

Seat No:

Question Paper Code:

**Tatyasaheb Kore Institute of Engineering & Technology**  
**Warananagar**  
**(An Autonomous Institute)**

**S. Y. B. Tech (E&TC Engineering) (Semester-III)**

**END SEMESTER EXAMINATION (ESE), DECEMBER 2023**

**Course Name: Engineering Mathematics-III**

**Course Code: ETC-301**

Day and Date: 18/12/2023

Time: 2.00 Hrs (2.00 pm to 4.00 pm)

**Max. Marks- 60**

**Instructions:**

- i. All Questions are compulsory
- ii. Figure to the right indicates full marks.
- iii. Assume suitable data if missing.
- iv. Use of non-programmable calculators is allowed.

**Q. No.1 Attempt any TWO from the following**

a) Solve  $(D^3 + 1)y = \cos 2x + e^{2x}$

Marks	CO	PO
6	1	1

b) Find  $L \left\{ e^{-t} \left( \frac{\cos 3t - \cos 2t}{t} \right) \right\}$

6	2	1
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c) Find  $L \left\{ e^{-3t} \int_0^t t \sin 2t dt \right\}$

6	2	1
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**Q. No.2 Attempt any TWO from the following**

a) Find  $L^{-1} \left\{ \frac{4s+5}{s^2+2s+10} \right\}$

6	3	1
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b) Find  $L^{-1} \left( \log \left( 1 + \frac{4}{s^2} \right) \right)$

6	3	1
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c) Obtain Fourier series for the  $f(x)$  given by

$$f(x) = \begin{cases} 1 + \frac{2x}{\pi} & -\pi \leq x \leq 0 \\ 1 - \frac{2x}{\pi} & 0 \leq x \leq \pi \end{cases}$$

6	4	1
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**Q. No.3 Attempt any TWO from the following**

a) In a large consignment of electric bulb 10% are defective . A random sample of 20 is taken for inspection. Find the probability that

i) all are good bulbs

ii) at most 3 defective bulbs

iii) at least one defective bulb

6	5	1
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b) If the probability that an individuals suffer a bad reaction from a certain injection is 0.001. Determine the probability that out of 2000 individuals

i) exactly 3

6 5 1

ii) more than 2

iii) at least one will suffer a bad reaction

c) Weight of 4000 students are found to be normally distributed with mean 50 kgs and standard deviation 5 kgs. Find the number of students with weights

i) less than 45 kgs

6 5 1

ii) above 60 kgs

( Given : S. N. V. Z area for  $z=0$  to  $z=1$  is 0.3413, for  $z=0$  to  $z=2$  is 0.4772)

**Q. No.4 Attempt any TWO from the following**

a) Find the directional derivatives of  $\phi = x^2 - y^2 - 2z^2$  at the point  $P(2, -1, 3)$  in the direction PQ where  $Q(5, 6, 4)$

6 6 1

b) Show that the vector field  $\vec{F} = (x^2 + xy^2)i + (y^2 + x^2y)j$  is irrotational and find the scalar potential.

6 6 1

c) Find  $\text{div}\vec{F}$  and  $\text{curl}\vec{F}$  at point  $(2, -1, 1)$  where

$$\vec{F} = xyzi + 3x^2yj + (xz^2 - y^2z)k$$

6 6 1

**Q. No.5 Attempt any TWO from the following**

a) Solve  $(D^2 + 2D + 1)y = x^2 + x$

6 1 1

b) Evaluate

$$\int_0^\infty e^{-t} \frac{\sin t}{t} dt \text{ by using Laplace transform}$$

6 2 1

c) Find  $L^{-1} \left\{ \frac{1}{(s-3)(s+3)^2} \right\}$

6 3 1

d) Fit a Poisson distribution to the following data

x:	0	1	2	3	4	5	6
f(x)	143	90	42	12	9	3	1

6 5 1

**Tatyasaheb Kore Institute of Engineering & Technology**  
**Warananagar**  
**(An Autonomous Institute)**

**S. Y. B. Tech (Electronics and Telecommunication Engineering) (Semester-III)**

**END SEMESTER EXAMINATION (ESE), DECEMBER-2023**

**Course Name: Electronic Devices and Circuit-I**

**Course Code: ETC302**

**Day and Date: Thursday, (21/12/2023)**

**Time : 2.00 Hrs (2:00pm To 4:00pm)**

**Max. Marks- 60**

**Instructions:**

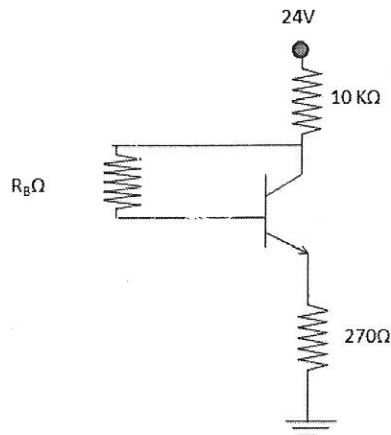
- i. All Questions are compulsory
- ii. Figure to the right indicates full marks.
- iii. Assume suitable data if missing.
- iv. Use of non-programmable calculators is allowed.
- v. *Standard DATA SHEET is allowed.*

Q. No.		Marks	CO	PO
<b>1</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
<b>a</b>	Draw the circuit diagram of Zener shunt regulator and explain its operation for varying input as well as varying load resistance condition.		<b>1</b>	<b>1</b>
<b>b</b>	A 250 – 0 – 250 Vrms transformer is used with full wave center tapped rectifier with each diode having an internal resistance of 30Ω. If the load resistance is 2KΩ, find, i) r m s value of Ripple Voltage. ii) Rectification Efficiency.		<b>2</b>	<b>3</b>
<b>c</b>	Design an unregulated power supply with inductor filter to produce 12V, 25mA with ripple factor of 4%.		<b>3</b>	<b>3</b>
<b>2</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
<b>a</b>	Explain the procedure of drawing the DC load Line.		<b>2</b>	<b>4</b>
<b>b</b>	Derive equation $t = \frac{0.35}{f2}$ .....rise time		<b>4</b>	<b>4</b>
<b>c</b>	Draw and explain Positive biased Clipper circuit with forward voltage using necessary waveform. Assume input sine wave = 10Vpp and biasing voltage = 3V DC.		<b>3</b>	<b>3</b>
<b>3</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
<b>a</b>	Draw and explain collector to base bias circuit. Derive the equation for $I_B$ , $V_{CE}$ and $I_C$ .		<b>2</b>	<b>3</b>
<b>b</b>	Define Stability Factor.		<b>2</b>	<b>3</b>

- Derive general expression for stability factor.
- c Design voltage divider biasing circuit for following specifications. 3      4  
 $V_{CC}=15V$ ,  $V_{CE} = 8V$ ,  $I_{CQ} = 4mA$ ,  $\beta_{min} = 100$ ,  $S = 10$ .

- 4 **Attempt any Two from the following** 12
- a Derive the stability factor of Self bias circuit. 2      3
- b Draw hybrid equivalent circuit of a CE transistor amplifier. 3      1  
 State the name of each parameter and write its equation.
- c For the transistor connected in CE configuration, determine 4      3  
 $A_v$ ,  $A_i$ ,  $R_i$  and  $R_o$  using the complete hybrid equivalent model given  $R_s=R_L = 1k\Omega$ ,  $h_{ie} = 1k\Omega$ ,  $h_{re} = 2 \times 10^{-4}$ ,  $h_{fe} = 100$ ,  $h_{oe} = 20\mu\Omega$ .

- 5 **Attempt any Two from the following** 12
- a As shown in fig. below given  $\beta=100$ ,  $V_{BE}=0.6V$ ,  $V_{CE}=5V$  under quiescent condition. Calculate  $R_B$  and  $S$ . 4      4



- b Draw the circuit diagram of Differentiator, State its conditions and derive the output equation. 3      4
- c Design a zener shunt voltage regulator to provide 5V output DC voltage at load with the load current of 10 mA. The input voltage is varies in between 6V to 8V. 2      3
- d Compare half wave; center tapped full wave and Bridge Rectifier. (Any six points.) 3      4



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**Tatyasaheb Kore Institute of Engineering & Technology Warananagar**  
(An Autonomous Institute)

**S. Y. B. Tech (Electronics & Telecom Engg.) (Semester-III)**  
**END SEMESTER EXAMINATION (ESE), DECEMBER 2023**

Course Name: Digital Electronics &amp; Microprocessor

Course Code: ETC303

Day and Date: Saturday, (23/12/2023)

Time: 2.00 Hrs 2:00 pm to 4:00 pm

Max. Marks- 60

**Instructions:**

- i. All Questions are compulsory
- ii. Figure to the right indicates full marks.
- iii. Assume suitable data if missing.
- iv. Use of non-programmable calculators is allowed.

