Bharatiya Vidya Bhavan's

SARDAR PATEL COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)

Munshi Nagar, Andheri (W) Mumbai – 400058

END SEMESTER-EXAMINATION - DECEMBER 2023

Program: S.Y.B.Tech (Electrical) Sem III

Duration: 3 Hours

Course Code: BS-BTE301

Maximum Points: 100

Course Name: Laplace Transform, Vector calculus & Linear Algebra

Semester: III

Note:

1. **Attempt Any Five Questions**
2. **Answers to the sub questions should be grouped together**
3. **Use of CALCULATOR is prohibited.**

		Questions	Points	CO	BL	Module
1	a	Determine the constants a, b and c if the matrix $A=\frac{1}{3}\begin{bmatrix}1 & 2 & a\\ 2 & 1 & b\\ 2 & -2 & c\end{bmatrix}$ is orthogonal	6	3	BL5	6
	b	Evaluate $L^{-1}\left\{\frac{s+2}{\left(s^2+4s+8\right)\left(s^2+4s+13\right)}\right\}$	6	1	BL5	2
	c	Find Eigen Values and corresponding Eigen Vectors of $A=\begin{bmatrix}3 & -2 & 3\\ 10 & -3 & 5\\ 5 & -4 & 7\end{bmatrix}$	8	3	BL3	7
2	a	Evaluate $\int_C \left(x^2-y^2+x\right)dx-\left(2xy+y\right)dy$ from origin to $(4,2)$ along a parabola $y^2=x$.	6	2	BL5	4
	b	Reduce the following matrix A to normal form and hence find its rank	6	3	BL2	6

END SEMESTER-EXAMINATION - DECEMBER 2023

		$A=\begin{bmatrix}2&3&4&9\\3&4&5&10\\4&5&6&11\\5&6&7&12\end{bmatrix}$				
	c	Evaluate (i) $L\{te^t\sqrt{1+\sin t}\}$ (ii) $L\left\{\frac{\sin^2 t}{t}\right\}$	8	1	BL3	1
3	a	Find the sum and product of the Eigen Values of A^{-1} where $A=\begin{bmatrix}2&0&0&0\\3&4&0&0\\4&-5&-3&0\\5&6&7&1\end{bmatrix}$	6	3	BL4	7
	b	Prove that $\int_0^\infty \frac{e^{-\sqrt{2}t}\sinh t\cdot\sin t}{t}dt=\frac{\pi}{8}$	6	1	BL5	1
	c	Evaluate $\iint_S (\nabla\times\overline{F})\cdot\hat{n}ds$, where $\overline{F}=(x^2+y-4)\hat{i}+3xy\hat{j}+(2xz+z^2)\hat{k}$ and S is the surface of the paraboloid $z=9-(x^2+y^2)$ above XY plane.	8	2	BL5	5
4	a	Evaluate $L\left\{\int_0^t e^{-4u}\cdot\cos 2u\,du+2^{3t}\right\}$	6	1	BL5	1
	b	Evaluate $\oint_C[(2x^2-y^2)dx+(x^2+y^2)dy]$ where C is the region bounded by the X – axis and the upper half of the circle $x^2+y^2=4$	6	2	BL3	4
	c	Find two non-singular matrices P and Q such that PAQ is in the normal form	8	3	BL3	6

END SEMESTER-EXAMINATION - DECEMBER 2023

		$A=\begin{bmatrix}2 & -2 & 3\\ 3 & -1 & 2\\ 1 & 2 & -1\end{bmatrix}$				
5	a	Find the angle between the surfaces $x\log y = z^2-1$ and $x^2z = 2-y$ at P(1,1,1)	6	2	BL4 ,5	3
	b	Using Convolution Theorem, Evaluate $L^{-1}\left\{\frac{1}{s^3(s+1)^2}\right\}$	6	1	BL4	2
	c	Verify Cayley Hamilton Theorem for $A=\begin{bmatrix}2 & -1 & 1\\ 1 & 2 & -1\\ 1 & -1 & 2\end{bmatrix}$ and Hence find $A^5-2A^4+3A^3+A$	8	3	BL2 BL4	7
6	a	Prove that $\frac{\vec{r}}{r^3}$ is Solenoidal	6	2	BL5	3
	b	If $A=\begin{bmatrix}2 & -1 & 1\\ 0 & 1 & 3\\ 0 & 0 & -1\end{bmatrix}$, find A^{50}	6	3	BL3	7
	c	Using method of Laplace Transform, solve $\frac{d^2y}{dt^2}-2\frac{dy}{dt}+y=e^t,\quad y(0)=2,\ y'(0)=-1$	8	1	BL3 BL5	2
7	a	Find the directional derivative of $\phi(x,y,z)=x^3y+y^3z+z^3x$ at $(1,-1,3)$ in the direction of the normal vector to the surface $x^2+y^2+z^2=9$ at $(-2,2,1)$	6	2	BL2 BL3	3
	b	Test the consistency of the following equations and solve them if they are consistent	6	3	BL5	6

		$2x+3y-z-2=0$ $x+2y+z+3=0$ $3x+y-2z-1=0$				
	c	Verify Gauss Divergence Theorem for $\overline{F}=4x\hat{i}-2y^2\hat{j}+z^2\hat{k}$ over the surface of the cylinder $x^2+y^2=16,\ z=0,\ z=4$	8	2	BL1 BL3	5

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(Government Aided Autonomous Institute)

Munshi Nagar, Andheri (W) Mumbai – 400058

RE-EXAMINATION - February 2024

Program: S.Y.B.Tech (Electrical) Sem III **Duration: 3 Hours**

Course Code: BS-BTE301 **Maximum Points: 100**

Course Name: Laplace Transform, Vector calculus & Linear Algebra

Semester: III

9/2/24

Note:

1. **Attempt Any Five Questions**
2. **Answers to the sub questions should be grouped together**
3. **Use of CALCULATOR is prohibited.**

		Questions	Points	CO	BL	Module
1	a	Determine the constants a, b and c if the matrix $A=\frac{1}{3}\begin{bmatrix}1 & 2 & a\\ 2 & 1 & b\\ 2 & -2 & c\end{bmatrix}$ is orthogonal	6	3	BL5	6
	b	Evaluate $L^{-1}\left\{\frac{s}{(s+1)(s+2)(s+3)}\right\}$	6	1	BL5	2
	c	Find Eigen Values and corresponding Eigen Vectors of $A=\begin{bmatrix}2 & 1 & 1\\ 2 & 3 & 2\\ 3 & 3 & 4\end{bmatrix}$	8	3	BL3	7
2	a	Evaluate $\int_C (x^2-y^2+x)dx-(2xy+y)dy$ from origin to $(1,1)$ along a parabola $y=x^2$.	6	2	BL5	4
	b	Reduce the following matrix A to normal form and hence find its rank	6	3	BL2	6

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RE-EXAMINATION - February 2024

		$A=\begin{bmatrix} 4 & -1 & 2 & 1 \\ 1 & 3 & 1 & 2 \\ -1 & 2 & 4 & 5 \\ 7 & 3 & 8 & 7 \end{bmatrix}$				
	c	Evaluate (i) $L\{te^t \cos 3t\}$ (ii) $L\left\{\frac{\cos at - \cos bt}{t}\right\}$	8	1	BL3	1
3	a	Find the sum and product of the Eigen Values of $adjA$ where $A=\begin{bmatrix} 2 & 0 & 0 & 0 \\ 3 & 5 & 0 & 0 \\ 4 & 7 & 3 & 0 \\ 5 & 6 & 7 & 1 \end{bmatrix}$	6	3	BL4	7
	b	Prove that $\int_0^\infty \frac{e^{-\sqrt{2}t}\sinh t \cdot \sin t}{t}dt = \frac{\pi}{8}$	6	1	BL5	1
	c	Evaluate $\iint_S (\nabla \times \overline{F}) \cdot n ds$, where $\overline{F} = (x^2+y-4)\hat{i} + 3xy\,j + (2xz+z^2)k$ and S is the surface of the paraboloid $z = 4-(x^2+y^2)$ above XY plane.	8	2	BL5	5
4	a	Evaluate $L\left\{\int_0^t e^{-3u} \cdot \sin 2u \; du + 4^t\right\}$	6	1	BL5	1
	b	Evaluate $\oint_C [(2x^2-y^2)dx + (x^2+y^2)dy]$ where C is the region bounded by the X – axis and the upper half of the circle $x^2+y^2=4$	6	2	BL3	4
	c	Find two non-singular matrices P and Q such that PAQ is in the normal form	8	3	BL3	6

RE-EXAMINATION - February 2024

		$A=\begin{bmatrix}3 & 2 & 1 & 4\\ 12 & 4 & 8 & 0\\ 9 & 5 & 4 & 9\end{bmatrix}$				
5	a	Find the angle between the surfaces $x\log y = z^2 - 1$ and $x^2 z = 2 - y$ at P(1,1,1)	6	2	BL4 ,5	3
	b	Using Convolution Theorem, Evaluate $L^{-1}\left\{\frac{1}{s^2(s-1)^3}\right\}$	6	1	BL4	2
	c	Verify Cayley Hamilton Theorem for $A=\begin{bmatrix}2 & -1 & 1\\ 1 & 2 & -1\\ 1 & -1 & 2\end{bmatrix}$ and Hence find $A^5 - 2A^4 + 3A^3 + A$	8	3	BL2 BL4	7
6	a	Prove that $\frac{\bar{r}}{r^3}$ is Solenoidal	6	2	BL5	3
	b	If $A=\begin{bmatrix}\alpha & \alpha\\ \alpha & \alpha\end{bmatrix}$, prove that $e^A = e^{\alpha}\begin{bmatrix}\cosh\alpha & \sinh\alpha\\ \sinh\alpha & \cosh\alpha\end{bmatrix}$	6	3	BL3	7
	c	Using method of Laplace Transform, solve $\frac{d^2y}{dt^2} - 3\frac{dy}{dt} + 2y = 4e^{2t}$, $y(0) = -3$, $y'(0) = 5$	8	1	BL3 BL5	2
7	a	Find the directional derivative of $\phi(x,y,z) = x^2y + y^2z + z^2x$ at $(1,2,3)$ in the direction of the normal vector to the surface $x^2 + y^2 + z^2 = 3$ at $(1,1,1)$	6	2	BL2 BL3	3
	b	Test the consistency of the following equations and solve them if they are consistent	6	3	BL5	6

