet. (b) B-H curve of magnetic material. (c) Significance of Back EMF in DC machine. (d) Motoring & Generating action in DC machine. (e) Conditions for parallel operation of transformers.	20	1 1 2 2 3		
Q. 2 (a)	Derive the expression of torque as a partial derivative of stored energy with respect to angular position of a rotating element.	10	1		
Q. 2 (b)	Explain the difference between linear and nonlinear magnetic circuits and derive the expression of energy stored in the magnetic circuit.	2+8	1		
Q. 3 (a)	Explain the different transformer phasor groups and their arrangements in detail with one example of each group.	10	3		
Q. 3 (b)	Obtain the equivalent circuit parameters of 20 kVA, 2500/250V, 50Hz, single phase transformer referred to L.V. side & H.V. side from the following test data: OC Test | 250V | 1.4A | 105W on L. V. Side SC Test | 104V | 8A | 320W on H. V. Side Draw the equivalent circuit referred to L.V. side.	10	3		
Q. 4 (a)	Two 100kVA, single phase transformers are connected in parallel. Impedance of both transformers A & B are (0.5+j8) Ω and (0.75+j4) Ω respectively. Show how they will share a load of 180kW at 0.9 power factor.	8	3		

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ODD SEM JUNE 2019 RE-EXAMINATIONS

Q. 4 (b)	Discuss the uses of an autotransformer. Prove that for the same output and transformation ratio k=N2/N1, an autotransformer requires less copper than an ordinary two winding transformer.	4 8	3		
Q. 5 (a)	A 200 kVA transformer has an efficiency of 98% at full load. If the maximum efficiency occurs at three quarters of full load, calculate the efficiency at half load. Assume negligible magnetizing current and pf 0.8 at all loads.	10	3		
Q. 5 (b)	Explain the transformer switching current transient phenomenon in detail with necessary graph & figure.	10	3		
Q. 6 (a)	What is armature reaction in case of dc machine? Hence explain the demagnetizing and cross-magnetizing effect of it in detail.	1+3+3	2		
Q. 6 (b)	Draw and explain the torque speed characteristic of separately excited dc shunt machine.	3	2		
Q. 6 (c)	A 220 V, dc shunt motor takes 4 A at no-load when running at 700 rpm. The field resistance is 100 Ω. The resistance of armature at standstill gives a drop of 6 volts across armature terminals when 10 A were passed through it. Calculate (a) speed on load (b) torque in N-m and (c) efficiency. The normal input of the motor is 8kW.	10	2		
Q. 7 (a)	What is the role of commutator in dc motor? Hence explain the process of commutation in detail.	2+8	2		
Q. 7 (b)	The armature winding of 4-pole, 250 V dc shunt motor is lap connected. There are 120 slots, each slot containing 8 conductors. The flux per pole is 20 mWb and current taken by the motor is 25A. Ra and Rsh are 0.1Ωand 125Ω respectively. If the rotational losses amount to be 810 W find, (i) Armature torque (ii) Shaft torque and (iii) Efficiency of motor.	10	2		

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ODD SEM JUNE 2019 RE-EXAMINATIONS

Program: S. Y. B.Tech Electrical
Course Code: PC-BTE 304
Course Name: Electrical Machine-I

Duration: 3 Hours
Maximum Points: 100
Semester: III

Notes: 1. Question No 1 is compulsory.

2. Attempt any four questions out of remaining six.

3. Figures to the right indicate full marks and Assume suitable data if necessary.

Q.No.	Questions	Points	CO	BL	PI
Q. 1.	Explain the following. **(Any Four)** (a) Visualization of magnetic field produced by Bar Magnet. (b) B-H curve of magnetic material. (c) Significance of Back EMF in DC machine. (d) Motoring & Generating action in DC machine. (e) Conditions for parallel operation of transformers.	20	1 1 2 2 3		
Q. 2 (a)	Derive the expression of torque as a partial derivative of stored energy with respect to angular position of a rotating element.	10	1		
Q. 2 (b)	Explain the difference between linear and nonlinear magnetic circuits and derive the expression of energy stored in the magnetic circuit.	2+8	1		
Q. 3 (a)	Explain the different transformer phasor groups and their arrangements in detail with one example of each group.	10	3		
Q. 3 (b)	Obtain the equivalent circuit parameters of 20 kVA, 2500/250V, 50Hz, single phase transformer referred to L.V. side & H.V. side from the following test data: OC Test: 250V, 1.4A, 105W on L. V. Side SC Test: 104V, 8A, 320W on H. V. Side Draw the equivalent circuit referred to L.V. side.	10	3		
Q. 4 (a)	Two 100kVA, single phase transformers are connected in parallel. Impedance of both transformers A & B are (0.5+j8) Ω and (0.75+j4) Ω respectively. Show how they will share a load of 180kW at 0.9 power factor.	8	3		