Q. No.	Marks	CO	PO
<b>1 Attempt any Two from the following</b>	<b>12</b>		
a What is minterm , maxterm and don't care condition.		1	1
b Reduce using Boolean Algebra		4	3
i) If $C = (AB)' + A'B$ then find $(AC)' + A'C$			
ii) $x'z' + y'z' + yz' + xyz$			
c Why NOR Gate is called as universal Gate? Justify.		4	4
<b>2 Attempt any Two from the following</b>	<b>12</b>		
a Explain 4 bit BCD adder with logic diagram.		2	2
b Explain encoder with block diagram and design octal to binary encoder circuit.		4	4
c Explain with example multiplexer tree.		6	2
<b>3 Attempt any Two from the following</b>	<b>12</b>		
a Implement using suitable decoder:- i) $F_1 = \sum_m (2,4,6,7)$		6	2
i i) $F_1 = \sum_m (0,4,5,)$			
b Draw logic circuit, truth table of JK FF and explain function of preset and clear signals.		4	3
c Design mod 6 ripple counter and draw waveforms.		6	2
<b>4 Attempt any Two from the following</b>	<b>12</b>		
a Derive T FF using JK FF. Why SR FF not used for T FF.		1	1
b Draw Programming model of 8085 and explain it in brief.		6	2
c Explain instructions in detail:- i) LDA C200h i) DAD B		1	1
<b>5 Attempt any Two from the following</b>	<b>12</b>		
a With examples explain operand addressing modes in 8085 microprocessor.		1	1
b Draw timing diagram of :- MVI A, 20h		2	1
c Draw flowchart and write a program to find smallest number from given array of 6 bytes.		1	1

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**Tatyasaheb Kore Institute of Engineering & Technology, Warananagar**  
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**S. Y. B. Tech (Electronics & Telecommunication Department) (Semester-III)**

**END SEMESTER EXAMINATION (ESE), DEC 2023**

**Course Name: Electrical Circuits**

**Course Code: ETC304**

Day and Date: Wednesday, (27/12/2023)

Time: 2:00pm to 4:00pm

**Max. Marks- 60**

**Instructions:**

- i. All Questions are compulsory
- ii. Figure to the right indicates full marks.
- iii. Assume suitable data if missing.
- iv. Use of non-programmable calculators is allowed.

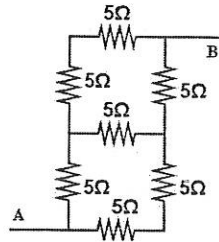
<b>Q. No.</b>		<b>Marks</b>	<b>CO</b>	<b>PO</b>
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**1 Attempt any Two from the following**

**12**

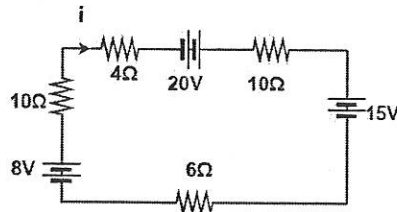
**a Find the equivalent resistance between terminals A & B.**

**1 2**



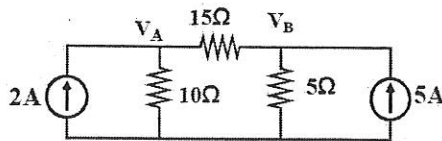
**b Find current "I" flowing through the circuit.**

**1 3**



**c Find the node voltages  $V_A$  &  $V_B$  using nodal analysis**

**1 2**



**2 Attempt any Two from the following**

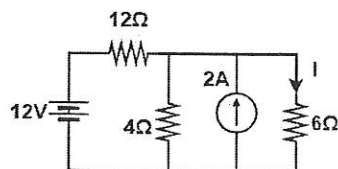
**12**

**a Derive the equation for star to delta & delta to star transformation.**

**1 3**

**b Use source transformation to find the current "I" flowing through circuit.**

**2 3**



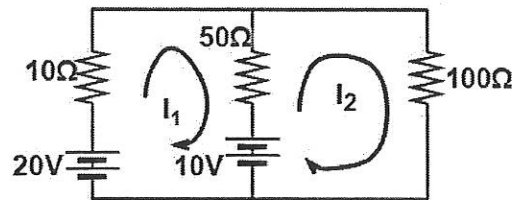
**c What are filter circuits? Explain their types.**

**3 2**

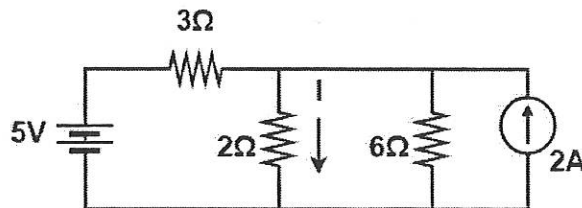
- 3 Attempt any Two from the following** 12
- a Explain the basic construction and working principle of a DC motor. 4 1
- b Define back electromotive force (EMF) in the context of DC motors. 4 1
- c A 250 Volts d. c. shunt motor has armature resistance of 0.25 ohm, on load it takes an armature current of 50 A and runs at 750 r. p.m. If the flux of motor is reduced by 10% without changing the load torque, find the new speed of the motor. 3 2

- 4 Attempt any Two from the following** 12
- a With help of Circuit diagram ,explain working of AC Servo motor with its applications. 4 1
- b How does a Permanent Magnet Stepper Motor operate ? What are the key principles behind its motion control? 4 1
- c Differentiate between AC servo motor and DC servo motor. 4 2

- 5 Attempt any Two from the following** 12
- a Describe briefly the method of speed control available for dc motors. A 230 V d.c. shunt motor runs at 800 r.p.m. and takes armature current of 50 A. Find resistance to be added to the field circuit to increase speed to 1000 r.p.m. at an armature current of 80 A. Assume flux proportional to field current. Armature resistance =  $0.15 \Omega$  and field winding resistance =  $250 \Omega$ . 3 2
- b A constant-K high pass filter having cut-off frequency of 8 KHz and nominal characteristic impedance of  $600 \Omega$ , find the component values of  $\pi$ -network. 3 1
- c By using Mesh analysis find current  $I_1$  and  $I_2$  for given circuit. 2 2



- d Find current "I" flowing through  $2 \Omega$  in given circuit by using superposition theorem. 2 3



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Question Paper Code:

**Tatyasaheb Kore Institute of Engineering & Technology, Warananagar**  
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**S. Y. B. Tech (ETC) (Semester-III)**

**END SEMESTER EXAMINATION (ESE), December 2023**

**Course Name: Transducers and Measurement**

**Course Code: ETC 305**

**Day and Date: 29/12/2023**

**Time: 2.00 pm to 4.00 pm**

**Max. Marks- 60**

**Instructions:**

- i. All Questions are compulsory
- ii. Figure to the right indicates full marks.
- iii. Assume suitable data if missing.
- iv. Use of non-programmable calculators is allowed.

Q. No.		Marks	CO	PO
<b>1</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Explain construction And working of Thermocouple		1	3
b	Explain Magnetic flow meter		2	4
c	Explain Hall Effect Transducer		1	2
<b>2</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Explain Piezoelectric sensor		2	4
b	Explain Maxwells bridge . Derive Expression for unknown Inductance. And Resistance		3	4
c	Explain operation of photomultiplier tube		3	2
<b>3</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	What is statistical analysis of measurement		2	3
b	Explain in detail static and dynamic characteristics of measurement system.		1	5
c	Find series equivalent inductance and capacitance that causes an opposite angle to null with following bridge arms $w=3000$ rad/sec $R_2=2k\Omega$ $C_1=1\mu F$ $R_3=1k$		3	6
<b>4</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Explain Dual trace CRO		3	5
b	Explain the working of function generator		4	6
c	Explain the working of DSO.		4	7
<b>5</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Explain Photovoltaic cell		2	5
b	Explain LVDT with neat Diagram		2	4
c	What are the limitations of wheatstones Bridge ? Explain Kelvins Bridge.		3	
d	Explain Basic Principle of signal display in CRO		4	5