RE-EXAMINATION - February 2024

		$3x-y+2z=1$ $x-2y+3z=3$ $x-y+z=-1$ $x+2y-z=3$				
	c	Verify Gauss Divergence Theorem for $\overline{F}=4x\hat{i}-2y^2j+z^2k$ over the surface of the cylinder $x^2+y^2=16$, $z=0$, $z=4$	8	2	BL1 BL3	5

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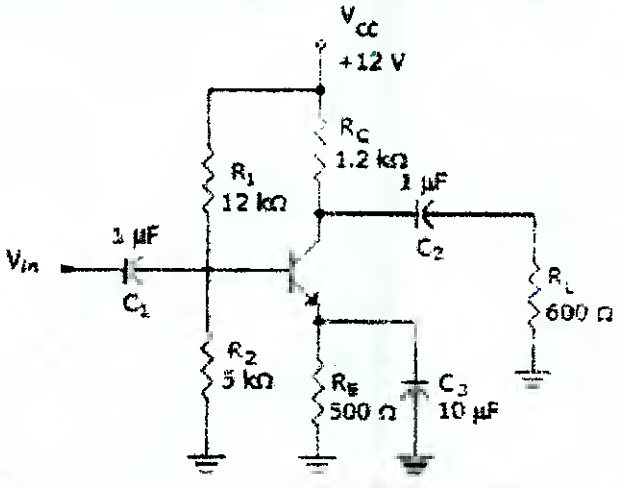
Sardar Patel College of Engineering
(A Government Aided Autonomous Institute)
Munshi Nagar, Andheri (West), Mumbai – 400058

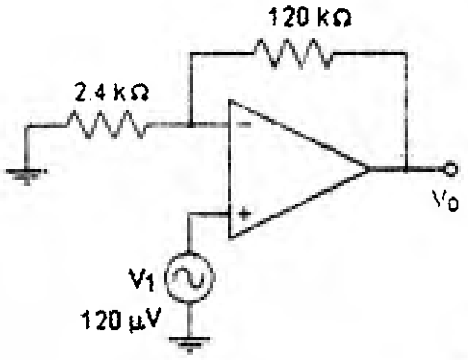
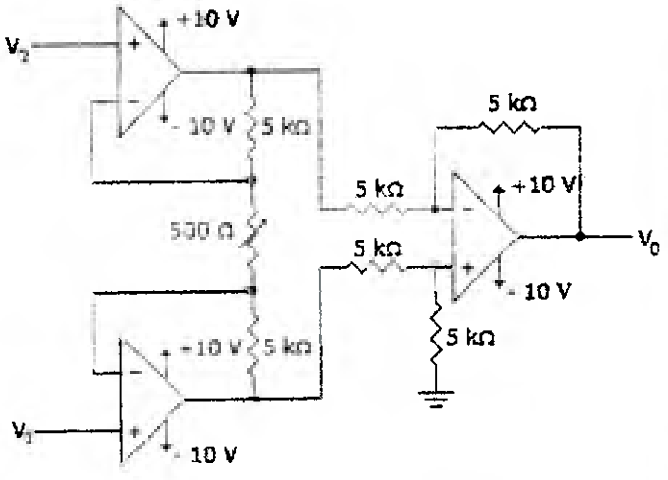
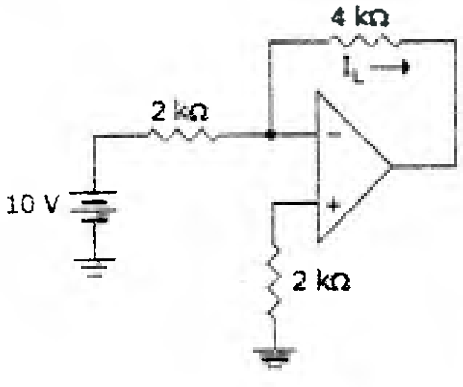
S. Y. **End Sem DEC 2023**

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

Duration: 3 Hour
Maximum Marks: 100
Semester: III

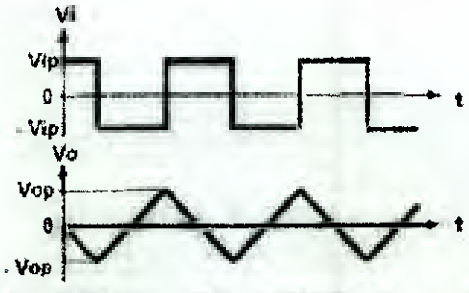
Solve any five questions out of seven.

Q. No.		Pts	CO	BL	Module
1. A	For the circuit shown below, (i) Draw DC and ac equivalent circuits. (ii) Determine I_{BQ}, I_{CQ}, V_{CEQ} assuming V_{BE} = 0.7V (iii) Determine Zi, Zo, Given h_{fe} = 100, h_{ie} = 2 kΩ.	10	1	3	1
					
B.	Explain how to calculate h parameters from BJT characteristics.	10	1	2	1
2A	In the circuit arrangement with FET, V_{GG} is 2 V, R_G = 1M Ω, R_D = 2KΩ, V_{DD} = 16 V. I_{DSS} = 10mA, V_P = - 3V. Draw the circuit diagram. Calculate V_{DSQ}. Which type of biasing is used? Explain the same.	8	1	3	2
B (i)	Draw the construction di of MOSFET and hence explain how it is different than JFET.	4	1	2	1
(ii)	Draw and explain ac equivalent circuit of JFET. Explain the parameters.	8	1	2	1
3A (i)	Calculate the CMRR in dB for a differential amplifier having a differential gain of 2000 and a common mode gain of 0.2.	2	2	3	3
(ii)	Explain the statement. 'Use of current mirror circuit enhances performance of differential amplifier'	8	2	2	3

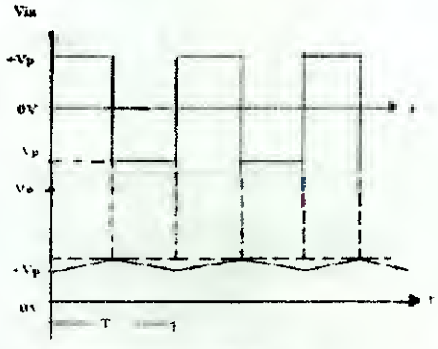
(iii)	Define CMRR. The following specifications are given for the dual input, balanced-output differential amplifier: R_C = 5 kΩ, R_S = 100Ω, R_E = 50 KΩ, $+V_{CC}$ = 10V, $-V_{EE}$ = -10 V, h_{ie} = 2 kΩ, h_{fe} = 50. Draw the circuit diagram showing components values. Determine A_d, A_c. Determine CMRR in dB.	10	2	3	3
4A (i)	Calculate the output voltage. 	1	2	3	4
(ii)	Calculate the output voltage for this circuit when V_1 = 2.215 V and V_2 = 2.225 V. 	2	2	3	4
(iii)	Calculate I_L for this circuit. 	2	2	3	4

(iv)	Opamp has open loop gain 20000 and bandwidth 40Hz. Determine unity gain frequency of the opamp.	1	2	3	4
(v)	Explain the statement with the help of proper circuit diagram and waveforms 'A zero-level detector is a comparator with a trip point referenced to zero'	4	2	2	4
B (i)	Fig. shows input output waveforms. Identify the application of opamp and draw the circuit diagram accordingly.	6	2	3	4

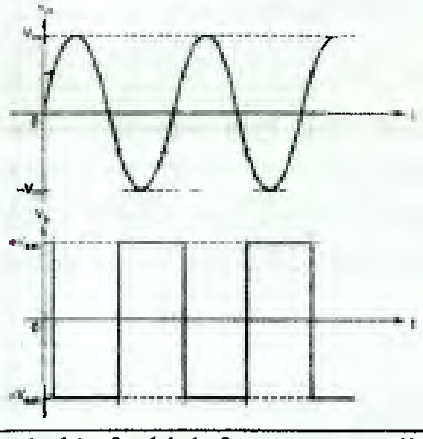
(a)



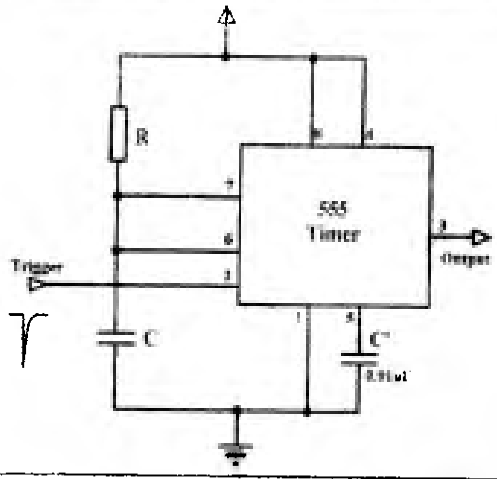
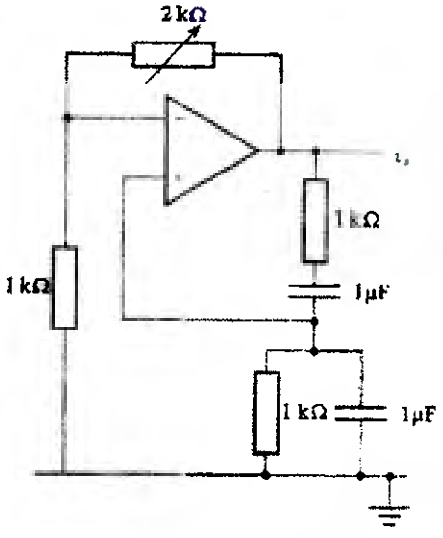
(b)



