CBCS SCHEME

USN ☐☐☐☐☐☐☐☐☐☐

BMATEC301/BEC301/BBM301

Third Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.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. Statistical table and Mathematics formula handbook are allowed.
3. M : Marks , L: Bloom's level , C: Course outcomes.

<table>
<tr><th colspan="3">Module – 1</th><th>M</th><th>L</th><th>C</th></tr>
<tr><td>Q.1</td><td>a.</td><td>Obtain the Fourier series of $f(x)=\frac{\pi-x}{2}$ in $0<x<2\pi$. Hence deduce that $1-\frac{1}{3}+\frac{1}{5}-\frac{1}{7}+.....=\frac{\pi}{4}$.</td><td>6</td><td>L2</td><td>CO1</td></tr>
<tr><td></td><td>b.</td><td>Find the Fourier series of $f(x)=\lvert x\rvert$ in $(-\ell \ \ \ell)$. Hence show that $\frac{1}{1^2}+\frac{1}{3^2}+\frac{1}{5^2}+......=\frac{\pi^2}{8}$.</td><td>7</td><td>L3</td><td>CO1</td></tr>
<tr><td></td><td>c.</td><td>Expand f(x) = 2x – 1 as a cosine half range Fourier series in $0<x<1$.</td><td>7</td><td>L2</td><td>CO1</td></tr>
<tr><th colspan="6">OR</th></tr>
<tr><td>Q.2</td><td>a.</td><td>Find the Fourier series of $f(x)=\begin{cases}1+\frac{2x}{\pi} & \text{in } -\pi<x<0\\ 1-\frac{2x}{\pi} & \text{in } 0<x<\pi\end{cases}$. Hence deduce that $\frac{\pi^2}{8}=\frac{1}{1^2}+\frac{1}{3^2}+\frac{1}{5^2}+.......$</td><td>6</td><td>L2</td><td>CO1</td></tr>
<tr><td></td><td>b.</td><td>Obtain the sine half range series of,
$f(x)=\begin{cases}\frac{1}{4}-x & \text{in } 0<x<\frac{1}{2}\\ x-\frac{3}{4} & \text{in } \frac{1}{2}<x<1\end{cases}$</td><td>7</td><td>L2</td><td>CO1</td></tr>
<tr><td></td><td>c.</td><td>Determine the constant term and the first cosine and sine terms of the Fourier series expansion of y from the following data :
<table>
<tr><td>x°:</td><td>0</td><td>45</td><td>90</td><td>135</td><td>180</td><td>225</td><td>270</td><td>315</td></tr>
<tr><td>y:</td><td>2</td><td>$\frac{3}{2}$</td><td>1</td><td>$\frac{1}{2}$</td><td>0</td><td>$\frac{1}{2}$</td><td>1</td><td>$\frac{3}{2}$</td></tr>
</table></td><td>7</td><td>L1</td><td>CO1</td></tr>
<tr><th colspan="6">Module – 2</th></tr>
<tr><td>Q.3</td><td>a.</td><td>Find the Fourier transform of the function,
$f(x)=\begin{cases}1 & \text{for } \lvert x\rvert\le a\\ 0 & \text{for } \lvert x\rvert>a\end{cases}$. Hence evaluate $\int_0^\infty \frac{\sin x}{x}dx$.</td><td>6</td><td>L2</td><td>CO2</td></tr>
<tr><td></td><td>b.</td><td>Find the Fourier sine and cosine transforms of $f(x)=e^{-\alpha x}$, $\alpha>0$.</td><td>7</td><td>L2</td><td>CO2</td></tr>
<tr><td></td><td>c.</td><td>Find the Fourier sine transform of $\frac{e^{-ax}}{x}$, $a>0$.</td><td>7</td><td>L3</td><td>CO2</td></tr>
</table>