**Tatyasaheb Kore Institute of Engineering & Technology**  
**Warananagar**  
**(An Autonomous Institute)**

**S. Y. B. Tech (Electronics and Telecommunication Engineering) (Semester-IV)**

**END SEMESTER EXAMINATION (ESE), DECEMBER-2023 (2023-24)**

**Course Name: Electronic Devices and Circuit-II      Course Code: ETC401**

Seat No:

**Day and Date: Thursday, (14/12/2023)**

**Time : 2.00 Hrs (2:00pm To 4:00pm)**

**Max. Marks- 60**

**Instructions:**

- i. All Questions are compulsory
- ii. Figure to the right indicates full marks.
- iii. Assume suitable data if missing.
- iv. Use of non-programmable calculators is allowed.
- v. *Standard DATA SHEET is allowed. (Will be provided by COE)*

Q. No.		Marks	CO	PO
<b>1</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
<b>a</b>	State Advantages and Disadvantages of Negative Feedback.	<b>6</b>	<b>1</b>	<b>1</b>
<b>b</b>	Derive the equation for Gain with Feedback ( $A_{vf}$ ).	<b>6</b>	<b>2</b>	<b>3</b>
<b>c</b>	For Current Series Feedback amplifier, $h_{fe}=50$ , $h_{ie}=1k\Omega$ , $R_L=1k\Omega$ , $R_e=100$ , $R=R_1 \parallel R_2=10K\Omega$ , Calculate feedback factor 'k' and $R_{if}$ .	<b>6</b>	<b>3</b>	<b>3</b>
<b>2</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
<b>a</b>	Draw the circuit diagram of two stage transformer coupled amplifier and explain in brief.	<b>6</b>	<b>2</b>	<b>4</b>
<b>b</b>	Design a two stage RC coupled amplifier to meet the following specifications. Load resistance- $2k\Omega$ , Source resistance- $600\Omega$ , Frequency range-20Hz to 20KHz, Voltage gain per stage $>60$ , Supply voltage-15V, Also calculate the overall voltage gain of the RC coupled amplifier.	<b>6</b>	<b>4</b>	<b>4</b>
<b>c</b>	Draw the frequency response of two stages RC coupled amplifier and explain in brief.	<b>6</b>	<b>3</b>	<b>3</b>
<b>3</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
<b>a</b>	Draw the circuit diagram of Class A power amplifier, its	<b>6</b>	<b>2</b>	<b>3</b>

	output characteristics stating 'Q' point location. Explain in brief.			
<b>b</b>	Design a transformer coupled class A amplifier to meet the following requirements $P_o=2W$ at across $4\Omega$ load resistance $R_L$ . Use $V_{cc}=12V$ .	<b>6</b>	<b>2</b>	<b>3</b>
<b>c</b>	Compare Class A, B, AB and C power amplifier.	<b>6</b>	<b>3</b>	<b>4</b>
<b>4</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
<b>a</b>	Briefly Explain the Barkhausens criteria and amplitude stability in oscillator.	<b>6</b>	<b>2</b>	<b>3</b>
<b>b</b>	Draw a neat circuit of Wein Bridge Oscillator. Derive an expression for frequency of oscillation (f)	<b>6</b>	<b>3</b>	<b>1</b>
<b>c</b>	Design an RC phase advancing phase shift Oscillator using BJT for the following specification: Peak to Peak Output amplitude = 5V, Frequency of Oscillation (f) = 2 KHz, Use $V_{cc} = 12V$ .	<b>6</b>	<b>4</b>	<b>3</b>
<b>5</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
<b>a</b>	Draw a neat circuit diagram of astable multivibrator. Explain its operation with Waveforms at the base and collector.	<b>6</b>	<b>4</b>	<b>4</b>
<b>b</b>	Explain the design procedure for transistorized Monostable Multivibrator.	<b>6</b>	<b>3</b>	<b>4</b>
<b>c</b>	Explain the operation of collector coupled monostable multivibrator. Derive an expression for Pulse width "T".	<b>6</b>	<b>2</b>	<b>3</b>

**Tatyasaheb Kore Institute of Engineering & Technology**  
**Warananagar**  
**(An Autonomous Institute)**

**S.Y. B. Tech (Electronics & Telecommunication Engineering) (Semester-IV)**

**END SEMESTER EXAMINATION (ESE), DEC 2023-24**

**Course Name: Communication Engineering**

**Course Code: ETC402**

Seat No:

Day and Date: Friday, (15/12/23)  
 Time: 2.00 Hrs (2.00 PM TO 4.00 PM)

**Max. Marks- 60**

**Instructions:**

- i. All Questions are compulsory
- ii. Figure to the right indicates full marks.
- iii. Assume suitable data if missing.
- iv. Use of non-programmable calculators is allowed.

Q. No.		Marks	CO	PO
<b>1</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Draw & explain basic block diagram of communication system.		1	1
b	Explain frequency modulation along with waveforms.		3	2
c	Draw & explain suppression of carrier using balanced modulator.		2	1
<b>2</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Draw & explain the block diagram of tuned radio frequency (TRF) receiver.		2	2
b	Draw & explain simple slope detector.		2	1
c	Draw & explain ratio detector with its output equation.		3	3
<b>3</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Explain generation of PAM signal with neat circuit diagram and waveform.		3	2
b	State and prove sampling theorem.		2	1
c	Explain natural sampling along its waveform.		1	2
<b>4</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Explain different sources of noise.		4	2
b	Write a short note on Thermal noise.		4	3
c	Explain Low frequency or Flicker noise.		4	2
<b>5</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Prove that $P_{Am}/P_C = 1 + m^2/2$		3	1
b	Draw & explain basic reactance modulator for the generation of FM.		2	2
c	Draw & explain with waveform diode detector in AM detection.		2	2
d	Draw & explain amplitude-limiting circuit with response characteristics.		2	1

Seat No.	
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**Tatyasaheb Kore Institute of Engineering and Technology, Warananagar**  
(An Autonomous Institute, Affiliated to Shivaji University, Kolhapur)

**S.Y.B.Tech.(E & TC Engg.) (Sem-II)**

**End Semester Examination, December- 2023**

Course Name :	Linear Integrated Circuit	Course Code:ETC403
Day & Date :	Saturday, 16-Dec-2023	Max Marks 60 Marks
Time :	2:00 pm to 4:00 pm	

- Instructions:**
- All questions are compulsory
  - Figures to the right indicates full marks, Course Outcome (CO) & Bloom's Taxonomy Level (BL)
  - Use of non-programmable calculator is allowed
  - Assume suitable data if required.

	Marks	B.L.	CO
<b>Q.1 Attempt any two</b>	<b>12</b>		
a) Determine $I_C$ , $V_{CE}$ , voltage Gain A, i/p resistance $R_i$ & o/p resistance $R_o$ for DIBO differential amplifier if $R_C = 2.2K\Omega$ , $R_E = 4.7K\Omega$ , $V_{CC} = 10V$ , $V_{EE} = -10V$ , $\beta = 100$ & $V_{BE} = 0.7V$ .		<b>L5</b>	<b>1</b>
b) Explain & analyze current mirror circuit.		<b>L1</b>	<b>2</b>
c) Explain electrical parameters of operational amplifier. (any 6)		<b>L1</b>	<b>1</b>
<b>Q.2 Attempt any two</b>	<b>12</b>		
a) Determine closed loop parameters $A_F$ , $R_{iF}$ , $R_{oF}$ , $F_F$ & $V_{OOT}$ for inverting amplifier if $R_1 = 470\Omega$ , $R_F = 4.7K\Omega$ , $R_i = 2M\Omega$ , $R_o = 75\Omega$ , $F_o = 5$ Hz, $A = 2 \times 10^5$ , $V_{CC} = 15V$ , $V_{EE} = -15V$ & $V_{sat} = \pm 13V$ .		<b>L5</b>	<b>2</b>
b) Explain inverting summing amplifier as summer and averaging circuit for three input signals $V_a$ , $V_b$ and $V_c$ .		<b>L2</b>	<b>3</b>
c) Explain instrumentation amplifier with circuit diagram.		<b>L2</b>	<b>2</b>
<b>Q.3 Attempt any two</b>	<b>12</b>		
a) Design following oscillator circuits for oscillating frequency $f_o = 1KHz$		<b>L1</b>	<b>4</b>
i. RC phase shift oscillator with $C = 0.1\mu F$			
ii. Wein bridge oscillator with $C = 0.05\mu F$			



b) Design 1<sup>st</sup> order wide band pass filter with  $f_L = 200\text{Hz}$ ,  $f_H = 1\text{KHz}$  & pass band gain of 4. Also determine Q factor. L2 4