(c)



(ii)	Explain why opamp 741 is not suitable for high frequency applications.	4	2	1	4
5 A	Explain with the help of proper circuit arrangements and waveforms applications of IC 555 as PWM	10	3	2	5
B (i)	With respect to functional diagram of 555 explain function of 1. Trigger pin 2. Discharge pin	4	3	1	5
(ii)	Determine the frequency of oscillation for the astable multivibrator using IC-555. Given that $R_A = R_B = 2.5K\Omega$ and C = 100 pF.	2	3	3	5
(iii)	Identify the application of IC 555 in the following diagram. Hence draw the output waveform showing the timing details. Given Vcc = 12 V, trigger pulse variation is from 0 to - 5 V, R = 1 kΩ, C = 1μF	4	3	3	5

					
6 A (i)	Voltage gain of an amplifier without feedback is 100 dB. It decreases to 60dB with feedback factor. Determine the value of feedback	3	4	3	6
(ii)	Determine the voltage gain , i/p and o/p impedance with FB for the voltage series FB having A= -100, Ri = 10KΩ, Ro = 20KΩ, FB factor = -0.1	6	4	3	6
(iii)	The distortion in an amplifier with feedback is found to be 3%. The feedback factor is 0.04. When the feedback is removed, the distortion becomes 15%. Find the open and closed loop gain.	3	4	3	6
B	State whether following statements are true or false. Justify your answer.	8	4	5	6
(i)	Input impedance increases in case of current shunt feedback.				
(ii)	Gain of the amplifier stabilizes with negative feedback.				
7A	With a neat circuit diagram, Explain RC phase shift oscillator using BJT	10	5	2	7
B (i)	Calculate the frequency of oscillation. 	2	5	3	7
(ii)	State the Barkhausens criteria	2	5	1	7
(iii)	State and explain application of crystal oscillator.	2	5	1	7
(iv)	State whether following statement is True/False. Justify your answer. 'Oscillator circuit does not require any input signal.'	4	5	5	7

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Re Exam Feb 2024

Program: **Electrical Engineering** Sem III

Course code: **PC-BTE301**

Name of the Course: **Electronic Circuits**

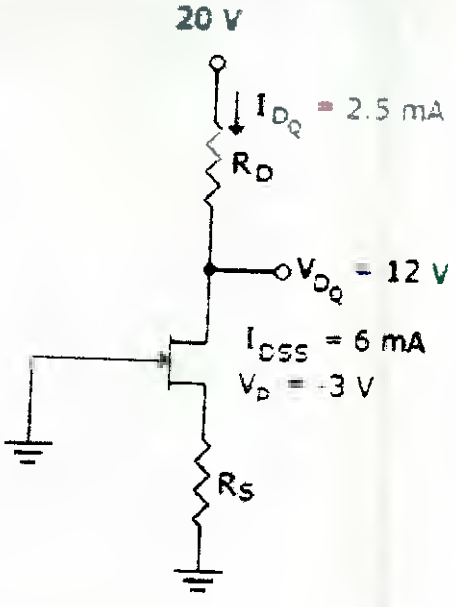
Duration: 3 Hour

Maximum Marks: 100

Semester: III

Solve any five questions out of seven.

Q. No.			Pts	CO	BL	M
1	A	State whether the following statements are true/false. Justify the same.	10		5	
	(i)	Higher the value of stability factor poor is the stability of the BJT amplifier.		1		
	(ii)	h_{fe} can be calculated from input characteristics of BJT		1		
	B	Draw the circuit of fixed bias BJT amplifier with V_{cc} = 9V, R_C = 0.5 K, R_B = 60K. Draw dc equivalent circuit. Hence determine I_{BQ}, I_{CQ}, V_{CEQ} and stability factor. Draw ac equivalent circuit. Hence determine input impedance, output impedance for the above circuit Given h_{ie} = 1.2KΩ, h_{fe} = 80	10	1	3	
2	A	State whether the following statements are true/false. Justify the same.	10		4	
	(i)	MOSFET is also referred to as IGFET		1		3
	(ii)	Transconductance g_m can be calculated from JFET characteristics.		1		2
	B	Given the values of V_{DQ} and I_{DQ} for this circuit, determine the required values of R_D and R_S. Explain the type of biasing used.	10	1	3	2



3A	With a neat circuit diagram explain working of differential amplifier. Describe different modes of operation.	10	2	2	3
B	The following specifications are given for the dual input, balanced-output differential amplifier : R_C = 3.3 kΩ, R_s = 150 Ω, V_{CC} and V_{EE} are 12V, and -12 V respectively, h_{fe} =100, h_{ie} = 1 kΩ, V_{BE} = 0.7V. R_E = 8.2 kΩ. Determine the operating points (I_{CQ} and V_{CEQ}) of the two transistors. Determine A_c, A_d, R_o, R_i, CMRR (dB).	10	2	3	3
4 A	Draw and explain block diagram of opamp.	8	2	1	4
B	Explain application of opamp as (i) integrator. ii) half wave rectifier	12	2	1	4
5 A	With a neat circuit diagram explain how the 555 is used as monostable multivibrator.	12	3	1	5
B	For an astable multivibrator, R_A = 2.2 KΩ, R_B = 6.8 KΩ, C = 0.01μF. Calculate T_{HIGH}, T_{LOW}, Frequency, Duty cycle.	08	3	3	5
6 A	What are the advantages of negative feedback?	08	4	1	6
B	With the help of suitable block diagram explain the different types of negative feedback. For each type give feedback factor, input resistance, output resistance.	12	4	1	6
7A	In RC phase shift oscillator feedback circuit provides phase shift of 90^0. State whether this statement is True/False. Justify with the help of corressponding circuit diagram.	10	5	5	7
B	Draw the circuit of wien bridge oscillator by selecting proper components	5	5	3	7
(i)	values to get oscillator frequency of 1.2kHz.				
(ii)	To generate a 1MHz signal, which is the most suitable circuit? Why?	5	5	2	7

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End Semester Exam
December 2023

Max. Marks: 100 Duration: 3 Hours
Class: S.Y. Mech/Electrical Sem **Semester: III** Program: B.Tech
Course Code : HSM BTM 307/ BTE 301

Organizational Communication and Interpersonal Skills

Note:

- ***Question 1 and Question 2 is Compulsory***
- **Out of remaining 5 questions attempt any 3**
- **Each question carries 20 marks**
- **Start every question from fresh page.**

Questions	Answer the following questions:	POINTS	CO	BL	PI
Q.1.	Attempt any ***Two questions out of Six.*** Each question carries Ten marks: A. Define a team. What are the types of teams? What are the advantages and disadvantages of working in a team? B. Differentiate between a leader and a Boss. Explain the six different leadership styles with an example each. C. Explain in detail Stephen Covey's Time Management Quadrant. What are the different techniques to be adopted for utilizing time effectively? D. "***Stress management*** helps in leading a happier and healthier life". What are some psychological and emotional signs of stress? E. Define reports. Explain contents of a report. F. List the prefatory parts of a report with an explanation	**20**	**01,2, 3,4,5**	**04**	**10.1. 3**
Q.2	All India Council of Technical Education has appealed the Principals of all engineering colleges to implement National Education Policy	**05+ 15**	**04**	**03**	**4.1.2**

	2020 with an immediate effect. The Principal Sardar Patel College of Engineering has appointed you as Dean Academics of the institute and has requested you to submit a feasibility report the pros and cons of implementing the NEP policy all across branches and semesters from 2024, January In the capacity of Dean Academics and Keeping the academics, Infrastructure, Laboratories, submit a **Memo Report** to Principal Dr Mohan Murudi, along with your five recommendations. (Apply minimum four procedures to collect the required data).	**20**			
Q.3.	Imagine you are the General Secretary of the college. The Chairperson Student Welfare Committee has requested you to submit a detailed program for SPHINX the annual technical and Cultural Event of the college to be conducted in the month of February for four days. Conduct the Student Council meeting to discuss the dates, Budget, List of events, Arrangements, list of Celebrities, Evening events.	**(20)**	**01**	**02, 03**	**3.1.1**
A.	Draft the notice and agenda for the meeting	**10**			
B.	Assuming the meeting conducted prepare the minutes of the meeting.	**10**			
Q.4	Draft a Job Application Letter for the Job opening mentioned below.	**(20)**	**02**	**01**	**10.1.2**
A.	Prepare a detailed resume for the post mentioned.	**10**			
B.	Wipro Eligibility Criteria for Fresher's 2024 • Candidate Should have 60% throughout their academics. • Students from Students who have completed Graduation and Graduation in BE, B.Tech or 5 Year Integrated M.Tech. • All Engineering Branches are Eligible. **Backlog Criteria** • Candidate should not have any backlog at the time of Selection Process. **Education Criteria** • Maximum 3 years in education gap ,if any, is allowed between 10th and graduation. • Candidate should have done a full degree course recognized by the Central/State Government of India.	**10**			