		OR			
Q.4	**a.**	If $f(x)=\begin{cases}1-x^2, & \lvert x\rvert<1\\ 0, & \lvert x\rvert\geq 1\end{cases}$, find the Fourier transform of f(x) and hence find the value of, $\int_0^\infty \frac{x\cos x-\sin x}{x^3}dx$.	6	**L2**	**CO2**
	b.	Find the Fourier sine transform of $f(x)=e^{-\lvert x\rvert}$ and hence evaluate $\int_0^\infty \frac{x\sin mx}{1+x^2}dx,\ m>0$.	7	**L3**	**CO2**
	c.	Find the Discrete fast fourier of signal = $(0, 1, 49)^T$	7	**L3**	**CO2**
		Module – 3			
Q.5	**a.**	Find the z-transform of, (i) $\cosh n\theta$ (ii) $\sinh n\theta$	6	**L1**	**CO3**
	b.	If $V(z)=\frac{2z^2+3z+12}{(z-1)^4}$, evaluate u_0, u_1 and u_2	7	**L2**	**CO3**
	c.	Find the inverse z-transform of, $\frac{z}{(z-1)(z-2)}$.	7	**L2**	**CO3**
		OR			
Q.6	**a.**	Solve by using z-transforms, $y_{n+2}+2y_{n+1}+y_n=n$ with $y_0=0=y_1$	6	**L3**	**CO3**
	b.	Find $Z_T^{-1}\left[\frac{5z}{(3z-1)(2-z)}\right]$.	7	**L2**	**CO3**
	c.	Solve by using z-transforms $u_{n+2}-5u_{n+1}+6u_n=2^n$ with $u_0=0=u_1$.	7	**L3**	**CO3**
		Module – 4			
Q.7	**a.**	Solve $\frac{d^3y}{dx^3}+6\frac{d^2y}{dx^2}+11\frac{dy}{dx}+6y=0$.	6	**L1**	**CO4**
	b.	Solve $(D^2+1)y=x^2+4x-6$.	7	**L2**	**CO4**
	c.	Using the method of variation of Parameters of $\frac{d^2y}{dx^2}-6\frac{dy}{dx}+9y=e^{3x}$	7	**L3**	**CO4**
		OR			
Q.8	**a.**	Solve $6\frac{d^2y}{dx^2}+17\frac{dy}{dx}+12y=e^{-x}$.	6	**L2**	**CO4**
	b.	Solve the Cauchy's differential equation, $x^2\frac{d^2y}{dx^2}+x\frac{dy}{dx}+8y=65\cos(\log x)$.	7	**L2**	**CO4**
	c.	The charge q in a series circuit containing an Inductance L, Capacitance C, emf E satisfy the differential equation, $L\frac{d^2q}{dt^2}+\frac{q}{C}=E$. Express q in terms of t.	7	**L3**	**CO4**
		Module – 5			
Q.9	**a.**	Fit a second degree parabola $y=a+bx+cx^2$ into least square sense for the data and estimate y at x = 6. x: 1 2 3 4 5 y: 10 12 13 16 19	6	**L1**	**CO5**

<table>
<tr><td></td><td>b.</td><td>Find a correlation coefficient for the two variables x and y.
<table>
<tr><td>x:</td><td>92</td><td>89</td><td>87</td><td>86</td><td>83</td><td>77</td><td>71</td><td>63</td><td>53</td><td>50</td></tr>
<tr><td>y:</td><td>86</td><td>83</td><td>91</td><td>77</td><td>68</td><td>85</td><td>52</td><td>82</td><td>37</td><td>57</td></tr>
</table></td><td>7</td><td>L2</td><td>CO5</td></tr>
<tr><td></td><td>c.</td><td>Ten students got the following percentage of marks in two subjects x and y. Compute the rank correlation coefficient.
<table>
<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></td><td>7</td><td>L2</td><td>CO5</td></tr>
<tr><td colspan="6">OR</td></tr>
<tr><td>Q.10</td><td>a.</td><td>If θ is the angle between the lines of regression show that $\tan\theta = \frac{\sigma_x \sigma_y}{\sigma_x^2 + \sigma_y^2}\left(\frac{1-r^2}{r}\right)$.</td><td>6</td><td>L2</td><td>CO5</td></tr>
<tr><td></td><td>b.</td><td>Obtain the lines of regression and hence find the coefficient of correlation for the data,
<table>
<tr><td>x:</td><td>1</td><td>3</td><td>4</td><td>2</td><td>5</td><td>8</td><td>9</td><td>10</td><td>13</td><td>15</td></tr>
<tr><td>y:</td><td>8</td><td>6</td><td>10</td><td>8</td><td>12</td><td>16</td><td>16</td><td>10</td><td>32</td><td>32</td></tr>
</table></td><td>7</td><td>L2</td><td>CO5</td></tr>
<tr><td></td><td>c.</td><td>If $8x - 10y + 66 = 0$ and $40x - 18y = 214$ are the two regression lines. Find $\bar{x}$, $\bar{y}$ and r. Find σ_y if $\sigma_x = 3$.</td><td>7</td><td>L2</td><td>CO5</td></tr>
</table>