Select  $C = 0.05\mu\text{F}$

c) Describe peak detector with circuit diagram & output waveform. L2 4

**Q.4 Attempt any two 12**

a) Draw and explain sample and hold circuit with waveform. L5 5

b) With neat circuit diagram and waveform explain how square waveform is generated using op-amp. L5 5

c) Write an expression for frequency of oscillation of Wien bridge oscillator, draw circuit diagram. What is gain value at this frequency of oscillation? L5 5

**Q.5 Attempt any two (Unit 1 to Unit 6) 12**

a) Derive the equation of differential gain of differential amplifier using op-amp. L3 1

b) Draw instrumentation amplifier using transducer bridge and show that output voltage is directly proportional to the change in resistance of the transducer. L5 3

c) Draw second order low pass filter and design at high cut off frequency of 1KHz. L4 2



**Tatyasaheb Kore Institute of Engineering & Technology**  
**Warananagar**  
**(An Autonomous Institute)**

**S.Y. B. Tech (Programme Name--ETC) (Semester-IV)**

**END SEMESTER EXAMINATION (ESE), MONTH DEC 2023-24**

**Course Name: Control System Engineering**

**Course Code: \_ETC 404**

Seat No:

**Day and Date: Monday 1/1/2024**

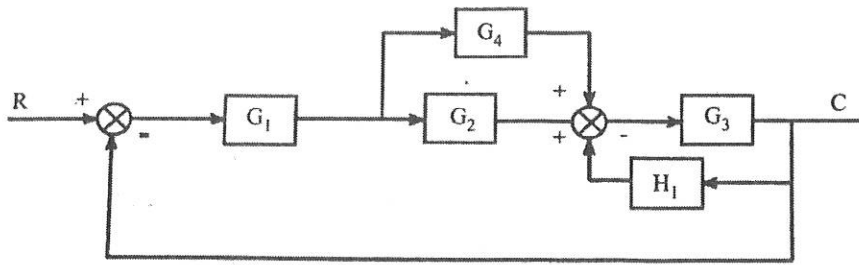
**Time: 10.00 am to 12.00 pm**

**Max. Marks- 60**

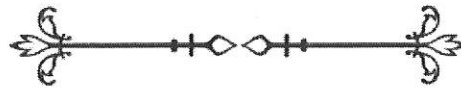
**Instructions:**

- i. All Questions are compulsory
- ii. Figure to the right indicates full marks.
- iii. Assume suitable data if missing.
- iv. Use of non-programmable calculators is allowed.

	Marks	CO	PO
<b>Q.1 Attempt any Two from the following</b>	<b>12</b>		
a) Explain mathematical modeling of Rotational mechanical system.		2	1
b) Explain SFG Terminology		1	2
c) Find overall transfer function C(S)/ R(S) of SFG.		2	2
<b>Q.2 Attempt any Two from the following</b>	<b>12</b>		
a) Comment on system stability using routh's criterion		4	3
$S^5 + 2S^4 + 3S^3 + 6S^2 + 10S + 15 = 0$			
b) Define Transfer function Derive for RLC Circuit.		4	3
c) Explain block diagram reduction rules		1	3
<b>Q.3 Attempt any Two from the following</b>	<b>12</b>		
a) Write Rules of Root Locus		3	4
b) Explain Time domain specifications		2	4
c) Define Time Response. Explain of 1 <sup>st</sup> order System.		3	4
<b>Q.4 Attempt any Two from the following</b>	<b>12</b>		
a) Define Compensator and Explain Lag Compensator		4	4
b) Explain Routh Stability Criterion.		3	4
c) Unity Feedback System is $G(s) = 1/s(s+1)$ calculate Rise Time, Peak Time, Maximum overshoot, Settling time		4	3
<b>Q.5 Attempt any Two from the following</b>	<b>12</b>		
a) Find C(S)/ R(S) using block diagram rules.		2	1



- |   |   |   |
|---|---|---|
| b) Explain $K_p, K_v, K_a$ , Error Constants  | 3 | 3 |
| c) Comment on system stability using routh's criterion<br>$S^5+2S^4+3S^3+6S^2+5S+3=0$ | 3 | 3 |
| d) Explain PID Controller with neat block diagram.                                    | 4 | 4 |



Seat No:

Question Paper Code:

**Tatyasaheb Kore Institute of Engineering & Technology, Warananagar**  
**(An Autonomous Institute)**

**S. Y. B. Tech (Electronics & Telecommunication) (Semester-IV)**

**END SEMESTER EXAMINATION (ESE), DECEMBER 2023**

**Course Name: Data Structures & Algorithms**

**Course Code: ETC 405**

Day and Date: Saturday 30-12-2023

Time: 10:00am to 12.00 pm

**Max. Marks- 60**

**Instructions:**

- i. All Questions are compulsory
- ii. Figure to the right indicates full marks.
- iii. Assume suitable data if missing.
- iv. Use of non-programmable calculators is allowed.

Q. No.		Marks	CO	PO
<b>1</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	What is Binary searching ? What is complexity of Binary searching ?.		1	2
b	Write an algorithm for traversing linear array.		2	1
c	What are Data structure operations		1	2
<b>2</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Explain Header linked list		1	2
b	What is Stack ? What are different Stack operations ?		2	1
c	Write an algorithm for Push & Pop operations		1	2
<b>3</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	What are different traversal methods used in Binary trees.		1	2
b	Write an algorithm for traversing Linked list		2	1
c	Explain complete Binary trees.		1	2
<b>4</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Explain BFS traversing method for graph.		1	2
b	What is linear searching ? What is complexity of Linear searching ?		2	1
c	What is graph ? What are different terminologies used in graphs ?		1	2
<b>5</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	What are different types of Data structures ?		1	2
b	Explain sparse Matrices.		2	1
c	What is linked list ? Differentiate array & linked list		1	2
d	What is Queue? Explain DEQUE.		1	2

**Tatyasaheb Kore Institute of Engineering & Technology**  
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**Third Year B. Tech. (Electronics & Telecommunication Engineering) (Semester-V)**

**END SEMESTER EXAMINATION (ESE), DECEMBER 2023**

**Course Name: VLSI Design**

**Course Code: ETC501**

Day and Date: Monday, (18/12/2023)

Seat No:

Time: 2.00 Hrs (10.00 am to 12.00 noon)

**Max. Marks- 60**

**Instructions:**

- i. All Questions are compulsory
- ii. Figure to the right indicates full marks.
- iii. Assume suitable data if missing.
- iv. Use of non-programmable calculators is allowed.

Q. No.		Marks	CO	PO
<b>1</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Draw and explain VLSI design flow.	6	1	1
b	Explain with example of modeling styles of VHDL.	6	1	2
c	Write VHDL code for 4:1 Multiplexer using if else statement.	6	1	1
<b>2</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Write VHDL code for T latch and T Flip-flop.	6	2	2
b	Write VHDL code for 4-bit SISO shift register.	6	2	2
c	Write VHDL code for synchronous up and down counter.	6	2	1
<b>3</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	What is mean by PLD? Compare different Filed Programmable Devices.	6	3	2
b	Draw and explain architecture, features of XC95xx series CPLD.	6	3	2
c	What is LUT? Explain its application in FPGA.	6	3	1
<b>4</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Differentiate Moore and Mealy finite state machines.	6	4	1
b	Write note on state diagram related to FSM.	6	4	2
c	Write note on state table related to FSM.	6	4	3
<b>5</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Explain working of delay models in VHDL.	6	1	1
b	Write VHDL code for Full Adder using structural modeling.	6	2	2
c	Write VHDL code for barrel shifter using ror, rol for data 1001010.	6	2	2
d	Write VHDL code for MOD-N counter.	6	2	1

Seat No:

Question Paper Code:

**Tatyasaheb Kore Institute of Engineering & Technology**  
**Warananagar**  
**(An Autonomous Institute)**

**TY (Programme Name- Electronics and Telecommunication Engg.) (Semester-V)**

**END SEMESTER EXAMINATION (ESE), DEC-2023-24**

**Course Name: MICROCONTROLLER**

**Course Code:- ETC502**

Day and Date: Wednesday, ( 20/12/2023)

Time: 10.00am -12.00pm

**Max. Marks- 60**

**Instructions:**

- i. All Questions are compulsory
- ii. Figure to the right indicates full marks.
- iii. Assume suitable data if missing.
- iv. Use of non-programmable calculators is allowed.