	Other Important Criteria • Students applying in Wipro must be Indian citizens or should carry a PIO or OCI card, in case holding a passport of any other country. • Candidate should have done a full degree course recognized by the Central/State Government of India • Students should be proficient in Microsoft, Canva, Matlab and C programming softwares. **Service Agreement** • Applicable for 15 months post joining @ INR 75,000 on pro rata basis				
Q.5. **A.** **B.**	Your best friend's concepts are clear and her reasoning is sound, but in the feedback to her presentations, the audience often says that she is very feeble. You just cannot hear her beyond the first two rows. She fumbles with words during presentations. She has also not made her PowerPoint slides properly as she has not read any rules for preparing PowerPoint presentations. You want to see her improve the quality of delivery of her presentations, as you feel this is a critical skill needed for going forward and achieving success as an engineer. What suggestions would you give her for presentations regarding improvement in the Content, Delivery, and Non-Verbal communication? What tips would you like to give for the talk power formula and the Visual Aids during presentation?	**(20)** **10** **10**	**05**	**04**	**10.1.3**
Q.6. A. **Q.6. B.**	"The first step in getting the right job and adding value to your career is to plan for your job". Explain sequentially the nuances and their stages to be focussed while planning. Prepare a detailed swot analysis in the quadrant for the Placements for Engineering students in SPCE.	**(10)** **(10)**	**02**	**01**	**10.1.2**
Q.7. A.	Multiple Choice questions: Each question carries 02 marks **1. Business Etiquette_____** **a. Ensures a business communicates with all the proper people** **b. Is a guide to personal success** c. Helps a business avoid civil rights complaints d. Ensures a professional business environment is maintained.	**(10)**	**01,03**	**03**	

	2. The four areas covered by business etiquette are: a. Texting, dress, computers and dinners b. informal, formal, verbal and non-verbal c. communication styles, dress and appearance, technology and social situations d. Communication Styles, transportation, financial and social situations e. None of these **3. You disagree with a point your boss made at your weekly brain storming session you:** a. random blurt your opinion in front of everyone b. politely disagree and suggest an alternative idea. c. ask to meet personally with your superior once the session is done to voice your objections d. complain to your co-workers behind your boss's back **4. It is casual Friday, but you have a meeting with a client. How should you dress that day?** a. casually b. A little nicer than usual, but nothing too formal c. In your Suit d. In business casual **5. Your office culture allows you to keep personal items on your desk and in your cubicle. You:** a. Fill your desk with pictures of family, kids, artwork and favourite Knick knacks b. Balance personal and office items. One in five objects can be personal c. Avoid displaying anything other than work related items d. your cubicle is for keeping papers and files so you do not have any space for personal items.					
Q.7. B.	Prepare your own business card and write 10 important etiquettes to be followed for a business card.	**(10)**				

Bharatiya Vidya Bhavan's

Sardar Patel College of Engineering
(A Government Aided Autonomous Institute)
Munshi Nagar, Andheri (West), Mumbai – 400058.
Re-Examination
February 2023

Max. Marks: 100 **Duration: 3 Hours**
Class: S.Y. Mech /Electrical/ [redacted] Sem II
Program: B.Tech

Course Code : HSM BTM 307/ BTE 301

13/2/23

Organizational Communication and Interpersonal Skills

Note:

- ***Question 1 and Question 2 is Compulsory***
- **Out of remaining 5 questions attempt any 3**
- **Each question carries 20 marks**
- **Start every question from fresh page.**

Questions	Answer the following questions:	POINTS	CO	BL	PI
Q.1.	Attempt any ***Two questions out of Four***. Each question carries Ten marks: **i.** Explain the contents of a report. **ii.** List ten most important Dining etiquette in to followed for formal dining. iii. What are the different methods to structure your presentation material? iv. Define meetings and the procedure for calling a meeting. What are the different types of minutes of a meeting?	**20**	**01,2, 3,4,5**	**04**	**10.1, 3**
Q.2	All India Council of Technical Education has appealed the Principals of all engineering colleges to improve the overall passing results of all semesters. The Principal Sardar Patel College of Engineering has appointed you as Dean Academics of the institute and has requested you to submit a detailed informative report on the reasons for student's poor performance in the exams and recommendations to improve the results, Submit a detailed Letter **Report** to Principal Dr Mohan	**05+ 15** **20**	**04**	**03**	**4.1.2**

	Murudi, along with your five recommendations. (Apply minimum four procedures to collect the required data).				
Q.3.	Imagine you are the General Secretary of the college. The Chairperson Student Welfare Committee has requested you to submit a detailed program for SPHINX the annual technical and Cultural Event of the college to be conducted in the month of February for four days. Conduct the Student Council meeting to discuss the dates, Budget, List of events, Arrangements, list of Celebrities, Evening events.	**(20)**	**01**	**02, 03**	**3.1.1**
A.	Draft the notice and agenda for the meeting	**10**			
B.	Assuming the meeting conducted prepare the minutes of the meeting.	**10**			
Q.4	Draft a Job Application Letter for the Job opening mentioned below.	**(20)**	**02**	**01**	**10.1.2**
A.	Prepare a detailed resume for the post mentioned.	**10**			
B.	Wipro Eligibility Criteria for Fresher's 2024 • Candidate should have 60% throughout their academics. • Students from Students who have completed Graduation and Graduation in BE, B.Tech or 5 Year Integrated M.Tech. • All Engineering Branches are Eligible. **Backlog Criteria** • Candidate should not have any backlog at the time of Selection Process. **Education Criteria** • Maximum 3 years in education gap, if any, is allowed between 10th and graduation. • Candidate should have done a full degree course recognized by the Central/State Government of India. **Other Important Criteria** • Students applying in Wipro must be Indian citizens or should carry a PIO or OCI card, in case holding a passport of any other country. • Candidate should have done a full degree course recognized by the Central/State Government of India • Students should be proficient in Microsoft, Canva, Matlab and C programming softwares. **Service Agreement**	**10**			

	• Applicable for 15 months post joining @ INR 75,000 on pro rata basis				
Q.5. A. **B.**	What suggestions would you give to yourself for presentations regarding improvement in the Content, Delivery, and Non-Verbal communication? Explain the talk power formula with an example of a speech and the Visual Aids during presentation?	**10** **10**	**05**	**04**	**10.1.3**
Q.6. A. **Q.6. B.**	What is Swot analysis? Write the questions that should be asked in each quadrants of swot. Prepare a detailed swot analysis in the quadrant for the Job market for Engineering students.	**(10)** **(10)**	**02**	**01**	**10.1.2**
Q.7. A.	Multiple Choice questions: Each question carries 02 marks **1. Business Etiquette_____** a. Ensures a business communicates with all the proper people b. Is a guide to personal success c. Helps a business avoid civil rights complaints d. Ensures a professional business environment is maintained. **2. The four areas covered by business etiquette are:** a. Texting, dress, computers and dinners b. informal, formal, verbal and non-verbal c. communication styles, dress and appearance, technology and social situations d. Communication Styles, transportation, financial and social situations e. None of these **3. You disagree with a point your boss made at your weekly brain storming session you:** a. random blurt your opinion in front of everyone b. politely disagree and suggest an alternative idea. c. ask to meet personally with your superior once the session is done to voice your objections d. complain to your co-workers behind your boss's back **4. It is casual Friday, but you have a meeting with a client. How should you dress that day?** a. casually	**(10)**	**01,03**	**03**	

	b. A little nicer than usual, but nothing too formal c. In your Suit d. In business casual **5. Your office culture allows you to keep personal items on your desk and in your cubicle. You:** a. Fill your desk with pictures of family, kids, artwork and favourite Knick knacks b. Balance personal and office items. One in five objects can be personal c. Avoid displaying anything other than work related items d. your cubicle is for keeping papers and files so you do not have any space for personal items.				
Q.7. B.	Prepare your own business card and write 10 important etiquettes to be followed for a business card.	**(10)**			

Bharatiya Vidya Bhavan's

SARDAR PATEL COLLEGE OF ENGINEERING

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

END SEM -JAN 2024

Program: SY Btech., Electrical Engineering Sem III

Course Code: PC-BTE302

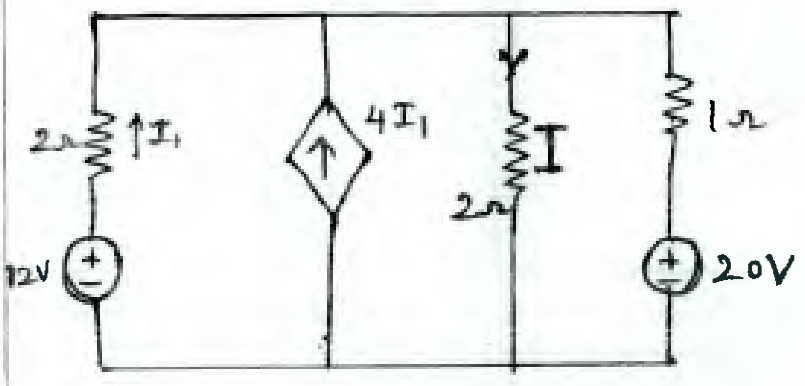
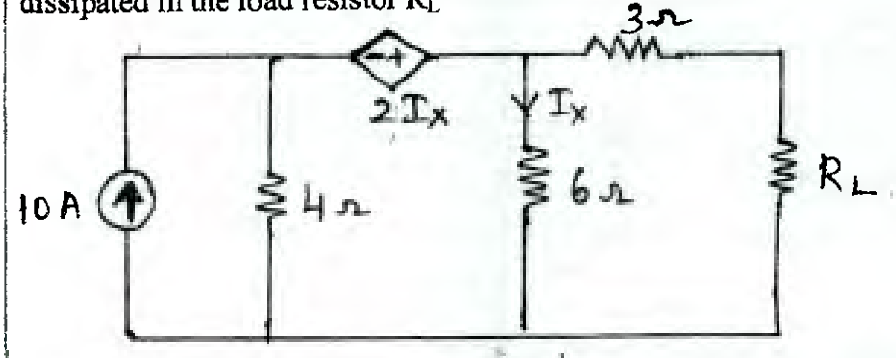
Course Name: Electrical Networks