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CBCS SCHEME

USN ☐☐☐☐☐☐☐☐☐☐ **BEC302**

Third Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.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 truth table so that an output is generated indicating when a majority of four inputs is tree.	**4**	**L3**	**CO1**
	b.	Find the prime implicants and the essential prime implicants of the following Boolean functions using Karnaugh maps. i) $f(a, b, c, d) = \Sigma(1, 5, 6, 7, 11, 12, 13, 15)$ ii) $f(a, b, c, d) = \Sigma(0, 1, 4, 5, 9, 11, 13, 15)$	**8**	**L4**	**CO1**
	c.	Simplify the given boolean function using Quine McCluskey minimization technique for the function $O = f(a, b, c, d) = \Sigma(0, 1, 2, 3, 6, 7, 8, 9, 14, 15)$	**8**	**L3**	**CO1**
		OR			
Q.2	**a.**	Place the following equations into the proper canonical form: i) $P = f(a, b, c) = ab' + ac' + bc$ ii) $G = f(w, x, y, z) = w'x + yz'$	**4**	**L3**	**CO1**
	b.	Find the minimal sum and minimal product for the following Boolean functions using Karnaugh maps i) $f(a,b,c,d) = \bar{a}\bar{b}d + bcd + a\bar{b}d + b\bar{c}\bar{d}$ ii) $f(a,b,c,d) = (a+\bar{b})(a+c+d)(\bar{a}+\bar{b}+\bar{d})(a+\bar{c}+d)$	**8**	**L4**	**CO1**
	c.	Simplify the given boolean function using quine. McCluskey minimization technique for the function. $s = f(a,b,c,d) = \Sigma(1,3,13,15) + \Sigma d(8,9,10,11)$	**8**	**L3**	**CO1**
		Module – 2			
Q.3	**a.**	Design and explain binary full adder with block diagram, Karnaugh map and logic circuit.	**10**	**L3**	**CO2**
	b.	Define decoder, write the symbol, truth table and logic circuit for 3:8 line decoder using minterm generator.	**10**	**L2**	**CO2**
		OR			
Q.4	**a.**	Define multiplexer, write the symbol, truthtable and logic circuit for 4:1 multiplexer using enable input.	**10**	**L2**	**CO2**
	b.	Realize the Boolean function $f(w, x, y, z) = \Sigma(0, 1, 5, 6, 7, 9, 12, 15)$ i) Using 8:1 MUX ii) Using 4:1 MUX	**10**	**L2**	**CO2**

Module – 3

Q.5	a.	Develop the characteristic equation for i) SR flip flop ii) JK flip flop iii) D flip flop iv) T flip flop.	10	L3	CO3
	b.	Explain serial in, parallel at unidirectional shift register and parallel in serious out unidirectional shift register.	10	L2	CO3

OR

Q.6	a.	Explain Mod-4 ring counter and Mod-8 twisted ring counter with logic diagram and counting sequence.	10	L2	CO3
	b.	Design a synchronous Mod-6 counter using clocked D-flip flop.	10	L3	CO3

Module – 4

Q.7	a.	Explain logical operators and relational operators used in verilog.	8	L2	CO4
	b.	Illustrate i) NETS ii) Register iii) Vector iv) integer data types with an example.	8	L2	CO4
	c.	Write a verilog code for full adder using data flow description style.	4	L2	CO4

OR

Q.8	a.	Illustrate the structure of behavioural description with an example using half adder.	8	L2	CO4
	b.	Illustrate the structure of verilog module with an example using half subtractor.	8	L2	CO4
	c.	Write a verilog code for binary to gray using behavioural description style.	4	L2	CO4

Module – 5

Q.9	a.	Write the syntax of IF and EISE-IF with an example.	8	L2	CO4
	b.	Write logic symbol, flowchart and program for D-latch using behavioural description style.	8	L2	CO4
	c.	Write a verilog code for 8:1 MUX using behavioural description style.	4	L2	CO4

