

CBCS SCHEME

USN

--	--	--	--	--	--	--	--	--	--

BMATEC301/BEC301/BBM301

Third Semester B.E./B.Tech. Degree Examination, June/July 2025 AV Mathematics III for EC/ BM Engineering

Time: 3 hrs.

Max. Marks: 100

- Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.
3. Use of Statistical table and Formula hand book is permitted.*

Module - 1			M	L	C													
Q.1	a.	Find the Fourier Series expansion of the function $f(x) = x $ in $(-\pi, \pi)$.	06	L2	CO1													
	b.	Find the half range Fourier sine series for function, $f(x) = \begin{cases} \frac{1}{4} - x & \text{in } 0 < x < \frac{1}{2} \\ x - \frac{3}{4} & \text{in } \frac{1}{2} < x < 1 \end{cases}$	07	L2	CO1													
	c.	Find the constant term and the first co-efficients of cosine and sine terms in the Fourier series expansion for the following data : <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>x</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> </tr> <tr> <td>y</td> <td>9</td> <td>18</td> <td>24</td> <td>28</td> <td>26</td> <td>20</td> </tr> </table>	x	0	1	2	3	4	5	y	9	18	24	28	26	20	07	L3
x	0	1	2	3	4	5												
y	9	18	24	28	26	20												
OR																		
Q.2	a.	Obtain the Fourier series of the square wave given by, $f(x) = \begin{cases} -K & \text{in } -\pi < x < 0 \\ K & \text{in } 0 < x < \pi \end{cases}$	06	L2	CO1													
	b.	Obtain the half range cosine series for $f(x) = (x-1)^2$ in $0 \leq x \leq 1$.	07	L2	CO1													
	c.	Obtain the constant term and coefficients of first cosine and sine terms in the expansion of 'y' from the following table : <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>x°</td> <td>0</td> <td>60°</td> <td>120°</td> <td>180°</td> <td>240°</td> <td>300°</td> </tr> <tr> <td>y</td> <td>7.9</td> <td>7.2</td> <td>3.6</td> <td>0.5</td> <td>0.9</td> <td>6.8</td> </tr> </table>	x°	0	60°	120°	180°	240°	300°	y	7.9	7.2	3.6	0.5	0.9	6.8	07	L3
x°	0	60°	120°	180°	240°	300°												
y	7.9	7.2	3.6	0.5	0.9	6.8												
Module - 2																		
Q.3	a.	Find the Fourier transform of $f(x) = \begin{cases} 1- x , & x \leq a \\ 0, & x > a \end{cases}$. Hence evaluate $\int_0^{\infty} \frac{\sin^2 t}{t^2} dt.$	06	L3	CO2													
	b.	Find the Fourier cosine transform of the function $f(x) = e^{-ax}$. Evaluate $\int_0^{\infty} \frac{\cos mx}{\alpha^2 + x^2} dx$	07	L2	CO2													
	c.	Find the DFT of a sequence $x(n) = \{1, 1, 0, 0\}$ and also find the IDFT of $Y(K) = \{1, 0, 1, 0\}$.	07	L3	CO2													
OR																		