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ODD SEM JUNE 2019 RE-EXAMINATIONS

Q. 4 (b)	Discuss the uses of an autotransformer. Prove that for the same output and transformation ratio k=N2/N1, an autotransformer requires less copper than an ordinary two winding transformer.	4 8	3		
Q. 5 (a)	A 200 kVA transformer has an efficiency of 98% at full load. If the maximum efficiency occurs at three quarters of full load, calculate the efficiency at half load. Assume negligible magnetizing current and pf 0.8 at all loads.	10	3		
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Q. 6 (c)	A 220 V, dc shunt motor takes 4 A at no-load when running at 700 rpm. The field resistance is 100 Ω. The resistance of armature at standstill gives a drop of 6 volts across armature terminals when 10 A were passed through it. Calculate (a) speed on load (b) torque in N-m and (c) efficiency. The normal input of the motor is 8kW.	10	2		
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ODD SEM JUNE 2019 RE-EXAMINATIONS

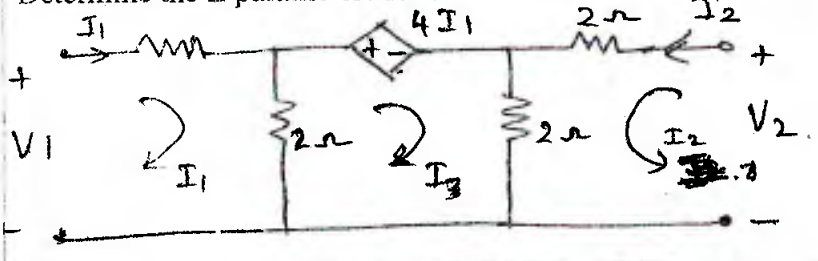
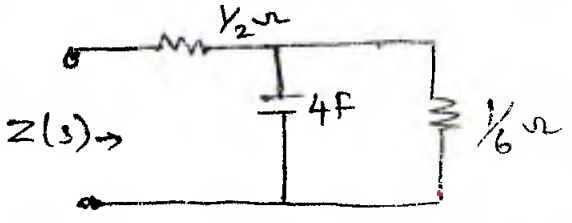
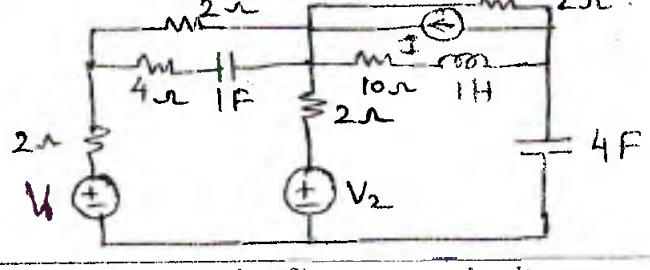
Program: Electrical Engineering
Course Code PC-BTE302