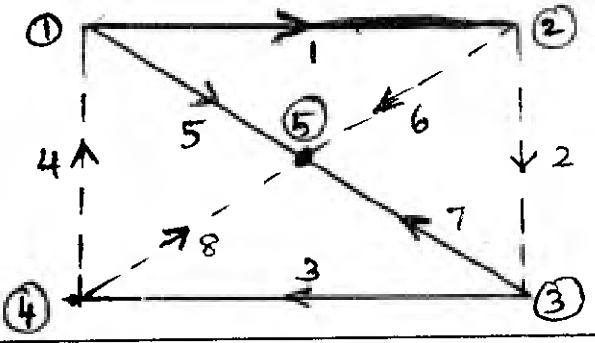
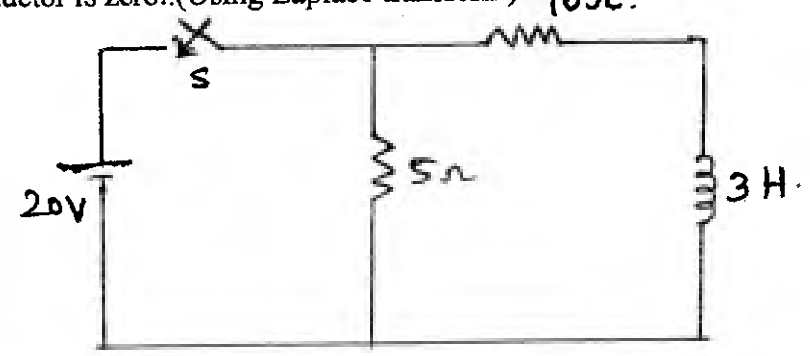
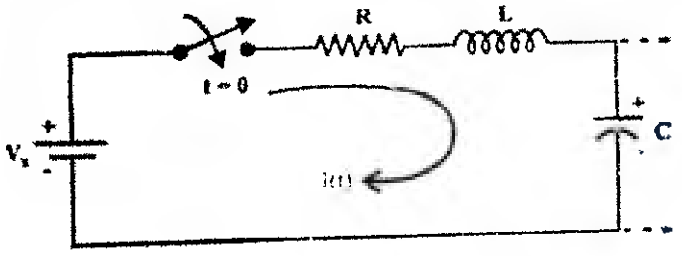
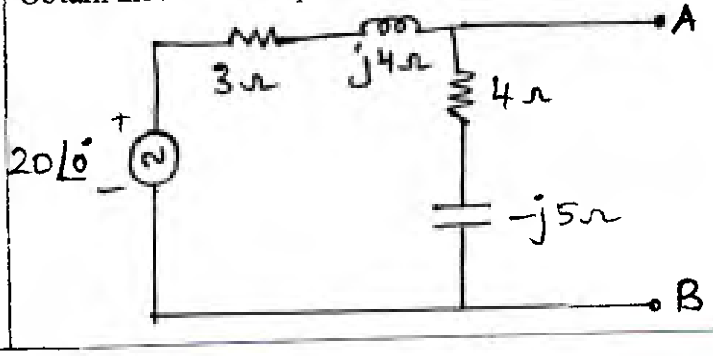
Duration:3 hours

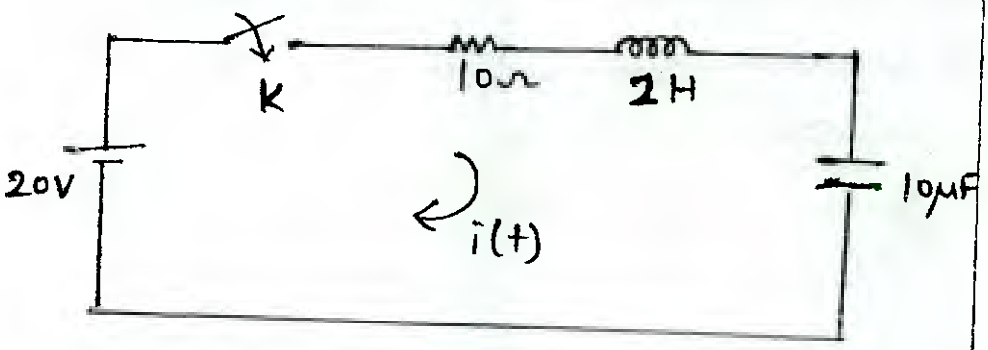
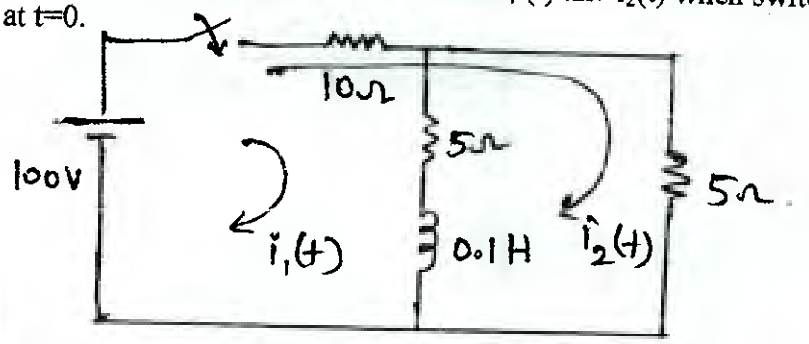
Maximum Points:100

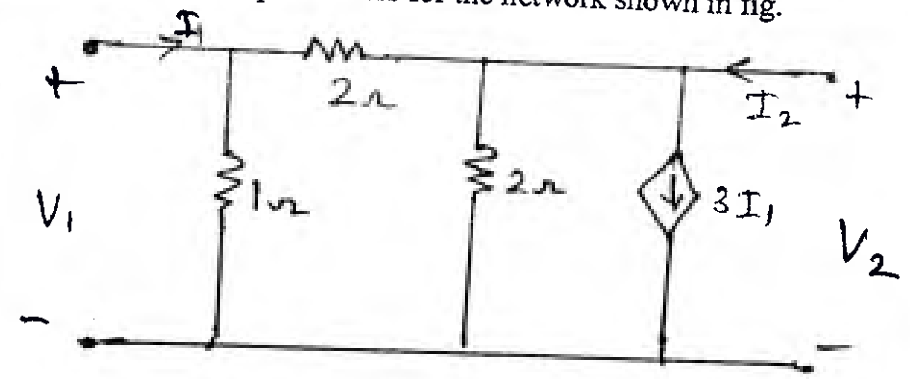
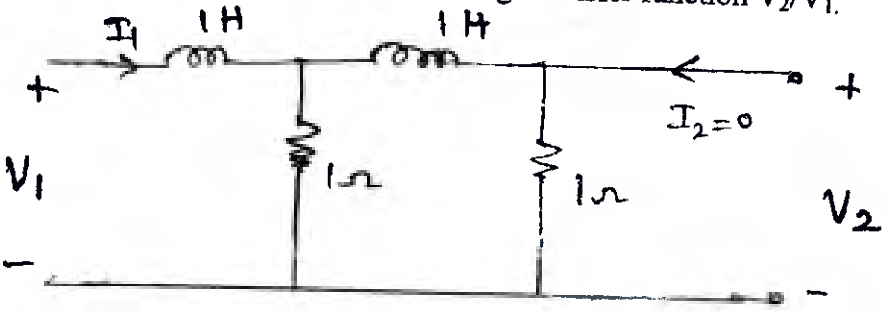
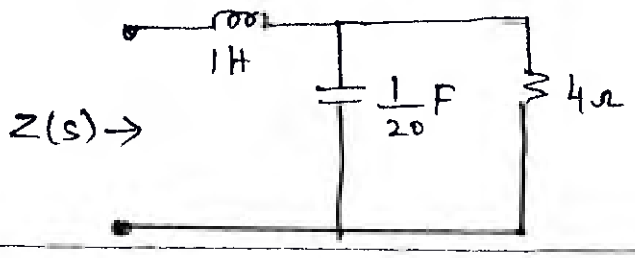
Semester:III

- Attempt any FIVE questions out of SEVEN questions.
- Answers to all sub questions should be grouped together.
- Figures to the right indicates full marks.

Q.No	Questions	Points	CO	BL
Q1.(a)	Find the current I through the 2 ohm resistor by superposition theorem. 	10	1	3
b)	For the given network calculate the maximum power that may be dissipated in the load resistor R_L 	10	1	3
Q2.(a)	Derive condition for maximum power transfer through complex load when load impedance has variable resistance .	6	1	2
2b)	Define i) tree of a graph ii)Driving point Functions iii)Transfer function iv)poles and zeros.	8	3,4	1

2c)	For the given linear graph of a network ,for the given tree (shown with firm lines ,including branches 1,5,7,3)write the i) incidence martrix ii) fundamental cut-set matrix iii) fundamental tie-set matrix. 	6	1	3
Q3(b)	For the circuit shown in fig determine the current in the 10 Ω resistor when the switch is closed at t=0.Assume initial current through the inductor is zero..(Using Laplace transform) 	12	2	3,4
b)	In the network of fig the switch is closed at t=0.Obtain the expression for current i(t) for t>0,GivenVs=100V, R=2Ω, L=1H, C=1μF...(Using Laplace transform). 	8	2	4
Q4(a)	Obtain the Nortons equivalent network across A and B 	8	1	3

b)	Check whether the following is Hurwitz $P(s)=2s^4+s^3+2s^2+4s+1$	4	3	3
c)	Obtain the expression of an Inductor current if it is connected to dc voltage source through a switch instantaneously and having a resistor in series. Assume initial conditions to be zero. Draw the profiles of V_R, V_L and I_L. Obtain the values of current for 5th time constant.	8	2	2,3
Q5.(a)	In the network switch K is closed at t=0. Assuming all initial conditions as zero, find I, di/dt, d^2i/dt^2 at $t=0^+$ 	8	2	3
Q5(b)	In the network determine the currents $i_1(t)$ and $i_2(t)$ when switch is closed at t=0. 	8	2	3
(c)	Draw the linear graph for [illegible] given incidence matrix. $A=\begin{bmatrix} 1 & 0 & -1 & 0 & 1 \\ -1 & 1 & 0 & 0 & 0 \\ 0 & -1 & 1 & -1 & 0 \end{bmatrix}$	4	1	2