Q.4	a.	Find the Fourier transform of $f(x) = \begin{cases} 1-x^2, & x < 1 \\ 0, & x \geq 1 \end{cases}$	06	L2	CO2												
	b.	Find the Fourier cosine transform of $f(x) = \begin{cases} 4x, & \text{for } 0 < x < 1 \\ 4-x, & \text{for } 1 < x < 4 \\ 0, & \text{for } x > 4 \end{cases}$	07	L1	CO2												
	c.	Find the Fourier sine transform of $f(x) = e^{- x }$ and hence evaluate $\int_0^{\infty} \frac{x \sin mx}{1+x^2} dx, m > 0.$	07	L3	CO2												
Module – 3																	
Q.5	a.	Find the z-transform of: (i) $(n+1)^2$ (ii) $\sinh n \theta$.	06	L2	CO3												
	b.	Find the inverse z-transform of $\frac{z}{(z-1)(z-2)}$.	07	L3	CO3												
	c.	Solve the difference equation of $y_{n+2} - 4y_n = 0$, given that $y_0 = 0$ and $y_1 = 2$ using Z-transform.	07	L3	CO3												
OR																	
Q.6	a.	Find the z-transform of $\sin(3n+5)$.	06	L2	CO3												
	b.	Obtain the inverse z-transform of $\frac{2z^2+3z}{(z+2)(z-4)}$.	07	L3	CO3												
	c.	If $U(z) = \frac{2z^2+3z+4}{(z-3)^3}$, evaluate u_2 and u_3 .	07	L3	CO3												
Module – 4																	
Q.7	a.	Solve $(D^3 - 3D^2 + 3D - 1)y = 0$.	06	L2	CO4												
	b.	Solve $\frac{d^2y}{dx^2} - 4y = \cosh(2x-1) + 3^x$	07	L2	CO4												
	c.	Solve $x^2 \frac{d^2y}{dx^2} - x \frac{dy}{dx} + 2y = \sin(\log x)$	07	L3	CO4												
OR																	
Q.8	a.	Solve $\frac{d^2y}{dx^2} + 4 \frac{dy}{dx} + 4y = 3 \sin x$.	06	L2	CO4												
	b.	Solve $(3x+2)^2 y'' + 3(3x+2)y' - 36y = 4(3x+2)^2$	07	L2	CO4												
	c.	In an LCR circuit the charge 'q' on a plate of a condenser is given by, $L \frac{d^2q}{dt^2} + R \frac{dq}{dt} + \frac{q}{c} = E \sin pt$. Solve the above equation.	07	L3	CO4												
Module – 5																	
Q.9	a.	Find a least square straight line for the following data : <table border="1" style="margin-left: 20px;"> <tbody> <tr> <td>x</td> <td>5</td> <td>10</td> <td>15</td> <td>20</td> <td>25</td> </tr> <tr> <td>y</td> <td>16</td> <td>19</td> <td>23</td> <td>26</td> <td>30</td> </tr> </tbody> </table>	x	5	10	15	20	25	y	16	19	23	26	30	06	L2	CO5
x	5	10	15	20	25												
y	16	19	23	26	30												
	b.	Compute \bar{x} , \bar{y} and r from the following equation of the regression lines $2x+3y+1=0$; $x+6y-4=0$.	07	L3	CO5												

	c.	Ten students got the following percentage of marks in two subjects say x and y, compute their rank correlation co-efficient.	07	L3	CO5																						
		<table border="1"> <tr> <td>x</td> <td>78</td> <td>36</td> <td>98</td> <td>25</td> <td>75</td> <td>82</td> <td>90</td> <td>62</td> <td>65</td> <td>39</td> </tr> <tr> <td>y</td> <td>84</td> <td>51</td> <td>91</td> <td>60</td> <td>68</td> <td>62</td> <td>86</td> <td>58</td> <td>53</td> <td>47</td> </tr> </table>	x	78	36	98	25	75	82	90	62	65	39	y	84	51	91	60	68	62	86	58	53	47			
x	78	36	98	25	75	82	90	62	65	39																	
y	84	51	91	60	68	62	86	58	53	47																	
OR																											
Q.10	a.	Fit a parabola $y = ax^2 + bx + c$ by the method of least squares for the following data :	06	L2	CO5																						
		<table border="1"> <tr> <td>x</td> <td>2</td> <td>4</td> <td>6</td> <td>8</td> <td>10</td> </tr> <tr> <td>y</td> <td>3.07</td> <td>12.85</td> <td>31.47</td> <td>57.38</td> <td>91.29</td> </tr> </table>	x	2	4	6	8	10	y	3.07	12.85	31.47	57.38	91.29													
x	2	4	6	8	10																						
y	3.07	12.85	31.47	57.38	91.29																						
	b.	Find the correlation co-efficient between x and y for the following data :	07	L3	CO5																						
		<table border="1"> <tr> <td>x</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> </tr> <tr> <td>y</td> <td>2</td> <td>5</td> <td>3</td> <td>8</td> <td>7</td> </tr> </table>	x	1	2	3	4	5	y	2	5	3	8	7													
x	1	2	3	4	5																						
y	2	5	3	8	7																						
	c.	Find the two regression-lines from the following data :	07	L3	CO5																						
		<table border="1"> <tr> <td>x</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> </tr> <tr> <td>y</td> <td>9</td> <td>8</td> <td>10</td> <td>12</td> <td>11</td> <td>13</td> <td>14</td> </tr> </table>	x	1	2	3	4	5	6	7	y	9	8	10	12	11	13	14									
x	1	2	3	4	5	6	7																				
y	9	8	10	12	11	13	14																				

CBCGS SCHEME

USN

--	--	--	--	--	--	--	--	--	--

BEC302

Third Semester B.E./B.Tech. Degree Examination, June/July 2025 Digital System Design using Verilog