OR

Q.10	a.	Explain the structure of structural model with built in gates using example of half adder. Also mention an primitive built in gates.	8	L2	CO4
	b.	Write a verilog code of a 3-bit ripple carry adder using structural description model.	8	L2	CO4
	c.	Write a verilog code of SR flip flop using behavioural description style.	4	L2	CO4

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CBCS SCHEME

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BEC303

Third Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.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.**	Derive expressions V_{in}, V_{out} and A_Y for a common emitter circuit with ac equivalent circuit with π – model.	12	L1	CO2
	b.	What is the voltage gain and output voltage across the load resistor of V_{DB} amplifier? $R_1 = 10\ k\Omega$, $R_2 = 2.2\ k\Omega$, $R_C = 3.6\ k\Omega$, $R_E = 1\ k\Omega$, $R_L = 10\ k\Omega$, $V_{CC} = 10\ V$, $V_{BE} = 0.7\ V$ and $V_{in} = 2\ mV$.	8	L1	CO1
		OR			
Q.2	**a.**	With a neat diagram, explain loading effect of input impedence.	10	L1	CO1
	b.	Explain three types of Bias circuit, (i) Emitter feedback bias. (ii) Collector feedback bias and (iii) Collector and emitter feedback.	10	L1	CO1
		Module – 2			
Q.3	**a.**	Explain the three biasing methods to bias MOS amplifiers with neat circuit diagram.	10	L2	CO2
	b.	Explain the T-equivalent circuit model of MOSFET.	10	L3	CO2
		OR			
Q.4	**a.**	With a small signal equivalent model of MOSFET, derive an expression of voltage gain and transconductance.	10	L2	CO2
	b.	Explain common source follower and derive the expression of voltage gain with necessary equation.	10	L2	CO2
		Module – 3			
Q.5	**a.**	Explain R and 2R resistor Digital to Analog converter and also derive the expression of output voltage.	10	L2	CO3
	b.	With a neat circuit diagram, explain the operation of Monostable multivibrator.	10	L2	CO3
		OR			
Q.6	**a.**	With a neat diagram, explain operation of RC-phase shift oscillator using op-amp. Write the expression for frequency of oscillations.	8	L2	CO3
	b.	With a net diagram, explain operation of crystal oscillator using BJT and Write necessary equations.	6	L2	CO3
	c.	A crystal has these values $L = 3\ H$, $C_S = 0.05\ PF$, $R = 2\ k\Omega$ and $C_m = 10\ PF$. What are the series and parallel resonant frequencies of the crystal?	6	L3	CO3

		Module – 4			
Q.7	**a.**	Explain the first order Low Pass filter with frequency response.	**10**	**L2**	**CO4**
	b.	Explain the two types of Band Pass filters.	**10**	**L2**	**CO4**
		OR			
Q.8	**a.**	Explain the four types of Negative feedback circuits.	**10**	**L2**	**CO4**
	b.	Explain the working of 2nd order high pass filter with a neat circuit and frequency response.	**10**	**L2**	**CO4**
		Module – 5			
Q.9	**a.**	Explain two load lines with necessary circuit diagram and equations.	**10**	**L2**	**CO5**
	b.	With a neat diagram, explain the working of a Thyristor.	**10**	**L2**	**CO5**
		OR			
Q.10	**a.**	Explain Basic Construction and working of IBGTs with necessary figure.	**10**	**L2**	**CO5**
	b.	With a neat diagram, explain the working of UJT relaxation oscillator.	**10**	**L2**	**CO5**