Q6.(a)	Determine Y and Z parameters for the network shown in fig.  	10	3	3
6b)	Derive ABCD parameters for two port network.	5	3	2
c)	For the given network determine voltage transfer function V_2/V_1.  	5	4	3
Q7a)	Realise Cauer I and II forms of the following LC impedance function . $Z(s)=\frac{10s^4+12s^2+1}{2s^3+2s}$ **Or** Realise the Foster form I for the LC impedance function. $Z(s)=\frac{(s^2+1)(s^2+3)}{s(s^2+2)}$.	10 10	4 4	3 3
b)	Check whether the following function is positive real. $F(s)=\frac{s^2+6s+5}{s^2+9s+14}$ or Determine Z(s) in the network and find poles and zeros of Z(s) and plot them on s plane .Comment on the stability.  	10 10	3 3	4

Bharatiya Vidya Bhavan's

SARDAR PATEL COLLEGE OF ENGINEERING

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

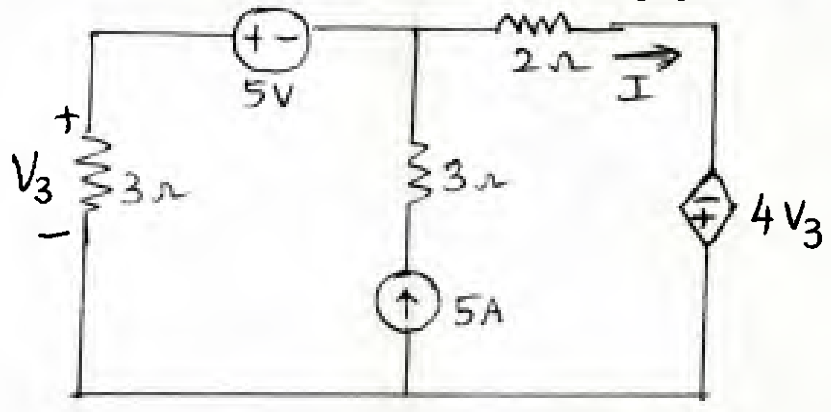
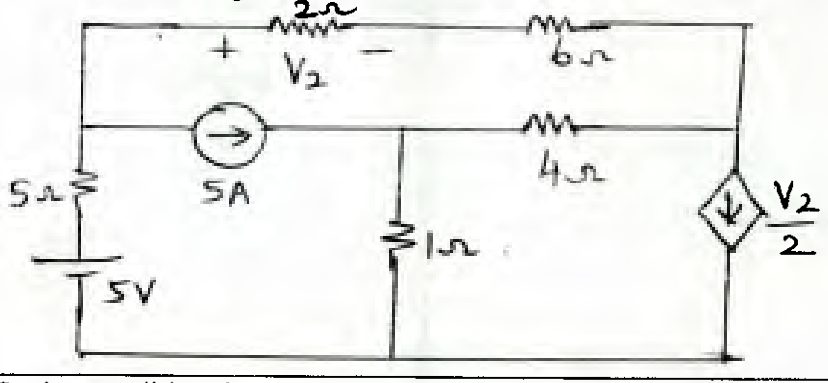
Re exam -FEB 2024

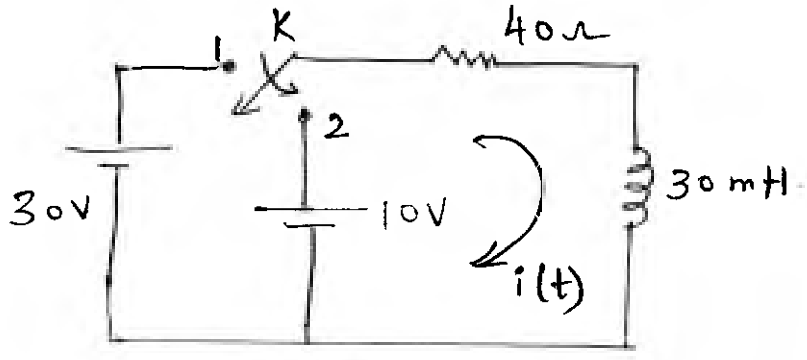
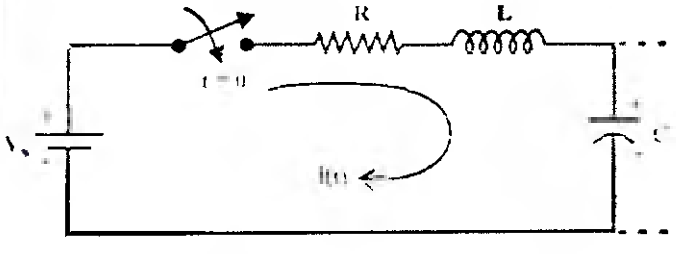
Program: SY Btech., Electrical Engineering Sem III — **Duration:3 hours**

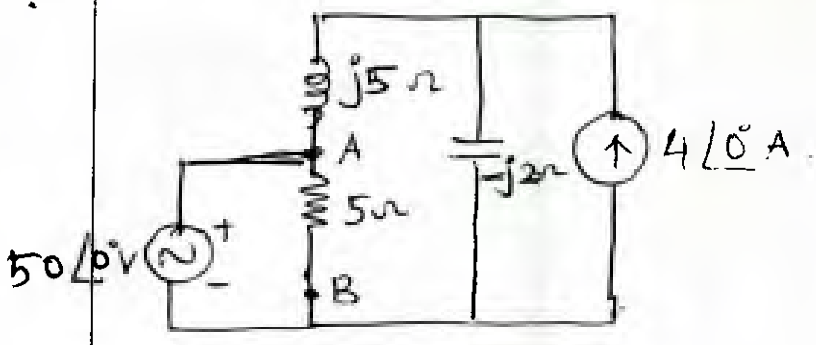
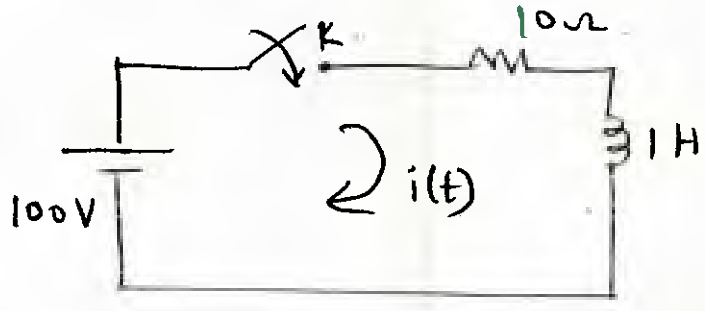
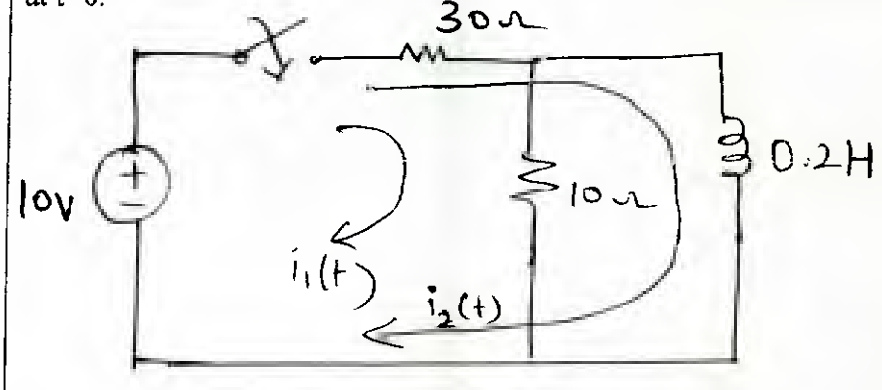
Course Code: PC-BTE302 — **Maximum Points:100**

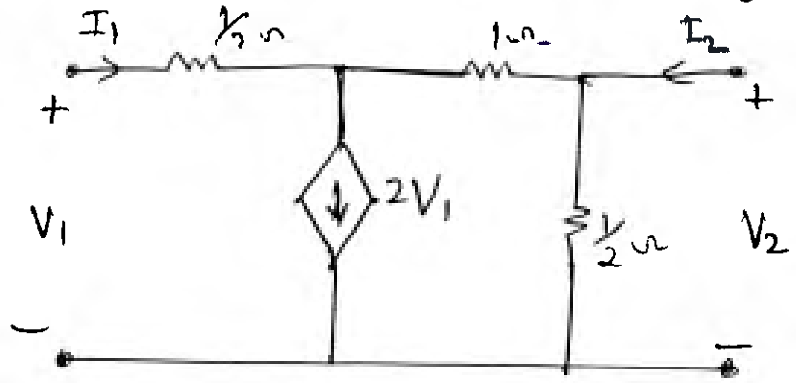
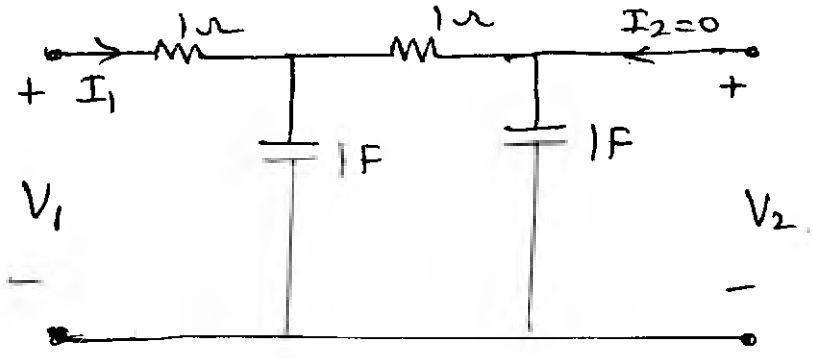
Course Name: Electrical Networks — **Semester:III**

- Attempt any FIVE questions out of SEVEN questions.
- Answers to all sub questions should be grouped together.
- Figures to the right indicates full marks.

