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## Second Semester B.E./B.Tech. Degree Examination, June/July 2026

### Introduction to Electronics & Communication 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.*

| Module – 1 |    |                                                                                                                                                                                                                                    | M | L  | C   |
|------------|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|----|-----|
| Q.1        | a. | Illustrate the block diagram of a regulated power supply and explain the function of each block.                                                                                                                                   | 8 | L2 | CO1 |
|            | b. | Using a Block diagram derive the expression for overall gain of a negative feedback amplifier. Mention its advantages                                                                                                              | 7 | L2 | CO1 |
|            | c. | With a suitable circuit diagram, describe the working of a voltage Doubler circuit.                                                                                                                                                | 5 | L2 | CO1 |
| OR         |    |                                                                                                                                                                                                                                    |   |    |     |
| Q.2        | a. | Explain with a neat circuit diagram of a Bi-Phase rectifier with the help of suitable input and output waveforms.                                                                                                                  | 8 | L2 | CO1 |
|            | b. | Describe the operation of a Switched Mode Power Supply (SMPS) with neat diagram.                                                                                                                                                   | 7 | L2 | CO1 |
|            | c. | What is an amplifier? Explain the types of amplifiers.                                                                                                                                                                             | 5 | L1 | CO1 |
| Module – 2 |    |                                                                                                                                                                                                                                    |   |    |     |
| Q.3        | a. | Draw the circuit diagram and input and output waveform of the following operational amplifier circuits: i) Differentiating opamp ii) Inverting Opamp.                                                                              | 8 | L1 | CO2 |
|            | b. | Define the following operational amplifier parameters value :<br>i) Open loop voltage gain ii) CMRR iii) Slew Rate.                                                                                                                | 6 | L1 | CO2 |
|            | c. | Explain the Barkhausen criteria required for sustained oscillations. Calculate the Frequency of Oscillations for a three-stage RC phase-shift oscillator with $R=10\text{ k}\Omega$ and $C=0.01\text{ }\mu\text{F}$ in each stage. | 6 | L3 | CO2 |
| OR         |    |                                                                                                                                                                                                                                    |   |    |     |
| Q.4        | a. | Explain the operation of a single stage Astable oscillator with a neat circuit diagram.                                                                                                                                            | 8 | L2 | CO2 |
|            | b. | With circuit diagram, Explain the operation of a Wien bridge oscillator.                                                                                                                                                           | 6 | L2 | CO2 |
|            | c. | With circuit diagram and waveform show how operational amplifier can be used as a comparator.                                                                                                                                      | 6 | L2 | CO2 |
| Module – 3 |    |                                                                                                                                                                                                                                    |   |    |     |
| Q.5        | a. | Explain with a neat block diagram. the individual blocks of Modem Communication System.                                                                                                                                            | 8 | L2 | CO3 |
|            | b. | Explain the concepts of ASK and FSK with the help of neat labelled waveforms.                                                                                                                                                      | 6 | L2 | CO3 |
|            | c. | Discuss different types of Communication system with example.                                                                                                                                                                      | 6 | L2 | CO3 |

## OR

|            |           |                                                                                            |          |           |            |
|------------|-----------|--------------------------------------------------------------------------------------------|----------|-----------|------------|
| <b>Q.6</b> | <b>a.</b> | Explain with a neat diagram the concept of radio wave propagation and its different types. | <b>8</b> | <b>L2</b> | <b>CO3</b> |
|            | <b>b.</b> | Compare Digital communication over Analog communication.                                   | <b>6</b> | <b>L2</b> | <b>CO3</b> |
|            | <b>c.</b> | Explain the concepts of AM and FM with the help of waveforms.                              | <b>6</b> | <b>L2</b> | <b>CO3</b> |

## Module – 4

|            |           |                                                                                                           |          |           |            |
|------------|-----------|-----------------------------------------------------------------------------------------------------------|----------|-----------|------------|
| <b>Q.7</b> | <b>a.</b> | Describe how different segments of a 7-segment display are activated to represent the digits 0 through 9. | <b>8</b> | <b>L2</b> | <b>CO4</b> |
|            | <b>b.</b> | Explain the classification of embedded systems based on generation.                                       | <b>6</b> | <b>L2</b> | <b>CO4</b> |
|            | <b>c.</b> | Compare Microprocessor vs Microcontroller in terms of architecture, performance, and applications         | <b>6</b> | <b>L2</b> | <b>CO4</b> |

## OR

|            |           |                                                                               |          |           |            |
|------------|-----------|-------------------------------------------------------------------------------|----------|-----------|------------|
| <b>Q.8</b> | <b>a.</b> | Describe the core components of an embedded system.                           | <b>8</b> | <b>L2</b> | <b>CO4</b> |
|            | <b>b.</b> | Discuss major application of Embedded system with examples                    | <b>6</b> | <b>L2</b> | <b>CO4</b> |
|            | <b>c.</b> | Differentiate between embedded systems and general-purpose computing systems. | <b>6</b> | <b>L2</b> | <b>CO4</b> |

## Module – 5

|            |           |                                                                                                                                                                     |          |           |            |
|------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------------|
| <b>Q.9</b> | <b>a.</b> | Apply the concept of half adders to realize a full adder using two half adders and an OR gate, and derive the Sum and Carry expressions along with the truth table. | <b>8</b> | <b>L3</b> | <b>CO5</b> |
|            | <b>b.</b> | Perform the following Using 2's Complement<br>i) $101000 - 10101$<br>ii) $100100 - 10100$                                                                           | <b>6</b> | <b>L3</b> | <b>CO5</b> |
|            | <b>c.</b> | Simplify the Boolean expression<br>i) $(x + y)(x' + z)(y + z)$<br>ii) $(A + C)(AD + AD') + AC + C$                                                                  | <b>6</b> | <b>L3</b> | <b>CO5</b> |

## OR

|             |           |                                                                                                                                                                  |          |           |            |
|-------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------------|
| <b>Q.10</b> | <b>a.</b> | i) Convert the Boolean expression to Canonical SOP<br>$F_1 = A + B.C + A.B$<br>ii) Convert the Boolean expression to Canonical POS<br>$F_2 = (A + B) + (A' + C)$ | <b>8</b> | <b>L3</b> | <b>CO5</b> |
|             | <b>b.</b> | Perform the following<br>a) Convert $(11010111)_2 = (?)_{10} = (?)_8 = (?)_{16}$<br>b) Find x if $(16)_{10} = (100)_x$                                           | <b>6</b> | <b>L3</b> | <b>CO5</b> |
|             | <b>c.</b> | Discuss the step-by-step procedure to design a Combinational circuit                                                                                             | <b>6</b> | <b>L2</b> | <b>CO5</b> |

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