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CBCS SCHEME

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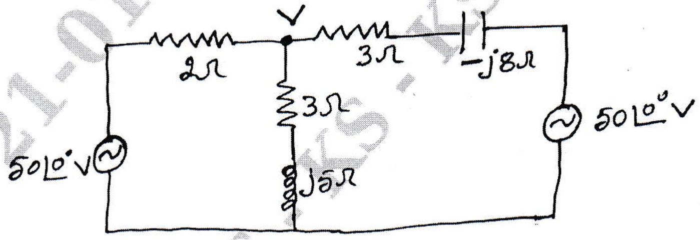
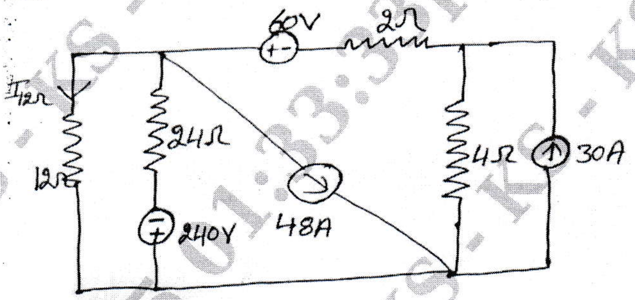
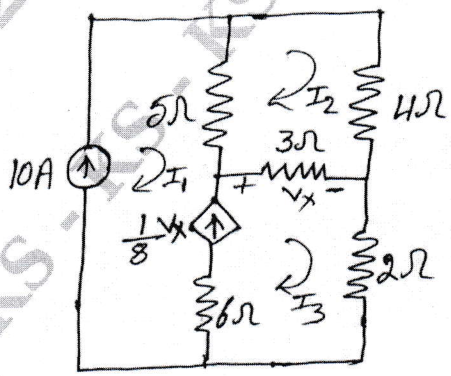
BEC304

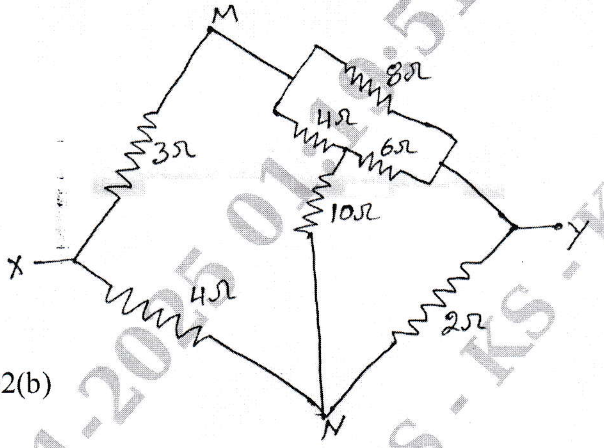
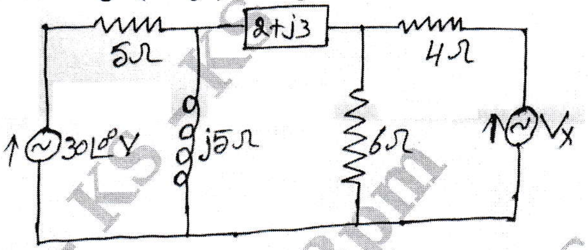
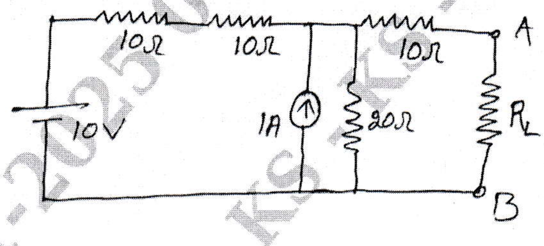
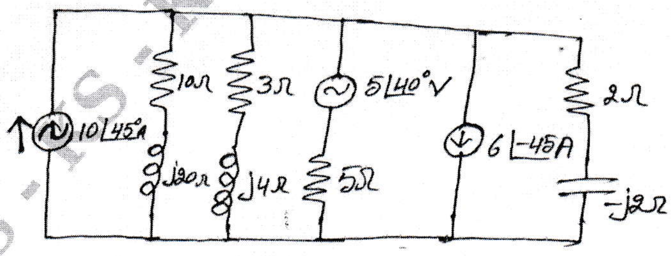
Third Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025

