

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 & ECE)

Max. Marks: 70

Time: 3 Hours

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

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

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

6. Derive the expressions for input resistance, output resistance and voltage gain of an emitter follower circuit. 14M 3 2

UNIT-IV

7. Draw the small-signal model of common drain FET amplifier. Derive expressions for voltage gain and output resistance? 14M 4 3

OR

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

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.

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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)

Marks CO BL

UNIT-I

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|-------|--|----|-----|----|
| 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

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|-------|--|----|-----|----|
| 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

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

OR

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|-------|---|----|-----|----|
| 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

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

OR

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|-------|---|----|-----|----|
| 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

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

OR

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|-------|--|----|-----|----|
| 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

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

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

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

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

OR

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|--|-----|-----|----|
| 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 |
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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

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|--|----|-----|----|
| 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

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|--|----|-----|----|
| 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

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

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|---|-----|-----|----|
| 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 |
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OR

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| 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 |
|---|-----|-----|----|