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.*

Module – 1			M	L	C
Q.1	a.	Design a combinational logic circuit which takes two, 2-bit binary numbers as its input and generates an output equal to 1, when the sum of the two numbers is even.	6	L1	CO1
	b.	Develop the canonical forms for the following Boolean equations: i) $a + b(a + c) + bc$ ii) $(a + b)(c + d)$	6	L1	CO1
	c.	Find all the prime implicants and essential prime implicants for the following functions using k-map method: i) $P = f(a, b, c, d) = \sum(1, 2, 3, 5, 6, 7, 11, 12, 13, 14, 15)$ ii) $S = f(a, b, c, d) = \prod(0, 2, 3, 8, 9, 10, 12, 14)$	8	L2	CO1
OR					
Q.2	a.	Simplify the following Boolean functions using k-map. Draw the logic diagram for the simplified equation: i) $w = f(a, b, c, d) = \sum(1, 5, 7, 9, 13, 15) + \sum d(8, 10, 11, 14)$ ii) $y = f(a, b, c, d) = \prod(0, 2, 3, 4, 5, 12, 13) + \prod d(8, 10)$	10	L2	CO1
	b.	Solve the following Boolean function by using Quine-McClusky method. Verify using k-map $s = f(w, x, y, z) = \sum(2, 3, 4, 5, 13, 15) + \sum d(8, 9, 10, 11)$	10	L2	CO1
Module – 2					
Q.3	a.	Realize the following functions using 3:8 decoder along with OR and/or NOR gates. In each case the gates should be selected so as to minimize their total number of inputs. i) $f_1(a, b, c) = \sum m(1, 3, 6)$ and $f_2(a, b, c) = \sum m(2, 5, 7)$ ii) $f_1(a, b, c) = \prod M(0, 3, 5, 6, 7)$ and $f_2(a, b, c) = \prod M(2, 3, 4, 5, 7)$	7	L2	CO2
	b.	Design a priority encoder for a system with three inputs, the middle bit with highest priority encoded as 10, MSB with next priority encoded as 11 and LSB with least priority encoded as 01. Write functional table and its logic diagram.	5	L2	CO2
	c.	Explain carry look ahead adder with sigma block and necessary equations.	8	L2	CO2
1 of 3					

OR

Q.4	a.	Implement the function $S = f(a, b, c, d) = \sum(1, 3, 4, 11, 12, 13, 14, 15)$ using i) 8:1 MUX and ii) 16:1 MUX	7	L2	CO2
	b.	Design a single decade decimal adder with necessary correction circuit.	8	L2	CO2
	c.	Explain briefly Programmable Array Logic (PAL)	5	L2	CO2

Module - 3

Q.5	a.	Construct the logic diagram of master slave JK flipflop and its truth table. Explain with necessary timing diagram.	8	L2	CO3
	b.	Construct Johnson counter using positive edge triggered flipflops and explain with necessary truth table.	8	L2	CO3
	c.	Derive the characteristic equation of SR flipflop.	4	L2	CO3

OR

Q.6	a.	Explain universal shift register with the help of logic diagram and mode control table.	10	L2	CO3
	b.	Design a mod-6 synchronous counter with the sequence 0 - 2 - 5 - 6 - 4 - 3 using T flipflops.	10	L2	CO3

Module - 4

Q.7	a.	Explain the following data types in verilog with example: i) Nets ii) Registers iii) Integer iv) Parameter	8	L2	CO4
	b.	Evaluate the following if $A = 0011$, $B = 0100$, $E = 4$ and $F = 2$ i) $A * B$ ii) $A + B$ iii) $E * * F$ iv) $A \& B$ v) $A \ll 2$ vi) $\{A[3], B\}$	6	L2	CO4
	c.	Write a verilog data flow model for full subtractor.	6	L2	CO4

OR

Q.8	a.	Explain three styles of description available in verilog with half adder example.	9	L2	CO4
	b.	Realize 2×1 multiplexer with active low enable and also write the Verilog program by considering delay time to signal assignment statements. Also draw simulation waveform.	7	L2	CO4
	c.	Write a short note on signal assignment in verilog with an example.	4	L2	CO4

Module - 5

Q.9	a.	Explain the following sequential statements in verilog : i) For loop ii) While loop iii) Repeat iv) Forever.	8	L1	CO4
	b.	Write a verilog behavioral description for JK flipflop along with the design and timing diagram.	8	L2	CO4

	c.	Explain different case statements in verilog.	4	L2	CO4
OR					
Q.10	a.	Write a verilog program for 3-bit ripple carry adder using structural description.	8	L2	CO4
	b.	Realize the binary up-down counter using verilog behavioral description.	7	L3	CO4
	c.	Explain if-else-if statement in verilog with an example.	5	L2	CO4

CBCS SCHEME

USN

--	--	--	--	--	--	--	--	--	--

BEC303

Third Semester B.E./B.Tech. Degree Examination, June/July 2025 Electronic Principles and Circuits