Q. No.		Marks	CO	PO
<b>1</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Draw & Explain Architecture of 8051 Microcontroller	6	1	2
b	Explain register organization and memory organization.	6	1	1
c	Explain Special Function Registers(SFR)	6	2	4
<b>2</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Explain ADC interfacing with 8051 Microcontroller.	6	3	1
b	Write a note on serial communication.	6	3	3
c	Explain STEPPER MOTOR interfacing with 8051 microcontroller.	6	4	2
<b>3</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Explain features of PIC 18 in details.	6	2	1
b	Explain WREG, File registers, Access bank & SFR.	6	1	2
c	Explain PIC 18 configuration registers.	6	3	3
<b>4</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Explain instruction pipeline.	6	1	4
b	Explain PIC 18 time delay.	6	3	1
c	Explain arithmetic operations.	6	4	2
<b>5</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Draw & Explain PIN diagram of 8051.	6	1	1
b	Write different addressing modes of 8051 with two examples each.	6	2	2
c	Explain data types used in Embedded C Programming for 8051.	6	1	3
d.	Explain PIC 18 PIN diagram.	6	2	1

Seat No:

Question Paper Code:

**Tatyasaheb Kore Institute of Engineering & Technology  
Warananagar**

**(An Autonomous Institute)**

**T.Y. B. Tech (Electronics & Telecommunication Engg.) (Semester-V)**

**END SEMESTER EXAMINATION (ESE), MONTH DEC 2023**

**Course Name: Digital Communication**

**Course Code: \_ETC503**

Day and Date:, Friday 22/12/2023

Time: 10.00am to 12.00 pm

**Max. Marks- 60**

**Instructions:**

- i. All Questions are compulsory
- ii. Figure to the right indicates full marks.
- iii. Assume suitable data if missing.
- iv. Use of non-programmable calculators is allowed.

Q. No.	Mark s	CO	PO
<b>1 Attempt any Two from the following</b>	<b>12</b>		
a Explain PCM transmitter and PCM receiver		1	3
b Explain Quantizer		2	4
c Explain Adaptive Delta Modulation		2	5
<b>2 Attempt any Two from the following</b>	<b>12</b>		
a Explain the types of Random Variables		3	5
b Explain BPSK with transmitter and receiver		4	6
c Explain Data formats or line Codes		4	5
<b>3 Attempt any Two from the following</b>	<b>12</b>		
a Derive the Expression for Entropy		4	7
b Calculate the source entropy and information rate(R) for discrete memoryless source capable of transmitting four distinct symbols M1,M2 and M3 M4,their probabilities are 1/8,3/8,3/8,1/8 respectively.		4	6
c Explain channel capacity and types of channels		4	5
<b>4 Attempt any Two from the following</b>	<b>12</b>		
a Explain Eye Diagram		4	6
b Construct the Shannon-Fano code and calculate the code efficiency. A discrete memoryless source has five symbols x1, x2, x3, x4 and x5 with probabilities $p(x1) = 0.4$ , $p(x2) = 0.19$ , $p(x3) = 0.16$ , $p(x4) = 0.15$ and $p(x5) = 0.15$		4	7
c Explain Baseband transmission system		4	6
<b>5 Attempt any Two from the following</b>	<b>12</b>		
a Explain ASK Generator with waveform		4	7
b Explain Delta Modulation with neat diagram		2	6
c Find code word and code efficiency messages using Huffman's algorithm for a discrete memoryless source has five symbols(messages) s1, s2, s3, s4 and s5 with probabilities $p(s1) = 0.4$ , $p(s2) = 0.15$ , $p(s3) = 0.15$ , $p(s4) = 0.15$ and $p(s5) = 0.15$ .		4	7
d Explain scramblers and unscramblers		3	6

Seat No.

**Tatyasaheb Kore Institute of Engineering and Technology, Warananagar**  
(An Autonomous Institute, Affiliated to Shivaji University, Kolhapur)

**T.Y.B.Tech.(E & TC Engg.) (Sem-V)**

**End Semester Examination, December- 2023**

Course Name : **Electromagnetic Engineering**Course Code: **ETC504**Day & Date : **Tuesday, 26-Dec-2023**Max Marks **60 Marks**Time : **10:00 am to 12:00 pm****Instructions:**

a) All questions are compulsory

Figures to the right indicates full marks, Course Outcome (CO) & Bloom's Taxonomy Level (BL) (L1-Remembering, L2- Understanding, L3 – Applying, L4 – Analyzing, L5 – Evaluating, L6 - Creating)

b) Use of non-programmable calculator is allowed

c) Assume suitable data if required.

		Marks	B.L	CO
<b>Q.1</b>	<b>Attempt any two</b>	<b>12</b>		
a)	Three vectors are represented by $A = 2ax - 2ay - az$ , $B = ax + ay + az$ , $C = ax + 2ay - 2az$ Find (i) $A \times (B \times C)$ (ii) $(A \times B) \times C$ (iii) $A \cdot B \times C$		<b>L2</b>	<b>CO1</b>
b)	Explain Coulomb's Law and Gauss's Law		<b>L5</b>	<b>CO2</b>
c)	Determine the Curl of these vector fields. (i) $A = ax(2X^2 + Y^2) + ay(XY - Y^2)$ (ii) $A = YZ ax + 4XY ay + Y az$		<b>L4</b>	<b>CO4</b>
<b>Q.2</b>	<b>Attempt any two</b>	<b>12</b>		
a)	State and explain Biot-Savart Law		<b>L2</b>	<b>CO1</b>
b)	Infinite current filament carrying 1 A is placed along Z axis Find magnetic field intensity at point P(3,-2,6)		<b>L5</b>	<b>CO2</b>
c)	A line charge of $2nC/m$ lies along Y axis while surface charge density of $0.1nC/m^2$ $Z=3$ . Find E at (1,-7,2)		<b>L1</b>	<b>CO1</b>
<b>Q.3</b>	<b>Attempt any two</b>	<b>12</b>		
a)	Starting from Maxwell's equations derive wave equation for sinusoidally time Varying field		<b>L3</b>	<b>CO3</b>
b)	Write Maxwell's equations for time varying fields in point form as well as integral Form		<b>L4</b>	<b>CO1</b>



- c) Moist soil has conductivity of  $10^{-3}$  S/m and  $\epsilon_r = 2.5$ . L5 CO1  
 Find  $J_c$  and  $J_d$  where  $E = 6.0 \times 10^{-6} \sin 9.0 \times 10^9 t$  (V/m)
- Q.4 Attempt any two** 12
- a) Using Maxwell's equations, derive the Helmholtz's equation for free space L4 CO3
- b) Electric field intensity  $E$  in air is 800V/m & is in X direction. Wave propagating in Z direction with wavelength 2m. Find frequency  $f$ , value of  $\beta$  if the field is expressed in the form  $A \cos(\omega t - \beta x)$ . Also find the expression for  $H$  L2 CO1
- c) Derive the characteristic equation of transmission line L4 CO2
- Q.5 Attempt any two** 12
- a) A uniform plane wave in conducting dielectric media has  $\epsilon = 9 \epsilon_0$   $E = 5 \cos(10^9 t - \beta z) \hat{a}_x$  V/m Find the expression for  $H$  field. What is the direction of propagation of this wave? L1 CO2
- b) Derive Expression to find magnetic field intensity due to infinite long straight filament L2 CO3
- c) A charge  $Q_1 = -20 \mu\text{C}$  is located at  $P_1(-6, 4, 7)$  and a second charge  $Q_2 = 50 \mu\text{C}$  is at  $P_2(5, 8, -2)$  in free space. If distance are given in meters find the vector force exerted on  $Q_1$  by  $Q_2$ . Also find unit vector. L4 CO3
- d) Find the amplitude of the displacement current density adjacent to an automobile antenna, where the magnetic field intensity of an F.M. Signal is  $H_x = 0.2 \cos[2.10(3 \times 10^8 t - x)] \hat{a}_z$  A/m L5 CO1



Seat No:

Question Paper Code:

**Tatyasaheb Kore Institute of Engineering & Technology, Warananagar**  
(An Autonomous Institute)

T. Y. B. Tech (Electronics and Telecommunication Engineering) (Semester-V)

END SEMESTER EXAMINATION (ESE), DECEMBER-2023

Course Name: Open Elective-I (Optical Communication)

Course Code: ETC505

Day and Date: Thursday, (28/12/2023)

Time: 2.00 Hrs (10:00am To 12:00pm)

Max. Marks- 60

**Instructions:**

- i. All Questions are compulsory
- ii. Figure to the right indicates full marks.
- iii. Assume suitable data if missing.
- iv. Use of non-programmable calculators is allowed.