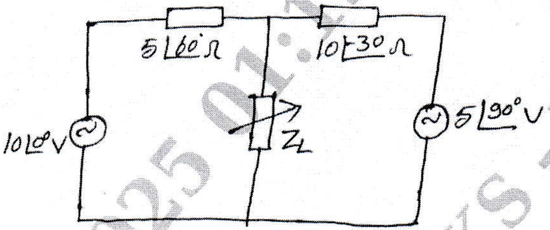
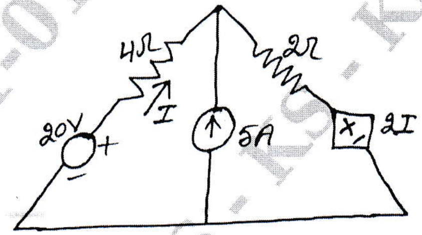
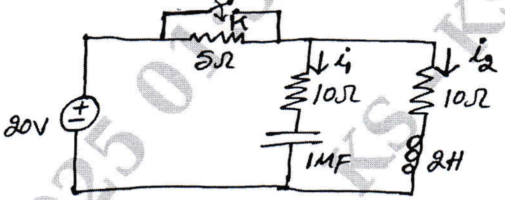
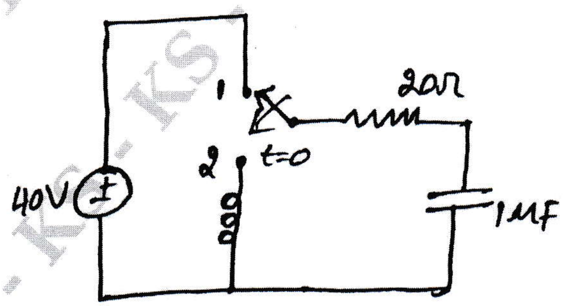
Network Analysis

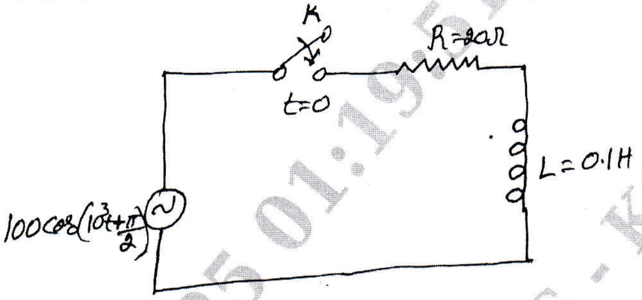
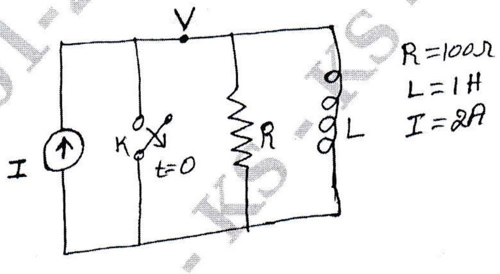
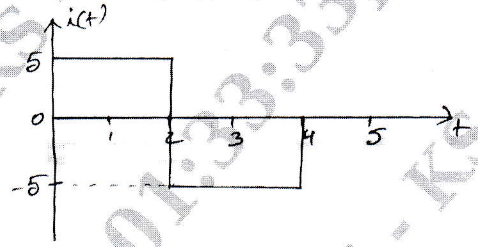
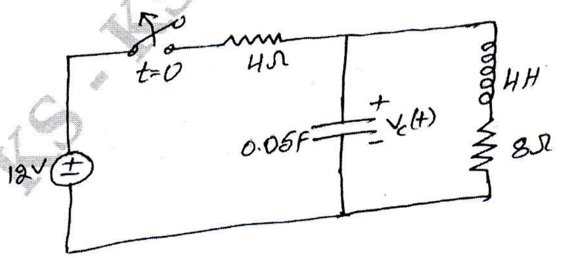
Time: 3 hrs. Max. Marks: 100