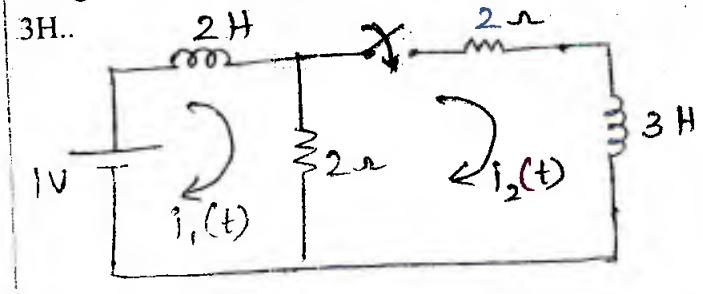
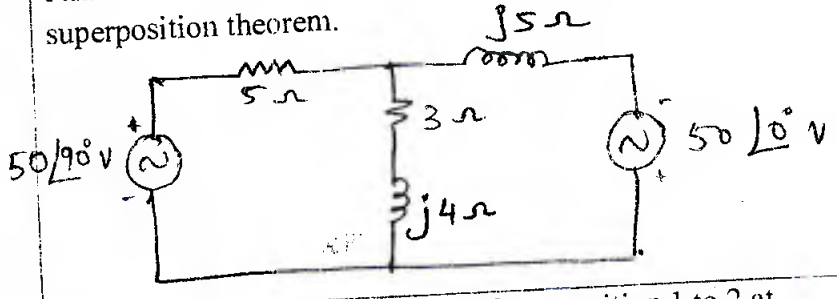
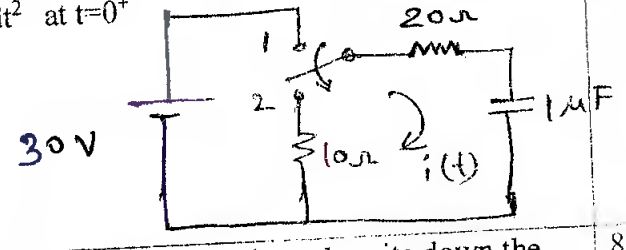
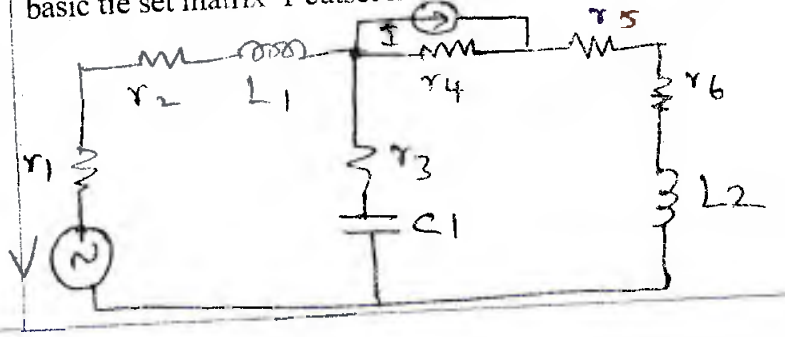
Duration:3 hours
Max points: 100 marks

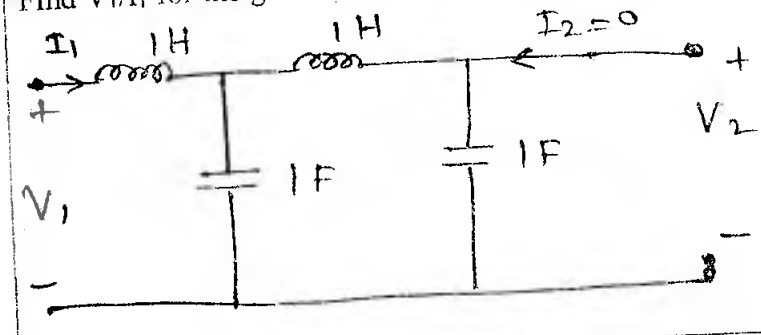
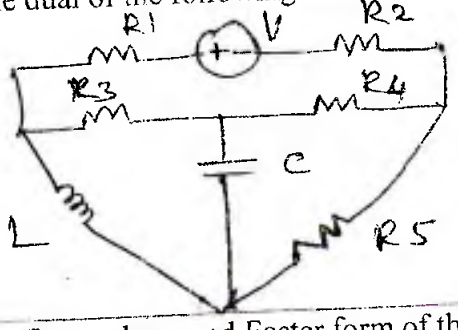
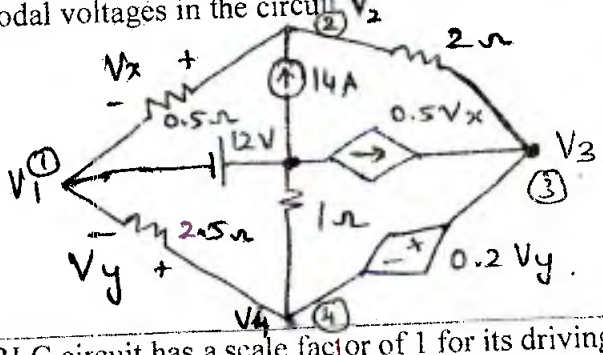
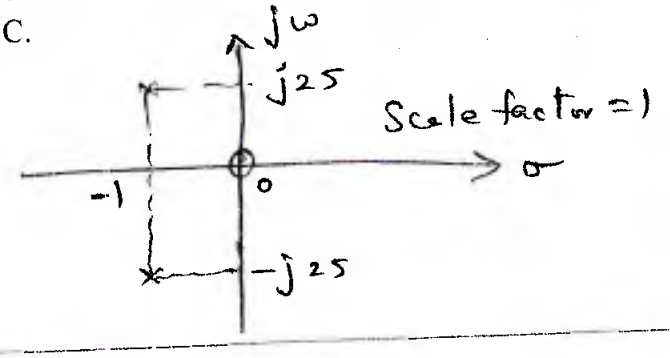
Name of the Course: Electrical Networks