Q.No	Questions	Points	CO	BL
Q1.(a)	Find the current I through the 2 ohm resistor by superposition theorem. 	10	1	3
b)	For the given network find the power delivered by 5V source using mesh analysis and voltage across 2 ohm resistor. 	10	1	3
Q2.(a)	Derive condition for maximum power transfer through complex load when load impedance has variable resistance .	6	1	2
2b)	Define i)Driving point Functions ii)Transfer function iii)poles and zeros.	6	3,4	1

2c)	The reduced incidence matrix of an oriented graph is given.Draw the graph and how many trees are possible with this graph.Write thr tieset and cutset for the same. $A = \begin{bmatrix} 0 & -1 & 1 & 0 & 0 \\ 0 & 0 & -1 & -1 & -1 \\ -1 & 0 & 0 & 0 & 1 \end{bmatrix}$	8	1	3
Q3(b)	The network is under steady state with switch at position1.At t=0 switch is moved to position 2 .Find i(t).. 	10	2	3,4
b)	In the network of fig the switch is closed at t=0.Obtain the expression for current i(t) for t>0,GivenVs=50V, R=2Ω, L=1H, C=1F...(Using Laplace transform). 	10	2	4

Q4(a)	Obtain the voltage V_{AB} by Superposition theorem 	8	1	3
b)	Check whether the following is Hurwitz $P(s)=s^4+7s^3+6s^2+21s+8$	4	3	3
c)	Obtain the expression of an capacitor voltage if it is connected to dc voltage source through a switch instantaneously and having a resistor in series. Assume initial conditions to be zero. Draw the profiles of V_R, V_C and I_C. Obtain the values of current for 5^{th} time constant.	8	2	2,3
Q5.(a)	In the network switch K is closed at t=0. Assuming all initial conditions as zero, find I, di/dt, d^2i/dt^2 at $t=0^+$ 	10	2	3
Q5(b)	In the network determine the currents $i_1(t)$ and $i_2(t)$ when switch is closed at t=0. 	10	2	3

Q6.(a)	Determine Y and Z parameters for the network shown in fig. 	10	3	3
6b)	Derive ABCD parameters for two port network.	5	3	2
c)	For the given network determine voltage transfer function V_2/V_1. 	5	4	3
Q7a)	**Answer any 2** Realise Cauer I and II forms of the following LC impedance function . $Z(s)=\frac{4(s^2+1)(s^2+9)}{s(s^2+4)}$	10	4	3
b)	Realise the Foster form I for the LC impedance function. $Z(s)=\frac{4(s^2+1)(s^2+9)}{s(s^2+4)}$.	10	4	3
c)	Check whether the following function is positive real. $F(s)=\frac{s^3+8s^2+15s}{s^2+5s+4}$	10	3	4

Bharatiya Vidya Bhavan's

SARDAR PATEL COLLEGE OF ENGINEERING

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

End Sem – January 2024 Examinations

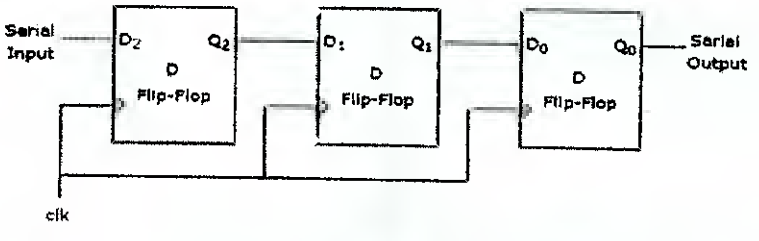
Program: Electrical F.Y. B.Tech (C) Sem II **Duration:** 3 hours

Course Code: PC-BTE303 **Maximum Points:** 100

Course Name: Digital Electronics **Semester:** III

3/1/24

- Question 1 is compulsory
- Attempt **any 4** out of remaining 6 questions
- Make suitable assumptions wherever necessary

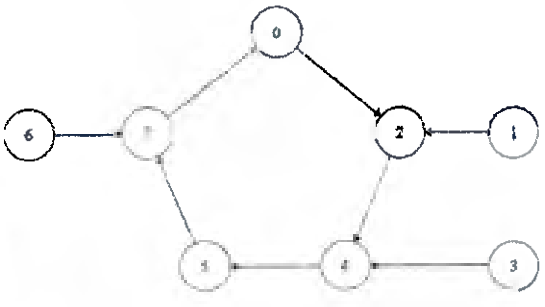
Q.No.	Questions	Points	CO	BL
1a.	Differentiate between Mealy and Moore Machine with suitable example.	05	3	2
1b.	Describe the basic block diagram of memory.	05	4	2
1c.	Perform the following: i. $(456)_8 = (?)_{BCD}$ ii. $(101101)_{gray} = (?)_{16}$	04	1	3
1d.	Convert SR Flip Flop to T Flip Flop	06	2	4
2a.	Explain the following terms related to Logic Families i. Speed of operation ii. Operating temperature iii. Voltage Parameters iv. Noise immunity and noise margin	10	4	2
2b.	 i. If D_2 represents MSB bit, identify the type of Register. ii. Also suggest the changes required in the above circuit if Twisted Ring counter needs to be implemented. iii. If the initial state of the twisted ring counter is 100 determine the state diagram of the counter.	10	2,3	3

Bharatiya Vidya Bhavan's

SARDAR PATEL COLLEGE OF ENGINEERING

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

End Sem – January 2024 Examinations

3a.	Explain the working of TTL NAND gate.	10	4	2
3b.	Design a sequence generator for the following sequence using Left shift register 101100	10	2	6
4a.	Implement the following $f(A,B,C,D) = \sum m(0,1,3,5,7,8,9,10,12,13,15)$ using 1. Single 8:1 Mux 2. Single 4:1 Mux	10	2	4
4b.	Design the following counter using T Flip Flop. 	10	2	6
5a.	Implement the following using 1:4 DeMux i. 2 input XOR Gate ii. 2 input AND gate	10	2	4
5b.	The input to a combinational circuit is a valid single digit BCD data. Design the logic circuit using minimum hardware to detect whenever a number greater then 5 appears at the input.	10	2	6
6a.	Discuss in detail PLA with diagram.	10	4	2
6b.	Discuss the drawbacks of Ripple counter	10	2	2

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SARDAR PATEL COLLEGE OF ENGINEERING

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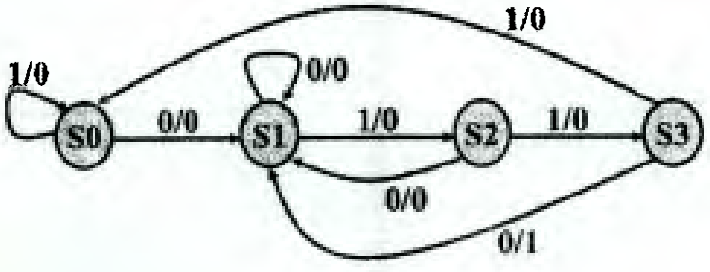
End Sem – January 2024 Examinations

7a.	 i. Identify the type of state machine. ii. Assume **S0 as 00, S1 as 01, S2 as 10, and S3 as 11.** Determine the state table for the same.	10	3	4
7b.	Design a 10 bit even Parity Generator circuit.	10	2	6

Bharatiya Vidya Bhavan's

SARDAR PATEL COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)

Munshi Nagar, Andheri (W) Mumbai - 400058

Re Exam/ Previous Exam - February 2024 Examinations

Program: Electrical S.Y.B.Tech Comp Sem III

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
1a.	Discuss Look ahead Carry generator.	10	2	2
1b.	Implement BCD to Seven Segment (common anode type) code converter	10	2	3
2a.	Design a 6 bit adder circuit using IC 7483.	10	2	6
2b.	Explain what are the problems associated with asynchronous counter and how they can be overcome.	10	2	2
3a.	Do the following conversion: i. S-R flip flop to D flip flop ii. J-K flip flop to T flip flop	10	2	5
3b.	Explain the working of CMOS NAND and NOR gate.	10	4	2
4a.	Implement the following 16:1 Mux using 8:1 Mux and additional gates.	10	2	5
4b.	Explain with help of neat diagram Left shift register and Right Shift register.	10	2	2
5a.	Design 11 bit comparator using IC 7485.	10	2	6
5b.	Discuss the classification of memories.	10	4	2
6a.	Design a MOD-10 ripple up counter.	10	2	6

6b.	Perform the following i. $(101101)_2 = (?)_8$ ii. $(A2C4)_{16} = (?)_{10}$ iii. $(10011)_2 - (11001)_2$ using 1's compliment method iv. $(46)_{10} = (?)_{XS-3}$ v. $(1111)_2 + (101)_2$	10	1	3
7a.	Discuss Mealy and Moore state machine with examples. Or Design a mod 4 synchronous counter using SR flip flop.	10	3 2	2 6
7b.	Write short note on SOP and POS.	10	1	2

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END SEM EXAMINATION JAN 2024

5/1/24

Program: S.Y.B.Tech. Short term III III

Course Code: PC-BTE04

Course Name: Electromagnetic Fields and Waves

Duration: One Hour

Maximum Points: 100

Semester: III

Notes:
1 Question No. 1 is compulsory.
2. Solve any four questions from remaining six.
3. Draw neat diagrams wherever necessary.
4. Assume suitable data if necessary