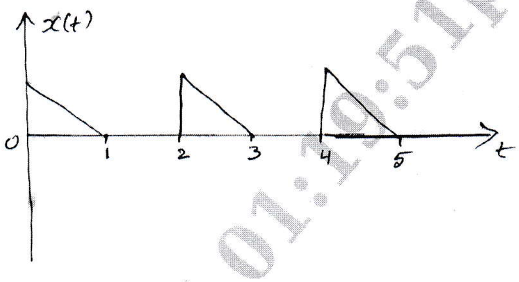
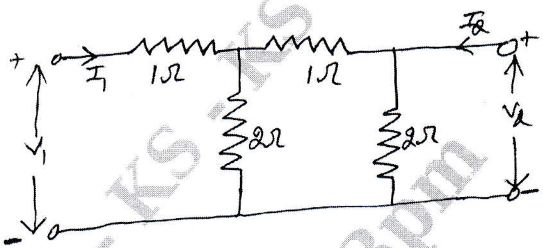
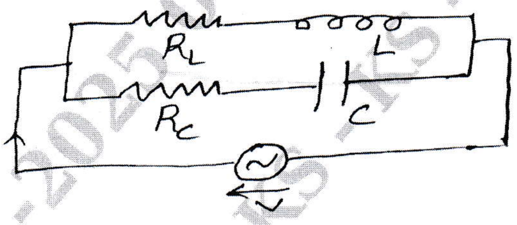
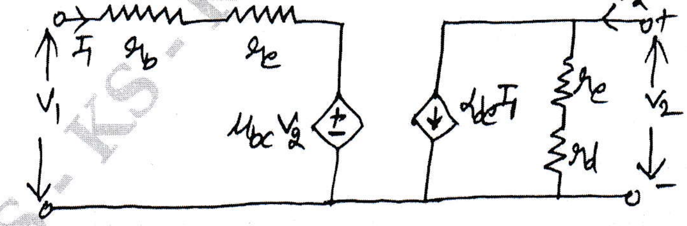
Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	**M**	**L**	**C**
Q.1	**a.**	Three impedances are connected in Delta. Obtain the star equivalent of the network.	7	L3	CO1
	b.	For the circuit shown in Fig. Q1(b). Find the voltage 'V' at node by using nodal analysis. Fig. Q1(b)  	6	L3	CO1
	c.	Determine the current in 12Ω resistor shown in Fig. Q1(c) using source transformation method.  Fig. Q1(c)	7	L3	CO1
		OR			
Q.2	**a.**	Find the loop currents I_1, I_2, and I_3 in the circuit shown in Fig. Q2(a).  Fig. Q2(a)	7	L3	CO1

	b.	Determine the resistance between the terminals X, Y using star delta transformation in the network shown in Fig. Q2(b).  Fig. Q2(b)	6	L3	CO1
	c.	Use the nodal analysis to find the value of V_X and the circuit shown in Fig. Q2(c). Such that the current through (2 + j3) Ω Impedance is zero.  Fig. Q2(c)	7	L3	CO1
		Module – 2			
Q.3	**a.**	Sate and prove Superposition theorem.	7	L2	CO2
	b.	For the circuit shown in Fig. Q3(b), obtain the Thevenin's equivalent circuit.  Fig. Q3(b)	7	L3	CO2
	c.	Using Millman's theorem, find current flowing through (3 + j4) Ω impedance for the circuit shown in Fig. Q3(c).  Fig. Q3(c)	6	L3	CO2
		OR			

Q.4	**a.**	State and prove Norton's theorem.	7	**L2**	**CO2**
	b.	Find the value of Z_L for Maximum Power transfer and the value of Maximum power for the circuit shown in Fig. Q4(b). Fig. Q4(b)  	6	**L3**	**CO2**
	c.	Find current 'I' using Super position theorem for the circuit shown in Fig. Q4(c). Fig. Q4(c)  	7	**L3**	**CO2**
		Module – 3			
Q.5	**a.**	Use the concepts of initial condition to illustrate the voltage behavior in inductor circuit for DC supply.	6	**L3**	**CO3**
	b.	In the circuit steady state is reached with switch 'K' open. The switch is closed at t = 0. Compute i , di/dt and d^2i/dt^2 at $t = 0^+$. Fig. Q5(b)  	7	**L3**	**CO3**
	c.	The switch is moved from position (1) to position (2) at t = 0. The steady state has been reached before switching. Computer i , di/dt and d^2i/dt^2 at $t = 0^+$ for Fig. Q5(c). Fig. Q5(c)  	7	**L4**	**CO3**
		OR			