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.*

Module – 1			M	L	C
Q.1	a.	Define the following: i) Voltage – divider bias ii) CC Amplifier iii) TSEB	6	L1	CO1
	b.	Discuss the importance of Emitter Resistance (R_E) with respect to voltage divider bias circuit on Q-point calculate with its supportive graph.	8	L2	CO1
	c.	Compare and summarize with respect to bias circuits; Emitter bias vs voltage divider bias vs two supply emitter bias.	6	L2	CO1
OR					
Q.2	a.	With suitable circuit and waveforms, Discuss TSEB amplifier.	8	L2	CO1
	b.	Derive the voltage gain equation for the CE amplifier from T model and π model.	6	L2	CO1
	c.	Explain the concept of emitter follower amplifier with suitable waveforms and circuit.	6	L2	CO1
Module – 2					
Q.3	a.	With neat circuits, deduce the common source amplifier using MOSFET (without R_s) obtain overall gain (G_v).	10	L2	CO2
	b.	Explain the biasing of a MOSFET using fixed V_g and a resistance in source, obtain the current I_d expression with neat circuit diagram.	10	L2	CO2
OR					
Q.4	a.	Design an MOSFET model of small-signal equivalent circuit by considering various parameter of the model.	10	L2	CO2
	b.	With respect to common-gate amplifier. Derive the equation for overall gain, open circuit voltage gain and voltage gain.	10	L2	CO2
Module – 3					
Q.5	a.	Discuss the concept of R to 2R ladder type digital to analog converter by considering 4-bit binary input with an Op-Amp circuit also demonstrate the equivalent analog output for the data "1010".	10	L2	CO3
	b.	Explain Colpitt's oscillators with its AC equivalent circuit and design parameter.	10	L2	CO3

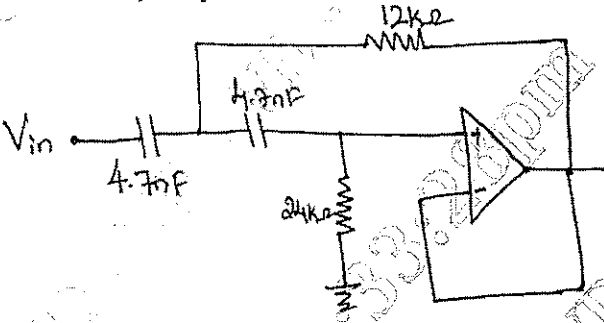
OR

Q.6	a.	Explain the following in view of linear op-amps: i) Schmitt Trigger ii) Single supply comparator	10	L2	CO3
	b.	Design an astable multivibrator using 555 timer with design equations of "T" and frequency.	10	L2	CO3

Module - 4

Q.7	a.	Summarize various voltage and current amplifier and converter with respect to ideal negative feedback circuits.	10	L2	CO4
	b.	Explain low-pass first order stage with non-inverting unity gain and inverting with voltage gain with suitable op-amp circuit and equations.	10	L2	CO4

OR

Q.8	a.	Design an second order VCVS unity gain low pass filter for Butterworth responses with an Op-Amp circuit also comment on the frequencies of operation.	10	L2	CO4
	b.	Calculate the value of Q and pole frequency for circuit shown in Fig.Q.8(b) also find the cut off frequency.	5	L2	CO4
 <p>Fig.Q.8(b)</p>					
	c.	Discuss the concept of MFB bandpass filter with the equation for "f _o ".	5	L2	CO5

Module - 5

Q.9	a.	Briefly describe the concept of DC load line and AC load line with neat circuit	10	L2	CO5
	b.	Explain class B Push-Pull Emitter follower with neat circuit diagram discuss cross-over distortion.	10	L2	CO5

OR

Q.10	a.	Describe the concept of Gate-Triggering in silicon controlled rectifier.	8	L2	CO5
	b.	Write short notes on following: i) Photo SCR ii) UJT iii) PUT iv) Silicon controlled switch	12	L2	CO5

CBCS SCHEME - Make-Up Exam

USN

--	--	--	--	--	--	--	--	--	--

BEC304

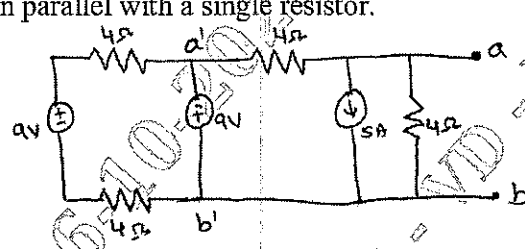
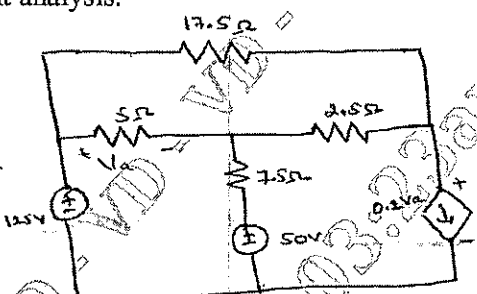
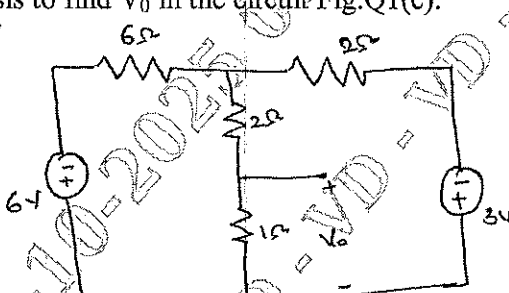
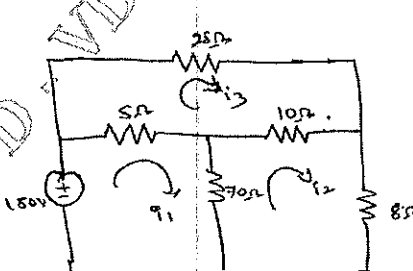
Third Semester B.E./B.Tech. Degree Examination, June/July 2025