No.	Questions	Points	CO	BL	Module No.
1.	**Answer any four.**				
	a. The surfaces $\rho = 3$ **and** 5, $\phi = 100^0$ **and** 130^0, **and** $z = 3$ **and** 4.5 identify a closed surface. Find the total area of the enclosing surface.	05	1	3	1
	b. Evaluate (a) V (b) E (Vector) (c) Magnitude of E (d) dV/dN and (e) ρ_v in free space for the potential field given in cylindrical Coordinates $V=((100/(z^2+1))\rho\cos\phi$ V at point $P(\rho = 3\ \phi = 60^0\ z = 2)$.	05	1,2	3	2
	c. Derive continuity equation for current in point form.	05	2,1	4	3
	d. State Biot-Savart law and Stokes Theorem.	05	1,4	1	4
	e. Explain Lorentz force equation.	05	1,4	2	5
	f. Write Maxwell's equations in point and integral form.	05	1,4	1	6
	g. Discuss the concept of potential difference and absolute potential.	05	1,4	2	3
2.	a. Discuss Faradays Law for production of EMF. Derive the mathematical relations for Transformer EMF and Motional or Generator EMF.	03+07	1,2,3	2	6
	b. Write expression for force on various differential current elemental configurations like volume current density, surface current density and current filament and their equivalent integral forms.	06	2,3	1	6
	c. Prove that torque is independent of a choice of origin provided that the total force is zero.	04	1,3,4	4	6
3.	a. Express the unit vector a_x in spherical component at the point: **1)** $r = 2, \theta = 1$ **rad,** $\phi = 0.8$ **rad.** **2)** $x = 3, y = 2\ z = -1$ **3)** $\rho = 2.5, \phi = 0.7$ **rad,** $z = 1.5$	03 03 04	1	3	1
	b. Define Divergence	02	3,1	1	2
	c. Starting from the Gauss Law derive expression for Divergence Theorem and state Divergence Theorem.	05+03	1,2,3	1,3	2

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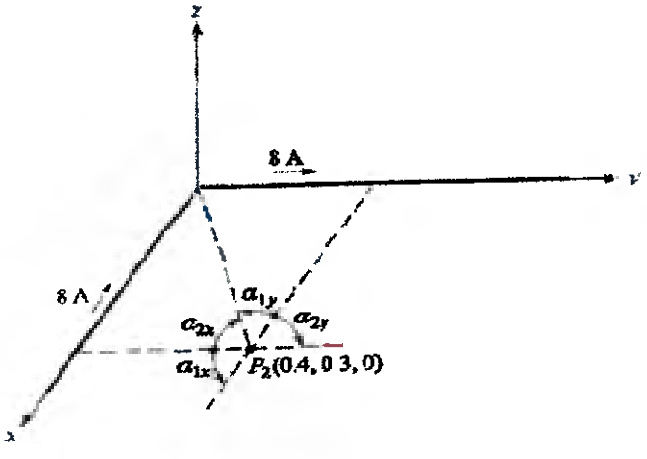
4.	a. Derive the expression for energy present in the system of point charges. b. The value of **E** at **P(ρ = 2 , ϕ =40⁰ z = 3)** is given as **$E = 100a_\rho - 200a_\phi + 300a_z$** V/m. Determine the incremental work done required to move a **20 μC** charge a distance of **6 μm** in the direction of ; 1) $\mathbf{a_\rho}$ 2) $\mathbf{a_\phi}$ 3) $\mathbf{a_z}$ 4) **E** 5) $G = 2a_x - 3a_y + 4a_z$	10 02 02 02 02 02	1,3 1,2,3	3 3	2 2
5.	a. Define Magnetization and write expression for it. b. Discuss Scalar and Vector Magnetic Potential. c. Scalar magnetic potential is not a single-valued function. Justify with or without an example.	03 10 07	1,2,4 3,4 3,4	1 2 4	6 4 4
6.	a. Define dipole. b. Derive the expression for potential and electric field intensity because of dipole. c. Apply Gauss law to differential volume element and thus derive the relevant expressions.	02 08 10	1,3,4 1,4 1,3,4	1 3 3	2 2 2
7.	a. Find magnetic field intensity at $P_2(0.4.0.3,0)$ in the field of 8A filamentary current directed inward from infinity to the origin on the positive x-axis, and then outward to infinity along y-axis as shown in figure below.  b. A uniform line charge density of **5 nC/m** is at **y = 0, z = 2m** in free space, while **-5 nC/m** is located at **y = 0, z = -2m**. A uniform surface charge density of **0.3 nC/m²** is at **y = 0.2m**, and **-0.3 nC/m²** is at **y = -0.2m**. Find magnitude of Electric Field Intensity at the origin.	10 10	2,3,4 3	3 3	6 2

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RE-EXAMINATION FEB 2024

Program: S.Y.B.Tech. Sem III E&TC

Duration: Three Hour

Course Code: PC-BTE04

Maximum Points: 100

Course Name: Electromagnetic Fields and Waves

Semester: III

Notes:
1 Question No. 1 is compulsory.
2. Solve any four questions from remaining six.
3. Draw neat diagrams wherever necessary.
4. Assume suitable data if necessary

No.	Questions	Points	CO	BL	Module No.
1.	**Answer any four.**				
	a. Write the expressions for differential length, surface area and volume in Cartesian, cylindrical and spherical coordinates.	05	1	3	1
	b. Evaluate (a) V (b) E (Vector) (c) Magnitude of E (d) dV/dN and (e) ρ_v in free space for the potential field given in cylindrical Coordinates $V=((100/(z^2+1))\rho\cos\phi$ V at point $P(\rho = 3\ \phi = 60^0\ z = 2)$.	05	1,2	3	2
	c. Derive continuity equation for current in point form.	05	2,1	4	3
	d. State Ampere's Circuital Law and writes expressions for curl of a vector in cylindrical and spherical coordinate systems.	05	1,4	1	4
	e. Derive the expression for force between two differential current elements.	05	1,4	2	5
	f. Write Maxwell's equations in point and integral form.	05	1,4	1	6
2.	a. Derive expression for Ampere's Circuital Law in point form.	10	1,2,3	2	6
	b. Write expression for force on various differential current elemental configurations like volume current density, surface current density and current filament and their equivalent integral forms.	06	2,3	1	6
	c. Prove that torque is independent of a choice of origin provided that the total force is zero.	04	1,3,4	4	6
3.	a. Express the unit vector $\mathbf{a_x}$ in spherical component at the point:				
	1) r = 2, θ = 1 rad, ϕ = 0.8 rad.	03	1	3	1
	2) x = 3, y = 2 z = -1	03			
	3) ρ = 2.5 , ϕ =0.7 rad, z = 1.5	04			
	b. Define Divergence	02	3,1	1	2
	c. Starting from the Gauss Law derive expression for Divergence Theorem and state Divergence Theorem.	05+03	1,2,3	1,3	2

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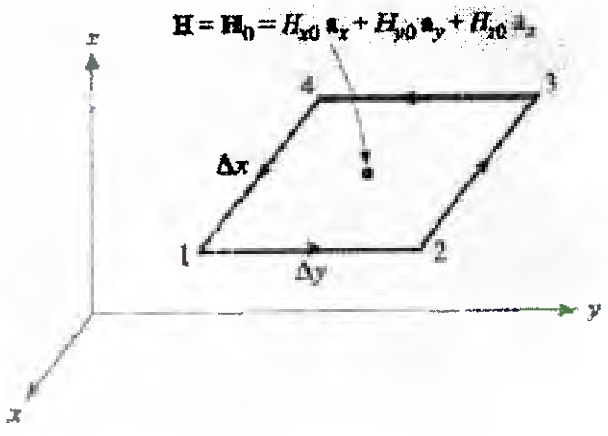
4.	a. Derive the expression work done in moving a point charge from one location to another in the presence of electric field. Further prove that in case of uniform electric field the field is said to be conservative field. b. It is known that the potential is given as $V=80r^{0.6}$ V. Assuming free space conditions, find 1. Vector E 2. The volume charge density at r = 0.5 m. 3. The total charge lying within the surface r = 0.6.	10 03 04 04	1,3 1,2,3	3 3	2 2
5.	a. Define Magnetization and write expression for it. b. Discuss the classification of different magnetic materials. c. Derive the expression for Curl by applying Ampere's Circuital Law to the perimeter of a differential surface element as given below in figure.  	03 07 10	1,2,4 3,4 3,4	1 2 4	6 4 4
6.	a. Define dipole. b. Infinite uniform line charges of 5nC/m lie along the (positive and negative) x and y axes in free space. Find vector **E** at (1) $P_A(0,0,4)$ and (2) $P_B(0,3,4)$ c. Apply Gauss law to differential volume element and thus derive the relevant expressions.	02 08 10	1,3,4 1,4 1,3,4	1 3 3	2 2 2
7.	a. Find magnetic field intensity at $P_2(0.4.0.3,0)$ in the field of 8A filamentary current directed inward from infinity to the origin on the positive x-axis, and then outward to infinity along y-axis as shown in **Figure 1**. b. Derive the expression form electric field intensity due to infinite line charge. Write expressions for electric field intensity for charge distributions; 1) Point charge 2) Sheet charge and 3) Volume charge.	10 07 03	2,3,4 3	3 3	6 2

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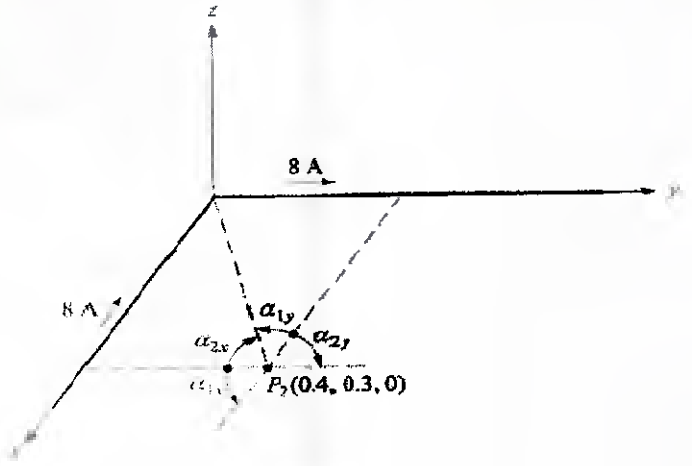

Figure 1