

Hall Ticket Number : 

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**R-19****Code: 19A421T**

I B.Tech. II Semester Supplementary Examinations November 2023

**Electronic Devices and Circuits**

(Common to EEE &amp; ECE)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

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Marks CO BL

**UNIT-I**

- |    |    |  |    |   |   |
|----|----|--|----|---|---|
| 1. | a) | What is meant by Q- point? What factors to be considered for selecting the Q- point? | 7M | 1 | 1 |
|    | b) | Define thermal runaway. How it can be avoided?                                       | 7M | 1 | 1 |

**OR**

- |    |    |   |    |   |   |
|----|----|---|----|---|---|
| 2. | a) | Determine the stability factor of a fixed bias silicon transistor with the following specifications: $V_{CC} = 9V$ , $R_C = 3\text{ K Ohms}$ , $R_B = 8\text{ K Ohms}$ , $\beta = 50$ , and $V_{BE} = 0.7\text{ V}$ . | 7M | 1 | 3 |
|    | b) | Write short notes on Thermal Resistance and Thermal Stability.  | 7M | 1 | 6 |

**UNIT-II**

- |    |    |   |    |   |   |
|----|----|---|----|---|---|
| 3. | a) | Sketch and Explain the Transfer Characteristics of P – channel JFET.  | 7M | 2 | 2 |
|    | b) | Distinguish between Gate bias & voltage divider bias for basic J-FET. | 7M | 2 | 3 |

**OR**

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|----|----|--|----|---|---|
| 4. | a) | What do you mean by Trans conductance, Drain resistance and Amplification factor.  | 7M | 2 | 1 |
|    | b) | Find out Trans conductance of Common Source Configuration having its drain resistance $r_d = 20\text{ K Ohms}$ and Amplification factor is 40. | 7M | 2 | 3 |

**UNIT-III**

- |    |    |   |    |   |   |
|----|----|---|----|---|---|
| 5. | a) | Draw and explain the amplifier equivalent circuit in detail   | 7M | 3 | 3 |
|    | b) | Explain about Voltage gain, Current gain and Power gain of an amplifier when it is drawn in equivalent circuit form | 7M | 3 | 2 |

**OR**

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|----|--|-----|---|---|
| 6. |  | 14M | 3 | 2 |
|----|--|-----|---|---|

**UNIT-IV**

- |    |  |     |   |   |
|----|--|-----|---|---|
| 7. |  | 14M | 4 | 3 |
|----|--|-----|---|---|

**OR**

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|----|----|---|----|---|---|
| 8. | a) | If properly biased, FET will act as a voltage controlled voltage source, justify. | 7M | 4 | 4 |
|    | b) | Write the differences between Common Drain and common source Amplifiers.          | 7M | 4 | 2 |

**UNIT-V**

- |    |    |  |    |   |   |
|----|----|--|----|---|---|
| 9. | a) | In what respect is an LED different from an ordinary PN junction diode? State applications of LED. | 7M | 5 | 3 |
|    | b) | Explain the working principle of UJT with neat diagram. Mention its applications.                  | 7M | 5 | 4 |

**OR**

- |     |    |  |    |   |   |
|-----|----|--|----|---|---|
| 10. | a) | With a neat sketch explain two transistor model of SCR | 7M | 5 | 3 |
|     | b) | Discuss in detail about Schottky Barrier Diode.        | 7M | 5 | 3 |

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Important Note: 1. On completing your answers. Compulsorily draw diagonal cross line on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 32+8=40, will be treated as malpractice.

Hall Ticket Number :

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**R-19**

**Code: 19A522T**

I B.Tech. II Semester Supplementary Examinations November 2023

## Programming Through Python

(Common to EEE & ECE)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

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Marks CO BL

### UNIT-I

- |       |  |    |     |    |
|-------|--|----|-----|----|
| 1. a) | Write about the process of computational problem solving           | 7M | CO1 | L2 |
| b)    | Who invented python? Write what you know about python programming. | 7M | CO1 | L2 |

**OR**

- |       |  |    |     |    |
|-------|--|----|-----|----|
| 2. a) | Illustrate infinite loop with an example         | 7M | CO1 | L2 |
| b)    | Write a program using while statements in Python | 7M | CO1 | L3 |

### UNIT-II

- |    |   |     |     |    |
|----|---|-----|-----|----|
| 3. | Summarize in detail about function routine. | 14M | CO2 | L2 |
|----|---|-----|-----|----|

**OR**

- |       |   |    |     |    |
|-------|---|----|-----|----|
| 4. a) | Describe the typical operations performed on lists        | 7M | CO2 | L3 |
| b)    | Write a Python program using programmer-defined functions | 7M | CO2 | L3 |

### UNIT-III

- |       |  |    |     |    |
|-------|--|----|-----|----|
| 5. a) | Discuss about string traversal in python | 9M | CO3 | L2 |
| b)    | What is exception handling?              | 5M | CO3 | L2 |