Network Analysis

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.*

Module - 1			M	L	C
Q.1	<p>a. Use source transformation to convert the circuit in Fig.Q1(a) to a single current source in parallel with a single resistor.</p>	 <p style="text-align: center;">Fig.Q1(a)</p>	05	L2 L3	CO1
	<p>b. Find the currents in various branches in the circuit shown in Fig.Q1(b) using mesh current analysis.</p>	 <p style="text-align: center;">Fig.Q1(b)</p>	10	L2 L3	CO1
	<p>c. Use nodal analysis to find V_0 in the circuit Fig.Q1(c).</p>	 <p style="text-align: center;">Fig.Q1(c)</p>	05	L2 L3	CO1
OR					
Q.2	<p>a. Refer the circuit shown in Fig.Q2(a). Find the power dissipated in the 70 Ω register.</p>	 <p style="text-align: center;">Fig.Q2(a)</p>	10	L2 L3	CO1

- b. Find the value of resistance between the terminals a – b of the network shown in Fig.Q2(b).

10

L2
L3

CO1

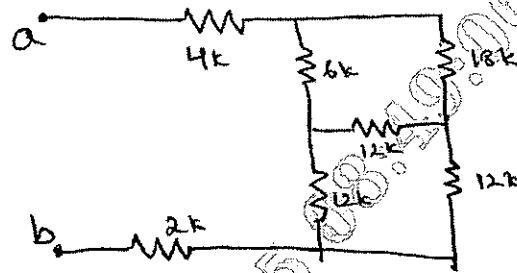


Fig.Q2(b)

Module – 2

- Q.3 a. Find the R_L for maximum power transfer and maximum power that can be transferred in the network shown in Fig.Q3(a).

10

L2
L3

CO2

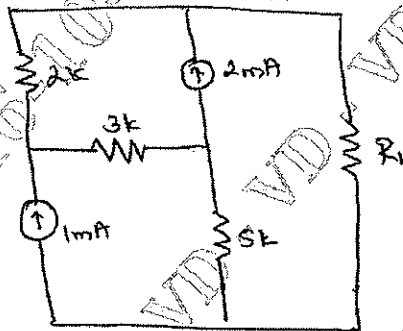


Fig.Q3(a)

- b. Find the current through $(10 - j3)\Omega$ using Millman's theorem. [Refer Fig.Q3(b)]

10

L2
L3

CO2

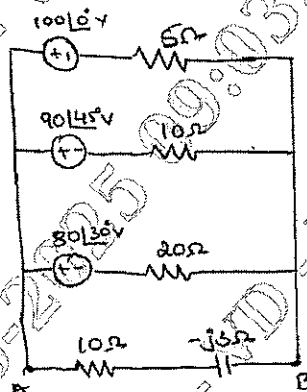


Fig.Q3(b)

OR

- Q.4 a. Obtain Thevenin's and Norton's equivalent circuit at the terminals AB for the network shown in Fig.Q4(a).

10

L2
L3

CO2

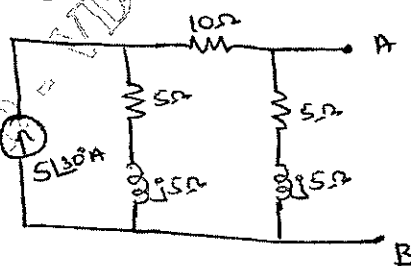


Fig.Q4(a)

- b. Find the value of R_L in the network shown in Fig.Q4(b) that will achieve max power transfer and determine the value of the maximum power.