Q. No.		Marks	CO	PO
<b>1</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Draw and explain OFC receiver block diagram with advantages of optical fibers.	6	1	1
b	Draw and explain optical spectral bands.	6	2	3
c	A silica optical fiber with core refractive index 1.50 and cladding index 1.47. Calculate i) Critical angle ii) Acceptance angle	6	3	3
<b>2</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Draw and explain comparison of conventional single mode and multimode step index and graded index optical fiber.	6	2	4
b	Comment on advantages of optical fiber to copper wire communication.	6	4	4
c	Draw and explain meridional ray propagation in an ideal step-index optical waveguide.	6	3	3
<b>3</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Comment on attenuation and losses in optical fiber communication.	6	2	3
b	For silica the fictive temperature $T_f=1400K$ , the isothermal compressibility $\beta_T=6.8 \times 10^{-12} \text{cm}^2/\text{dyn}$ and photoelastic coefficient $=0.286$ . Calculate the scattering loss at $1.3\mu\text{m}$ where $n=1.45$ .	6	2	3
c	Explain fiber optic cables with indoor and outdoor.	6	3	4
<b>4</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Explain LED structure in detail.	6	2	3
b	Explain LASER diode with three key transition process involved in laser action.	6	3	1
c	Draw and explain spectral emission pattern of $\text{Ga}_{1-x}\text{Al}_x$ A <sub>s</sub> LED with peak emission at 850nm.	6	4	3
<b>5</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Draw and explain in detail PIN photo detector.	6	4	4
b	Explain photo detector noise in optical fiber communication system.	6	3	4
c	Define photo detector and compare various photo detector on performance.	6	2	3
d	Explain signal dispersion in fibers.	6	3	4

**T.Y.B.Tech.(E & TC Engg.) (Sem-II)**

**End Semester Examination, December- 2023**

Course Name :	Signal Processing	Course Code:ETC601	
Day & Date :	Thursday, 14-Dec-2023	Max Marks	60 Marks
Time :	10:00 am to 12:00 pm		

- Instructions:**
- All questions are compulsory
  - Figures to the right indicates full marks, Course Outcome (CO) & Bloom's Taxonomy Level (BL)
  - Use of non-programmable calculator is allowed
  - Assume suitable data if required.

	Marks	B.L	CO
<b>Q.1 Attempt any two</b>	<b>12</b>		
a) Define:- i. continuous time signal ii. Discrete time signal iii. Deterministic and random signal.		L1	1
b) Explain elementary (basic) continuous time signal.		L1	2
c) Determine convolution sum of two sequences. $x(n)=\{3,2,1,2\}$ ; $h(n)=\{1,2,1,2\}$		L1	1
↑			
<b>Q.2 Attempt any two</b>	<b>12</b>		
a) Compute 4-point DFT of the sequence:- $x(n)=\{0,2,4,6\}$		L3	2
b) Explain any three properties of DFT.		L3	3
c) Find the circular convolution of two finite duration sequences $x_1(n) = \{1,-1,-2,3,-1\}$ ; $x_2(n) = \{1,2,3\}$ using matrix method.		L3	2
<b>Q.3 Attempt any two</b>	<b>12</b>		
a) Write summary of steps of radix-2 DIT FFT algorithm.		L1	4
b) Write steps to design a digital filter using impulse invariance method.		L3	4
c) Write note on mapping of S-plane to Z-plane.		L2	4
<b>Q.4 Attempt any two</b>	<b>12</b>		
a) Define ROC and explain properties of ROC.		L1	5
b) Explain in detail any three properties of Z-Transform.		L1	5
c) Find Z-Transform of sequence and draw ROC , $x(n)=\{2,-1,3,2,1,0,2,3,-1\}$		L1	5
<b>Q.5 Attempt any two</b>	<b>12</b>		
a) Draw direct form-I structure of discrete time system.		L3	1
b) Explain cascade form realization and parallel form realization of system.		L2	3
c) Using convolution method find inverse Z-Transform of		L1	2

$$X(Z) = \frac{1}{1-3Z^{-1}+2Z^{-2}}$$

**Tatyasaheb Kore Institute of Engineering & Technology  
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**Third Year B. Tech. (Electronics & Telecommunication Engineering) (Semester-VI)**

**END SEMESTER EXAMINATION (ESE), DECEMBER 2023-24**

**Course Name: Power Electronics**

**Course Code: ETC602**

Seat No:

Day and Date: Friday, 15/12/2023

Time: 2.00 Hrs (10.00 AM TO 12.00 NOON)

**Max. Marks- 60**

**Instructions:**

- i. All Questions are compulsory
- ii. Figure to the right indicates full marks.
- iii. Assume suitable data if missing.
- iv. Use of non-programmable calculators is allowed.

Q. No.		Marks	CO	PO
<b>1</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Draw static characteristics of SCR. Define latching current, holding current, forward breakover voltage with reference to SCR	6	1	1
b	State different turn-off methods of SCR. Explain any one method in detail.	6	1	2
c	Explain the UJT relaxation oscillator circuit for SCR with neat circuit diagram and waveforms.	6	1	1
<b>2</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Explain with necessary waveforms midpoint configuration with R load. Derive the equation of average output voltage.	6	2	2
b	For 230V, 1 phase semiconverter with RL load, load current is continuous and ripple free. It is observed that average output voltage is 50% that of maximum possible average output voltage. Calculate: i) firing angle ii) Average output vol. ii) RMS output vol. iv) Rectification efficiency.	6	2	2
c	Explain in detail operation of single-phase full bridge inverter with R load. Also, derive the equation of rms output voltage.	6	2	1
<b>3</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Explain the operation of step down chopper with R load. Derive the equation of output voltage.	6	3	2
b	Explain step up chopper with RL load with neat diagram and waveforms.	6	3	2
c	Explain the control techniques of chopper.	6	3	1
<b>4</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Explain single phase full converter drives.	6	4	1
b	Explain speed torque characteristics of induction motor.	6	4	2
c	Compare AC & DC Drives.	6	4	3
<b>5</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Explain construction detail & VI characteristic of DIAC.	6	1	1
b	Differentiate forced and natural commutation methods of SCR.	6	2	2
c	Explain different voltage control technique of inverter.	6	2	2
d	Differentiate symmetric & asymmetric semiconverter.	6	2	1

Seat No.

**Tatyasaheb Kore Institute of Engineering and Technology, Warananagar**  
(An Autonomous Institute, Affiliated to Shivaji University, Kolhapur)

**T.Y.B.Tech.(E & TC Engg.) (Sem-II)**

**End Semester Examination, December- 2023**

Course Name : ANTENNA AND WAVE PROPAGATION Course Code: ETC603

Day & Date : Saturday, 16-Dec-2023

Max Marks 60 Marks

Time : 10:00 am to 12:00 pm

- Instructions:**
- All questions are compulsory
  - Figures to the right indicates full marks, Course Outcome (CO) & Bloom's Taxonomy Level (BL)  
(L1-Remembering, L2- Understanding, L3 – Applying, L4 – Analyzing, L5 – Evaluating, L6 - Creating)
  - Use of non-programmable calculator is allowed
  - Assume suitable data if required.