Q.6	**a.**	In the circuit shown in Fig. Q6(a), determine complete solution for current when switch 'K' is closed at t = 0. Fig. Q6(a)  	**10**	**L3**	**CO3**
	b.	Compute v , dv/dt , $d^2v/^{dt2}$ at t = 0^+ for the circuit shown in below Fig. Q6(b), when the switch K is opened at t = 0. Fig. Q6(b)  	**10**	**L4**	**CO3**
		Module – 4			
Q.7	**a.**	Using waveform synthesis method to express the voltage pulse interms of unit step. Find i) L{i(t)} ii) L{∫ i(t).dt}. Fig. Q7(a)  	**8**	**L3**	**CO4**
	b.	State and prove initial value and final value theorem for Laplace transform.	**6**	**L2**	**CO4**
	c.	Obtain the Laplace transform of step and ramp function with relevant expressions.	**6**	**L3**	**CO4**
		OR			
Q.8	**a.**	Determine $i_L(t)$ for t ≥ 0 using Laplace transform for circuit shown in Fig. Q8(a). Fig. Q8(a)  	**10**	**L3**	**CO4**

	b.	Find the Laplace transform of the periodic signal x(t) as shown in Fig. Q8(b).  Fig. Q8(b)	10	L3	CO4
		Module – 5			
Q.9	**a.**	Define Z – parameters. Determine Y parameters interms if Z – parameters.	6	L3	CO5
	b.	Show that resonant frequency is geometric mean of cut off frequency in series R – L – C circuit.	7	L3	CO5
	c.	Apply the two – port network analysis technique to determine ABCD – parameters of the network shown in Fig. Q9(c).  Fig. Q9(c)	7	L3	CO5
		OR			
Q.10	**a.**	Derive the expression for the resonant frequency of the circuit shown in Fig. Q10(a). Also show that the circuit resonate at all frequency if $R_L = R_C = \sqrt{\frac{L}{C}}$.  Fig. Q10(a)	10	L3	CO5
	b.	The model of a transistor in the CE mode is shown in Fig. Q10(b). Determine the h – parameters.  Fig. Q10(b)	10	L3	CO5

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CBCS SCHEME

USN 1 K S 2 3 E C 0 4 9

BEC306C

Third Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.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.

			M	L	C
		Module – 1	**M**	**L**	**C**
Q.1	**a.**	With neat diagram explain connection between the processor and memory.	10	L1	CO1
	b.	Write the difference between little endian and big endian memory assignments.	05	L1	CO1
	c.	Write a short note on basic performance equation.	05	L1	CO1
		OR			
Q.2	**a.**	Describe the concept of branching with an example program of instruction execution.	10	L1	CO1
	b.	Represent the following decimal values as signed 7-bit numbers using sign and magnitude, signed 1's complement and signed 2's complement formats. – 55, +51, 8, – 27, – 39, +43, – 10, 62	05	L2	CO1
	c.	Write a short note on memory operations.	05	L1	CO1
		Module – 2			
Q.3	**a.**	What is an addressing mode? Explain any four types of addressing modes, with suitable example.	10	L1	CO2
	b.	Write a program to compute the sum of test scores of all the students in the three tests. Store the corresponding sums in memory.	10	L2	CO2
		OR			
Q.4	**a.**	Explain the Rotate and Shift instructions with an example.	10	L1	CO2
	b.	Define subroutine. Explain subroutine linkage using a link register.	05	L1	CO2
	c.	What are assembler directives? Explain any two directives.	05	L1	CO2
		Module – 3			
Q.5	**a.**	Define I/O interface? Explain I/O interface to connect an input device to the bus with neat diagram.	10	L1	CO3
	b.	What is interrupt? Discuss interrupt I/O method for data transfer.	05	L1	CO3
	c.	Describe two methods of handling multiple devices.	05	L1	CO3
		OR			
Q.6	**a.**	Explain the use of DMA controllers in a computer system with neat diagram.	10	L1	CO3
	b.	Write a note on Bus Arbitration.	10	L1	CO3
		Module – 4			
Q.7	**a.**	Explain the organization of 1K×1 memory chip.	10	L1	CO4
	b.	Write a note on : (i) Static memories (ii) Cache memory	10	L1	CO4
		OR			
Q.8	**a.**	Explain the Magnetic disk principles.	10	L1	CO4
	b.	Draw and explain the internal organization of 2M×8 asynchronous DRAM chip.	10	L2	CO4
		Module – 5			
Q.9	**a.**	Discuss with neat diagram the single bus organization of data path inside a processor.	10	L1	CO5
	b.	What are the actions required to execute a complete instruction ADD (R_2), R_1	10	L1	CO5
		OR			
Q.10	**a.**	Draw and explain multiple bus organization of CPU.	10	L1	CO5
	b.	Draw and explain organization of the control unit to allow conditional	10	L1	CO5