10 L2 L3 CO2

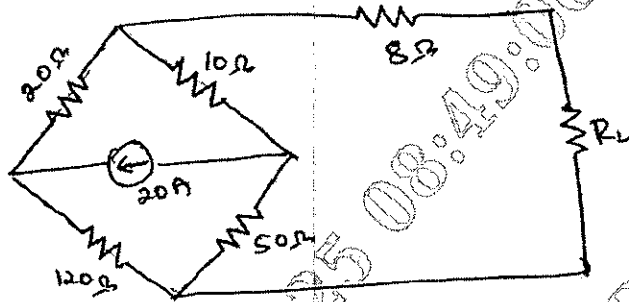


Fig.Q4(b)

Module - 3

- Q.5 a. In the network of Fig Q5(a) the switch is moved from position (1) to position (2) at $t = 0$. The steady state having reached before switching. Calculate i , $\frac{di}{dt}$, $\frac{d^2i}{dt^2}$ at $t = 0^+$

10 L2 L3 CO2

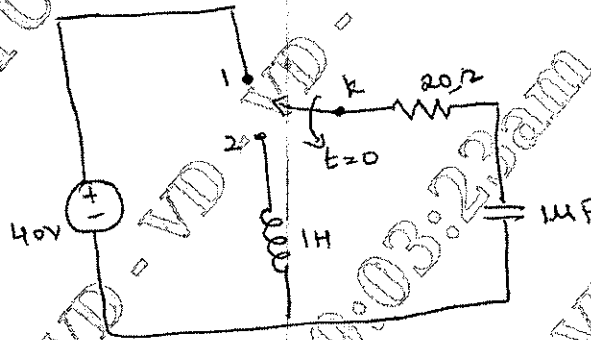


Fig.Q5(a)

- b. For the circuit shown in Fig Q5(b) steady state is reached with switch K open. At $t = 0$, the switch is closed. Determine the values of $V_a(0^-)$ and $V_a(0^+)$.

10 L2 L3 CO2

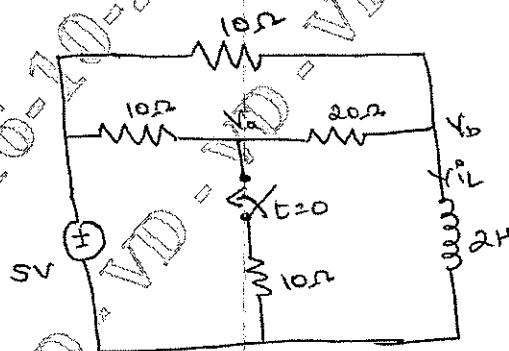


Fig.Q5(b)

OR

- Q.6 a. In the given network Fig.Q6(a), the switch K is opened at $t = 0^+$, solve for the values of V , $\frac{dv}{dt}$ and $\frac{d^2v}{dt^2}$ if $I = 2A$, $R = 200 \Omega$ and $L = 1 H$.

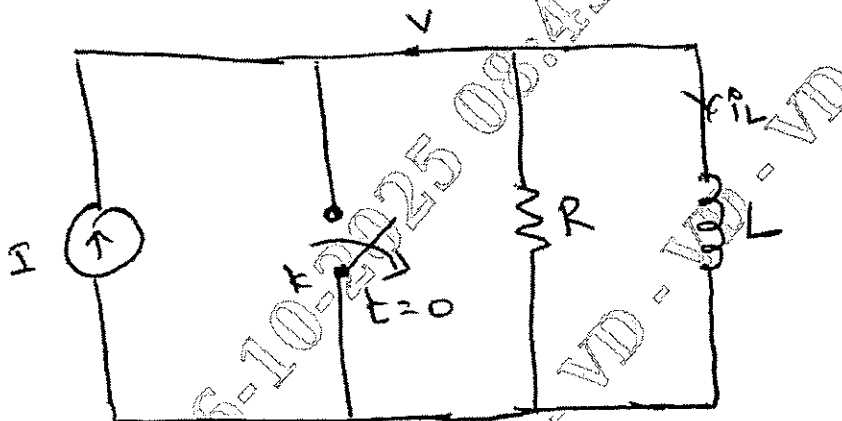


Fig.Q6(a)

- b. In the circuit shown in Fig.Q6(b), steady state is reached with switch K open, the switch is closed at $t = 0$. Determine i_1 , i_2 , $\frac{di_1}{dt}$ and $\frac{di_2}{dt}$ at $t = 0^+$.

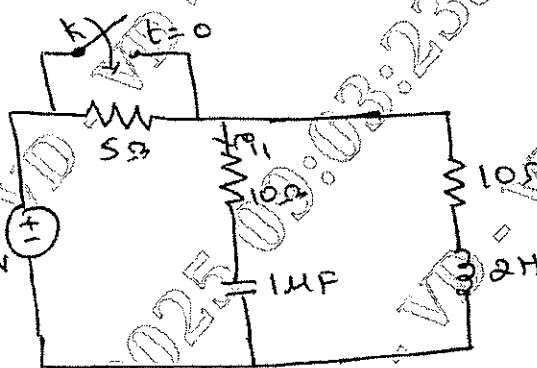


Fig.Q6(b)

Module -4

- Q.7 a. Determine the current $i_L(t)$ for $t \geq 0$ for the circuit shown in Fig.Q7(a).