	Marks	B.L	CO
<b>Q.1 Attempt any two</b>	<b>12</b>		
a) Explain the term radiation intensity		L2	CO1
b) Explain the terms antenna bandwidth and antenna beam width		L5	CO2
c) Find the basic transmission losses between two antennas separated by 30 meters, operating at 10 MHz		L4	CO4
<b>Q.2 Attempt any two</b>	<b>12</b>		
a) Explain any one method for outdoor range measurement		L2	CO1
b) With diagram explain Wheatstone bridge method for antenna impedance measurement		L5	CO2
c) Explain how the reflection of EM waves varies with roughness of earth.		L1	CO1
<b>Q.3 Attempt any two</b>	<b>12</b>		
a) Derive an expression to find refractive index of ionosphere		L3	CO3
b) Define (i) Critical frequency (ii) Maximum Usable Frequency.		L4	CO1
c) What are the factors which affects ionosphere propagation		L5	CO1
<b>Q.4 Attempt any two</b>	<b>12</b>		
a) Explain basic principle of RADAR.		L4	CO3
b) Draw and explain pulsed RADAR system		L2	CO1
c) Describe the applications of RADAR.		L4	CO2
<b>Q.5 Attempt any two</b>	<b>12</b>		
a) Explain slotted line method for measurement of frequency		L1	CO2
b) Define directivity and front to back ratio of antenna		L2	CO3
c) Write note on Radiation pattern of antenna.		L4	CO3
d) What is difference between antenna band width and antenna beam width?		L5	CO1



Seat No:

Question Paper Code:

**Tatyasaheb Kore Institute of Engineering & Technology, Warananagar  
(An Autonomous Institute)**

**T. Y. B. Tech (Electronics & Telecommunication) (Semester-VI)  
END SEMESTER EXAMINATION (ESE), DECEMBER 2023**

**Course Name: Embedded System**

**Course Code: ETC 604**

Day and Date: --Tuesday, 02/01/2024

Time: 10am to 12.00pm

**Max. Marks- 60**

**Instructions:**

- i. All Questions are compulsory
- ii. Figure to the right indicates full marks.
- iii. Assume suitable data if missing.
- iv. Use of non-programmable calculators is allowed.

Q. No.		Marks	CO	PO
<b>1</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Differentiate Von Neuman & Harward architecture		1	2
b	What is Embedded system ? What are types of Embedded systems ?		2	1
c	What are different ARM operating modes ?		1	2
<b>2</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Draw & explain RS-485		1	2
b	Draw & explain memory organization of LPC 2148		2	1
c	Write data transfer & Arithmetic instruction set of ARM.		1	2
<b>3</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	What are features of LPC 2148 ?		1	2
b	What are features of DAC used in LPC 2148		2	1
c	What are Features of GPIO used in LPC 2148		1	2
<b>4</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Write a program for Relay interfacing.		1	2
b	Draw & explain CAN bus		2	1
c	Draw & explain IIC bus.		1	2
<b>5</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Differentiate RISC & CISC architecture...		1	2
b	Draw & explain ARM core data flow model.		2	1
c	What is barallel shifter ?Write barallel shifter instructions		1	2
d	Draw & explain CPSR register		1	2

Seat No:

Question Paper Code:

**Tatyasaheb Kore Institute of Engineering & Technology, Warananagar  
(An Autonomous Institute)**

**T.Y. B. Tech (E&TC Engg) (Semester- VI)**

**END SEMESTER EXAMINATION (ESE), DECEMBER, 2023**

**Course Name: Mobile Technology (OE-II)**

**Course Code: ETC605**

**Day and Date: Wednesday, 03/01/2024**

**Time: 10:00 am to 12:00 pm**

**Max. Marks- 60**

**Instructions:**

- i. All Questions are compulsory
- ii. Figure to the right indicates full marks.
- iii. Assume suitable data if missing.
- iv. Use of non-programmable calculators is allowed.

Q. No.		Marks	CO	PO
<b>1</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
<b>a</b>	Write short note on LTE Technology.		1	1
<b>b</b>	What is fading? Explain in detail with its types.		1	2
<b>c</b>	Explain Doppler shift?		2	2
<b>2</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
<b>a</b>	Explain different handoff strategies?		1	3
<b>b</b>	Draw the diagram and explain architecture of GSM.		1	2
<b>c</b>	Write short note on GPRS.		2	1
<b>3</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
<b>a</b>	Write a note on Advantages of I-TCP?		3	2
<b>b</b>	Explain Cell splitting.		3	4
<b>c</b>	Explain snooping TCP approach in mobile wireless network?		3	2
<b>4</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
<b>a</b>	Write short note on wireless datagram protocol (WDP).		4	1
<b>b</b>	Why do we need WAP? Give its applications		3	4
<b>c</b>	What are the features of wireless application protocol?		4	2
<b>5</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
<b>a</b>	Write short note on cell sectoring.		1	2
<b>b</b>	Explain the simple IP packet delivery process		1	1
<b>c</b>	Write short note on 5G Technology		2	2
<b>d</b>	Write short note on security in GSM		3	3



**Tatyasaheb Kore Institute of Engineering & Technology**  
**Warananagar**  
**(An Autonomous Institute)**

**FINAL YEAR B. Tech (Electronics & Telecommunication) (Semester-VII)**  
**END SEMESTER EXAMINATION (ESE), DECEMBER 2023**

**Course Name: Computer Networks & Security**

**Course Code: ETC 701**

Day and Date: Tuesday, 19-12-2023

Time: 2.00 Hrs (10.00 AM TO 12.00 NOON)

**Max. Marks- 60**

**Instructions:**

- i. All Questions are compulsory
- ii. Figure to the right indicates full marks.
- iii. Assume suitable data if missing.
- iv. Use of non-programmable calculators is allowed.

Q. No.	Marks	CO	PO
<b>1 Attempt any Two from the following</b>	<b>12</b>		
a What is Computer Network ? What are advantages & drawbacks of computer Networks. ?.		1	2
b Draw & explain TCP/IP model		2	1
c What are design issues of Data link layer ?.		1	2
<b>2 Attempt any Two from the following</b>	<b>12</b>		
a Draw & explain SDLC frame format. ?.		1	2
b What are design issues of Network Layer ?.		2	1
c Explain working of Connection oriented service with diagram .		1	2
<b>3 Attempt any Two from the following</b>	<b>12</b>		
a Explain working of Stop & Wait protocol.		1	2
b What is Framing ? Explain different Framing methods..		2	1
c Differentiate Virtual Circuit & datagram		1	2
<b>4 Attempt any Two from the following</b>	<b>12</b>		
a What are different shortest path algorithms ? Explain Dijkstras shortest path algorithms..		1	2
b Draw & explain TCP Header format		2	1
c Draw & explain FTP		1	2
<b>5 Attempt any Two from the following</b>	<b>12</b>		
a What is topology ? Explain different topology..		1	2
b What are functions of transport layer ?.		2	1
c What is sliding window protocol ? Explain a)Go back N b)Selective repeat.		1	2
d Explain a)LAN b)MAN c)WAN.		1	2



Seat No.	
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**Tatyasaheb Kore Institute of Engineering and Technology, Warananagar**  
(An Autonomous Institute, Affiliated to Shivaji University, Kolhapur)

**Final Year B.Tech.(E & TC Engg.) (Sem-VII)**

**End Semester Examination, December- 2023**

Course Name : Microwave Engineering

Course Code: ETC702

Day & Date : Thursday, 21-Dec-2023

Max Marks 60 Marks

Time : 10:00 am to 12:00 pm

- Instructions:**
- All questions are compulsory
  - Figures to the right indicates full marks, Course Outcome (CO) & Bloom's Taxonomy Level (BL)  
(L1-Remembering, L2- Understanding, L3 – Applying, L4 – Analyzing, L5 – Evaluating, L6 - Creating)
  - Use of non-programmable calculator is allowed
  - Assume suitable data if required.

	Marks	B.L	CO
<b>Q.1 Attempt any two</b>	<b>12</b>		
a) Explain with suitable equations TE mode equations for a rectangular waveguide		L2	CO1
b) Determine the cut-off wavelength for the dominant mode in a rectangular waveguide of breadth 10 cms. For a 2.5 Ghz signal propagated in this waveguide in the dominant mode; calculate the guide wavelength, the group and phase velocities ?		L5	CO2
c) What are the limitations of normal vacuum devices and semiconductor devices, due to which they cannot be used at microwave frequency?		L4	CO4
<b>Q.2 Attempt any two</b>	<b>12</b>		
a) Explain various slow wave structures used at travelling tube.		L2	CO1
b) In H plane Tee junction 20 mW power is applied to H arm that is perfectly matched to junction. Calculate Power delivered to load $60 \Omega$ and $75 \Omega$ connected to side ports 1 and 2 Characteristics impedance of line is $50 \Omega$		L5	CO2
c) With the help of suitable diagram explain the operation of Magic Tee.		L1	CO1