**OR**

- |       |   |    |     |    |
|-------|---|----|-----|----|
| 6. a) | Differentiate between a text file and a binary file | 7M | CO3 | L3 |
| b)    | How to deal with text files in python?              | 7M | CO3 | L3 |

### UNIT-IV

- |       |   |    |     |    |
|-------|---|----|-----|----|
| 7. a) | Define class and explain it with suitable example | 7M | CO4 | L2 |
| b)    | Explain the concept of an object                  | 7M | CO4 | L2 |

**OR**

- |       |  |    |     |    |
|-------|--|----|-----|----|
| 8. a) | Justify the need of automatic garbage collection in python   | 7M | CO4 | L5 |
| b)    | Summarize the concept of memory allocation and deallocation. | 7M | CO4 | L5 |

### UNIT-V

- |    |   |     |     |    |
|----|---|-----|-----|----|
| 9. | What is stack? Demonstrate stack operations with the example. | 14M | CO5 | L3 |
|----|---|-----|-----|----|

**OR**

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|-----|--|-----|-----|----|
| 10. | Write an algorithm for Single Linked List-traversing and explain it with an example. | 14M | CO5 | L5 |
|-----|--|-----|-----|----|

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Important Note: 1. On completing your answers. Compulsorily draw diagonal cross line on the remaining blank pages.  
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**Code: 19AC21T**

I B.Tech. II Semester Supplementary Examinations November 2023

**Differential Equations and Vector Calculus**

(Common to All Branches)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks )

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## UNIT-I

- |                                      | Marks | CO  | BL |
|--------------------------------------|-------|-----|----|
| 1. a) Solve $(D^2 + 4)y = \cos x$    | 7M    | CO1 | L3 |
| b) Solve $(D^2 + 6D + 9)y = e^{-3x}$ | 7M    | CO1 | L3 |

OR

- |   |     |     |    |
|---|-----|-----|----|
| 2. Solve $\frac{d^2 y}{dx^2} - 3\frac{dy}{dx} + 2y = xe^{3x} + \sin 2x$ | 14M | CO1 | L3 |
|---|-----|-----|----|

## UNIT-II

- |   |     |     |    |
|---|-----|-----|----|
| 3. Solve $x^2 \frac{d^2 y}{dx^2} - 4x \frac{dy}{dx} + 6y = x^2$ | 14M | CO2 | L3 |
|---|-----|-----|----|

OR

- |   |     |     |    |
|---|-----|-----|----|
| 4. Solve $(1+x)^2 \frac{d^2 y}{dx^2} + (1+x) \frac{dy}{dx} + y = 2 \sin[\log(1+x)]$ | 14M | CO2 | L3 |
|---|-----|-----|----|

## UNIT-III

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|--|----|-----|----|
| 5. a) Form the partial differential equations by eliminating arbitrary functions from $f(x^2 + y^2, z - xy) = 0$                           | 7M | CO3 | L3 |
| b) Form the partial differential equation by eliminating arbitrary constants a and b from $z = a \log \left\{ \frac{b(y-1)}{1-x} \right\}$ | 7M | CO3 | L3 |

OR

- |  |    |     |    |
|--|----|-----|----|
| 6. a) Form the partial differential equation by eliminating arbitrary function from $z = f(x^2 + y^2)$ | 7M | CO3 | L3 |
| b) Solve $pyz + qzx = xy$  | 7M | CO3 | L3 |

## UNIT-IV

- |  |    |     |    |
|--|----|-----|----|
| 7. a) Find $\text{div } \vec{f}$ where $\vec{f} = \text{grad}(x^3 + y^3 + z^3 - 3xyz)$ | 7M | CO4 | L2 |
| b) Find $\text{grad } f$ where $f = x^3 + y^3 + 3xyz$                                  | 7M | CO4 | L2 |

OR

- |   |     |     |    |
|---|-----|-----|----|
| 8. Prove that $r^n \vec{r}$ is solenoidal if $n = -3$ . | 14M | CO4 | L2 |
|---|-----|-----|----|

## UNIT-V

- |   |     |     |    |
|---|-----|-----|----|
| 9. Verify Stokes theorem for the function $\vec{F} = x^2 \vec{i} + xy \vec{j}$ integrated around the square in the plane $z=0$ whose sides are along the lines $x=0, y=0, x=a, y=a$ . | 14M | CO5 | L3 |
|---|-----|-----|----|

OR

- |   |     |     |    |
|---|-----|-----|----|
| 10. Using Green's theorem evaluate $\oint_C (2xy - x^2)dx + (x^2 + y^2)dy$ , where C is the closed curve of the region bounded by $y = x^2$ and $y^2 = x$ . | 14M | CO5 | L3 |
|---|-----|-----|----|

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