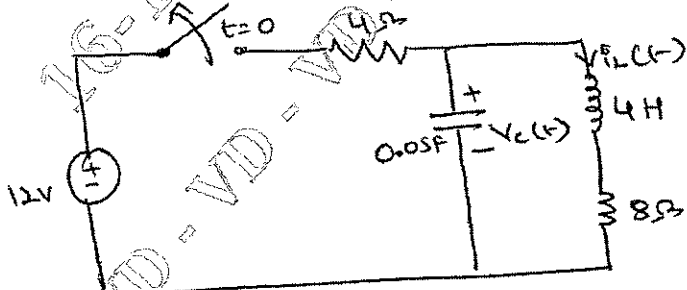
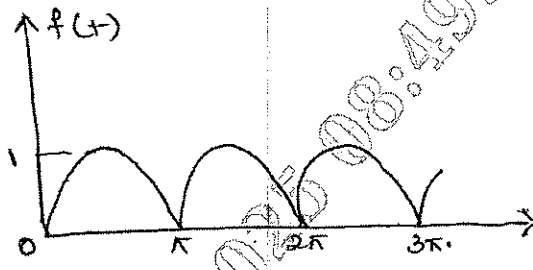
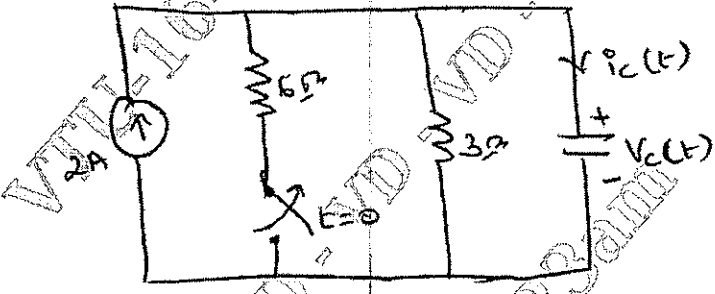
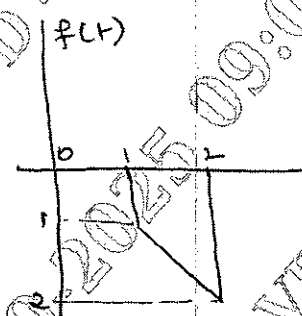


Fig.Q7(a)

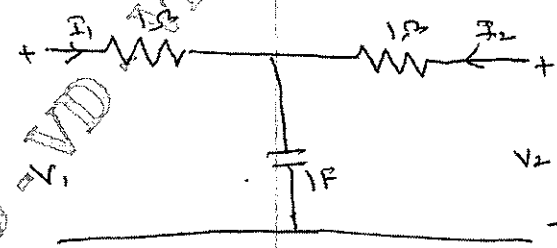
	<p>b. Refer the waveform shown in Fig.Q7(b). The equation for the waveform is $\sin t$ from 0 to π, $-\sin t$ from π to 2π. Show the Laplace transform of this waveform is $F(s) = \frac{1}{s^2+1} \coth\left(\frac{\pi s}{2}\right)$</p>  <p style="text-align: center;">Fig:Q7(b)</p>	10	L2 L3	CO3
--	--	----	----------	-----

OR

<p>Q.8</p>	<p>a. Determine the voltage $V_c(t)$ and the current $i_c(t)$ for $t \geq 0$ for the circuit shown in Fig.Q8(a).</p>  <p style="text-align: center;">Fig:Q8(a)</p>	10	L2 L3	CO3
------------	--	----	----------	-----

	<p>b. Express the function shown in Fig.Q8(b) using singularity function and then find $F(s)$.</p>  <p style="text-align: center;">Fig:Q8(b)</p>	10	L2 L3	CO3
--	--	----	----------	-----

Module - 5

<p>Q.9</p>	<p>a. Obtain Y parameters in terms of Z parameters and h-parameters.</p> <p>b. Determine the transmission parameters for the circuit shown in Fig.Q9(b).</p>  <p style="text-align: center;">Fig:Q9(b)</p>	10	L2 L3	CO4
------------	--	----	----------	-----

OR

Q.10	a. Derive an expression of Bandwidth, half power frequencies and quality factor of a series resonance circuit.	10	L1 L2	CO5
	b. For the circuit shown in Fig.Q10(b) find the following : i) ω_0 , Q, B ii) ω_1 and ω_2 iii) The max power dissipated at ω_0 , ω_c and ω_c (resonate freq and cutoff freq.)	10	L2 L3	CO5