<b>Q.3</b>	<b>Attempt any two</b>	<b>12</b>		
a)	Write note on Microwave Hazard .		<b>L3</b>	<b>CO3</b>
b)	With the help of suitable diagram explain the operation of directional coupler		<b>L4</b>	<b>CO1</b>
c)	Explain two valley model theory in Gunn –effect diode		<b>L5</b>	<b>CO1</b>
<b>Q.4</b>	<b>Attempt any two</b>	<b>12</b>		
a)	Explain in detail procedure for measurement of VSWR with block diagram		<b>L4</b>	<b>CO3</b>
b)	Explain in detail procedure for measurement low microwave power in bridge circuit using thermistor.		<b>L2</b>	<b>CO1</b>
c)	Explain slotted line technique for measurement of microwave frequency		<b>L4</b>	<b>CC</b>
<b>Q.5</b>	<b>Attempt any two</b>	<b>12</b>		
a)	Define attenuation and insertion loss. Explain substitution method for attenuation Measurement		<b>L1</b>	<b>CO2</b>
b)	Explain parabolic reflector and how gain of this antenna is determined		<b>L2</b>	<b>CO3</b>
c)	Explain the power losses in rectangular wave guide		<b>L4</b>	<b>CO3</b>
d)	Explain the terms Anechoic Chamber and Quiet zone in microwave measurement		<b>L5</b>	<b>CO1</b>



Seat No:

Question Paper Code:

**Tatyasaheb Kore Institute of Engineering & Technology**  
**Warananagar**  
**(An Autonomous Institute)**

**Final Year B. Tech. (Electronics & Telecommunication Engineering) (Semester-VII)**  
**END SEMESTER EXAMINATION (ESE), DECEMBER 2023**

**Course Name: Power Electronics & Drives****Course Code: ETC703**

Day and Date: Saturday, (23/12/2023)

Time: 2.00 Hrs (10.00 am to 12.00 noon)

**Max. Marks- 60****Instructions:**

- i. All Questions are compulsory
- ii. Figure to the right indicates full marks.
- iii. Assume suitable data if missing.
- iv. Use of non-programmable calculators is allowed.

Q. No.		Marks	CO	PO
<b>1</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Explain with diagram and waveform 3 phase half wave controlled rectifier at Resistive load. Find expression for average load voltage for continuous mode.		1	1
b	A 3 phase semiconverter is operated from 3-phase, 400V, 50 Hz mains supply and delivers power to sufficiency large inductive load having resistance of 10 $\Omega$ . If is required that the average output voltage should be 50% of maximum possible output voltage. Find Firing angle, Average load voltage & Average load current. State whether conduction will be continuous or not?		1	2
c	Explain in detail 180 degree mode of conduction of 3 phase IGBT based inverter. Also, draw output waveforms.		1	1
<b>2</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Explain the operation of single phase to single phase Cycloconverter (Bridge type) feeding R load. Draw the waveforms for frequency divide by three.		2	2
b	Explain with circuit diagram and waveform operation of circulating current mode operation of Cycloconverter.		2	2
c	Draw and explain block diagram of electric drives system.		2	1
<b>3</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Write different speed control methods of DC motor. Explain any one briefly.		3	2
b	Explain speed control of separately excited DC motor using single phase full controlled converter with appropriate waveforms.		3	2
c	Explain speed-torque characteristics DC motor.		3	1
<b>4</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Name different braking methods used in induction motor? Explain dynamic braking system in detail with circuit diagram.		4	1
b	Explain different speed control methods of induction motor. Explain any one briefly.		4	2
c	What is mean by slip? Draw & explain static scherbius drive.		4	3
<b>5</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Comparison of VSI and CSI inverter.		1	1
b	State and explain selection criteria of electric drives.		2	2
c	Write different starters in A.C. motor. Explain any one briefly.		2	2
d	Compare circulating and non- circulating mode operation of Cycloconverter.		2	1

**Tatyasaheb Kore Institute of Engineering & Technology**  
**Warananagar**  
**(An Autonomous Institute)**

**Final year B. Tech (Electronics & Telecommunication Department) (Semester-VII)**

**END SEMESTER EXAMINATION (ESE), DEC 2023-24**

**Course Name: PLC & Automation      Course Code: ETC705**

Seat No:

Day and Date: Friday, (29/12/23)

Time: 2.00 Hrs

**Max. Marks- 60**

**Instructions:**

- i. All Questions are compulsory
- ii. Figure to the right indicates full marks.
- iii. Assume suitable data if missing.
- iv. Use of non-programmable calculators is allowed.

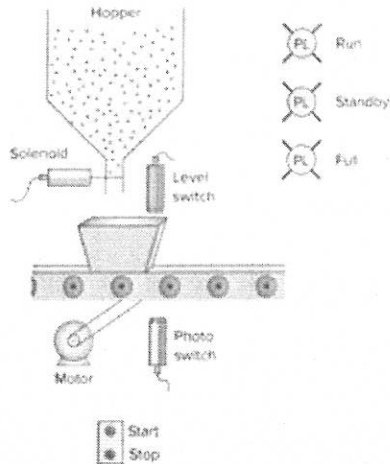
Q. No.		Marks	CO	PO
<b>1</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Explain the different parts of a PLC and their roles in its operation?		1	1
b	What are the core principles of operation that underlie the functioning of PLCs in industrial control systems?		1	1
c	Draw Ladder logic Diagram for AND, OR, NOR, NAND, EXOR and EXNOR Gates with its truth table and logic diagram.		2	6
<b>2</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	In Output Control Devices what are the symbols used to represent them? Explain Solenoids, Solenoid Valves, Stepper Motors, and Servo Motors.		1	2
b	Explain working principle of an On-Delay timer instruction with its control bits.		2	2
c	Draw electromechanical retentive timer and explain the concept retentive timer with its on-delay timer timing chart.		2	3
<b>3</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Describe data transfer operations and elucidate the MOV, MVM, and FAL instructions.		3	1
b	Illustrate the Subroutine function using a diagram and elucidate the JSR, SBR, and RET instructions.		3	2
c	Elaborate on the Addition instruction within the context of a ladder logic program.		3	2
<b>4</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	What are PLC Voltage Variations and Surges? Explain diode, RC snubber, and MOV surge suppressor functions.		4	3
b	What are the types of programming in PLC? Additionally, please explain monitoring and its functions.		4	2
c	Explain the troubleshooting process within the output Malfunctions of a PLC.		4	2

5 Attempt any Two from the following

12

- a Explain the concept of program files and data files in PLC programming.  
 b Figure shows the sketch of a continuous filling operation.

1 1  
 3 3



This process requires that boxes moving on a conveyor be automatically positioned and filled. The sequence of operation for the continuous filling operation is as follows:

- Start the conveyor when the start button is momentarily pressed.
- Stop the conveyor when the stop button is momentarily pressed.
- Energize the run status light when the process is operating.
- Energize the standby status light when the process is stopped.
- Stop the conveyor when the right edge of the box is first sensed by the photosensor.
- With the box in position and the conveyor stopped, open the solenoid valve and allow the box to fill. Filling should stop when the level sensor goes true.
- Energize the full light when the box is full. The full light should remain energized until the box is moved clear of the photosensor.

- c What are branch instructions in PLC programming.  
 d Explain the logic rungs associated with data compare instructions.

2 3  
 3 2

**Tatyasaheb Kore Institute of Engineering & Technology**  
**Warananagar**  
**(An Autonomous Institute)**

Final year B. Tech (Programme Name- Electronics and Telecommunication Engg.) (Semester-VII)

END SEMESTER EXAMINATION (ESE), DEC-2023-24

Course Name: **IMAGE PROCESSING** course code:- ETC7041

Seat No:

Day and Date: Wednesday, (27/12/2023)

Time: 2.00 Hrs

**Max. Marks- 60**

**Instructions:**

- i. All Questions are compulsory
- ii. Figure to the right indicates full marks.
- iii. Assume suitable data if missing.
- iv. Use of non-programmable calculators is allowed.

Q. No.		Marks	CO	PO
<b>1</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Explain steps in image processing in detail.	6	1	2
b	Explain concept of digital image processing.	6	2	1
c	Explain image sensing & acquisition in detail	6	2	3
<b>2</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Explain basic grey level transformations.	6	3	1
b	Explain three categories of spatial domain in detail.	6	3	2
c	write a note on Histogram Processing.	6	4	2
<b>3</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Explain need for Morphological Processing.	6	3	4
b	Explain structuring elements.	6	1	1
c	Explain region filling.	6	2	2
<b>4</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Explain detection of discontinuities.	6	2	2
b	Explain Point detection.	6	4	1
c	Explain Line detection.	6	3	3
<b>5</b>	<b>Attempt any Two from the following</b>	<b>12</b>		
a	Explain component of image processing system with neat diagram	6	1	2
b	Explain Region Based Segmentation.	6	2	1
c	Explain application ,advantages, and disadvantages of image processing.	6	1	3
d.	Explain basic relation between pixels.	6	3	2