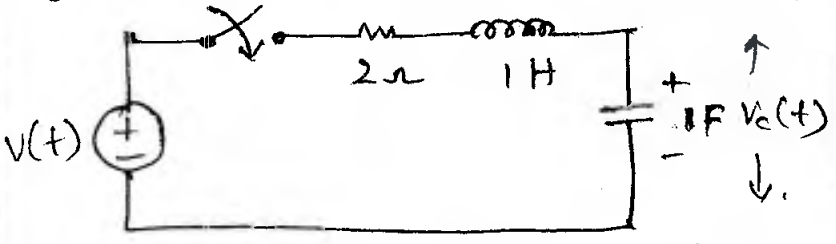
Semester: III

Note: Question No1 is compulsory
Answer any 4 from the remaining six questions.
Assume suitable data if missing

QN		Marks	CO	BL	PI
1a.	Determine the Z parameters for the network. 	5	4	3	1.3.1
b.	Determine Z(s)-the input impedance for the network .Find out the poles and zeros of Z(s) and plot them on s plane 	5	3	3	1.3.1
c.	Draw the oriented graph and obtain the incidence matrix 	5	3	3	1.3.1
d	Derive the expression for current and voltage across a capacitor and plot current and voltage as a function of time	5	4	5	2.4.3

2a.	In the network shown the switch is closed at t=0,steady state being reached before t=0.find the current through inductor of 3H.. 	10	2	3	1.3.1
b.	Check whether the function $Z(s)=\frac{s(s+3)(s+5)}{(s+1)(s+4)}$ is a positive real function.	10	3,4	5	2.4.1
3a	Find the current through the 3+j4 ohm impedance using superposition theorem. 	10	1	3	1.3.1
b	In the network switch is changed from position 1 to 2 at t=0,steady state condition reached before switching.Find the values of i,di/dt,d^2i/dt^2 at $t=0^+$ 	10	2	3	2.2.3
4a	For the given network draw the oriented graph write down the basic tie set matrix f-cutset matrix and incidence matrix 	8	2	3	2.1.3

b	Find V_1/I_1 for the given circuit. 	8	3,4	3	2.1.3
c.	Draw the dual of the following network 	4	2	2	1.3.1
5a	Find the first and second Foster form of the driving point impedence function. $Z(s)=\frac{(s+1)(s+3)}{s(s+2)}$	10	4	3	1.3.1
b	Find the nodal voltages in the circuit 	10	1	3	1.3.1
6a	A series RLC circuit has a scale factor of 1 for its driving point admittance.Pole zero diagram is ahown in fig,Find the values of R,L,and C. 	10	4	3	1.3.1

b.	A series RLC circuit is connected to a 200V ac supply.The current drawn by the circuit at resonance is 20A.The voltage drop across the capacitor is 5000V at series resonance. Calculate the resistance and inductance if capacitance is 4μF,and calculate the resonant frequency.	10	1	3	2.2.3
7a.	Synthesize the following driving point impedance in Cauer I and Cauer II form $Z(s)=\frac{(s+2)(s+6)}{s(s+1)(s+3)}$	10	4	3, 4	2.1.3
b	Find the impulse response of the voltage across a capacitor for the given network.also determine response $v_c(t)$ for step input. 	10	2,3	3	2.1.3