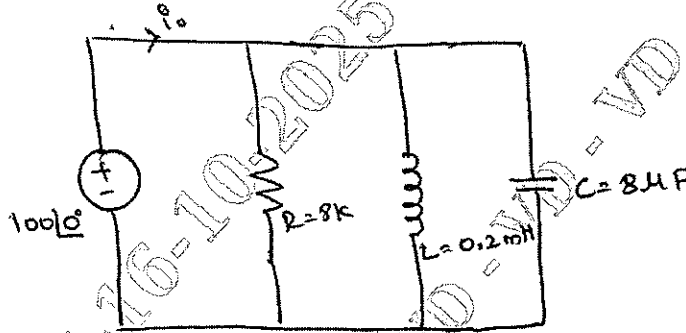


Fig.Q10(b)

CBCS SCHEME

USN

--	--	--	--	--	--	--	--	--	--	--	--

BEC306C

Third Semester B.E/B.Tech. Degree Examination, June/July 2025 Computer Organization and Architecture

Time: 3 hrs.

Max. Marks:100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level, C: Course outcomes.

Module – 1					
1	a.	With a neat diagram, explain the basic operational concept of a computer.	10	L2	CO1
	b.	Explain the single bus structure of computers.	4	L2	CO1
	c.	What is an operating system? Explain the user program and OS routine sharing the processor.	6	L2	CO1
OR					
2	a.	Define byte addressability, Big-endian and Little-endian assignments.	8	L2	CO1
	b.	With examples, explain : i) Three address ii) Two address iii) One address iv) Zero address instructions.	8	L2	CO1
	c.	Represent 85.125 in IEEE floating point single precision.	4	L2	CO1
Module – 2					
3	a.	What do you mean by addressing mode? Explain : i) Indirect ii) Index iii) Base with index iv) Autoincrement addressing modes.	10	L2	CO2
	b.	Consider a database of marks scored by students in 3 tests, stored in memory starting at address LIST. Each student record consists of student ID followed by marks in 3 tests. Assume each of these to be 4 bytes in size. There are 50 students in the class and this value is stored at location NUM. i) Sketch the memory map showing all the details ii) Develop an ALP using indexed addressing mode to compute the sum of scores by all the students in Test-2 and store the result in location SUM. Write appropriate comments.	5	L3	CO2
	c.	Consider a register R1 to size 16-bit with initial data 5867d. With neat sketches, depict the output in each case, after performing the following operations. i) LShiftL #2, R1 ii) RotateR #1, R1.	5	L2	CO2

OR

4	a.	Explain shift and rotate instructions with examples.	7	L2	CO2
	b.	Consider a set of numbers (each 4 bytes in size) stored in memory starting at address TABLE. Total numbers are N and this value is stored at location LOCN. i) Sketch memory map showing all details ii) Develop an ALP using auto-increment addressing mode, to compute the sum of all numbers and store the result at memory address RESULT. Write appropriate comments.	8	L3	CO2
	c.	Explain any five assembler directives used in assembly language programming.	5	L2	CO2

Module – 3

5	a.	Showing the register details of the keyboard and display, write an ALP to demonstrate program – controlled I/O to read a line from the keyboard, store it in memory, and also echo it back to the display.	10	L2	CO3
	b.	What is an interrupt? With neat diagrams explain interrupt priority schemes.	10	L2	CO3

OR

6	a.	Using registers involved in a DMA interface, illustrate the operation of DMA.	10	L2	CO3
	b.	Define interrupts. Point out and explain various ways to enable and disable the interrupts.	6	L2	CO3
	c.	Explain the concept of vectored interrupts.	4	L2	CO3

Module – 4

7	a.	With a neat diagram, explain virtual memory organization.	10	L2	CO4
	b.	Explain any five non-volatile memory concepts.	10	L2	CO4

OR

8	a.	With diagram explain the internal organization of 2M × 8 dynamic memory chip.	10	L2	CO4
	b.	Explain the construction and working of a secondary storage device.	10	L2	CO4

Module – 5

9	a.	Explain the process of fetching a data word from memory using designated registers of the processor.	10	L2	CO5
	b.	Explain the following : i) Grating signal ii) Control word iii) Micro – routine iv) Control store.	4	L2	CO5
	c.	Give the actions required to execute the complete instruction ADD(R3), R1 using single bus organization.	6	L2	CO5

OR

10	a.	Explain the three-bus organization of a processor and its advantages.	8	L2	CO5
	b.	With a block diagram, explain the organization of a micro programmed control unit.	8	L2	CO5
	c.	Give the actions required to execute the complete instruction ADD R4, R5, R6 using three bus organization.	4	L2	CO5
