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R-19

Code: 19A421T

I B.Tech. II Semester Supplementary Examinations April 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. Derive the Stability factors (S, S') for Voltage Divider Bias Circuit.	14M	1	6
OR			
2. a) Explain the importance of Stability factor in Amplifier circuits.	7M	1	2
b) Discuss Heat Sinks with neat sketches.	7M	1	2
UNIT-II			
3. a) Write the necessary steps for gate bias circuit design and voltage divider bias circuit design.	7M	2	6
b) What are the differences between Bipolar Junction Transistor & Field Effect Transistor?	7M	2	1
OR			
4. 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
UNIT-III			
5. Derive the expressions for input resistance, output resistance and voltage gain of an emitter follower circuit.	14M	3	2
OR			
6. a) What is single stage transistor amplifier and how transistor will amplifies weak signal	7M	3	1
b) Explain about the graphical demonstration of transistor amplifier with example	7M	3	2
UNIT-IV			
7. a) Explain about JFET small signal modeling with necessary expressions.	7M	4	3
b) Write a short note on AC Equivalent circuit for JFET.	7M	4	2
OR			
8. a) Draw and explain the notations of AC Equivalent circuit for MOSFETs	7M	4	2
b) Briefly explain about Common Source MOSFET Amplifier.	7M	4	1
UNIT-V			
9. a) Explain the working of Photo Transistor with neat diagram	7M	5	3
b) What are the applications of Tunnel diode?	7M	5	2
OR			
10. a) Discuss the principle of operation of UJT.	7M	5	1
b) Write a note on LED.	7M	5	2

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R-19

Code: 19AC24T

I B.Tech. II Semester Supplementary Examinations April 2023

Engineering Chemistry

(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 glass electrode? How it is used to find pH of the solution?	7M	1	1
b) What are the different types of electrodes or half cells?	7M	1	1
OR			
2. a) How to find the standard electrode potential of zinc.	8M	1	1
b) Write a short notes on i) oxidation. ii) reduction iii) electrolytes iv) salt bridge.	6M	1	1
UNIT-II			
3. a) Illustrate the working principle of Li- MnO ₂ batteries	7M	2	4
b) Discuss the classification of batteries.	7M	2	4
OR			
4. a) Define reserve battery with example.	5M	2	1
b) Write any five basic characteristic nature of batteries.	9M	2	1
UNIT-III			
5. Explain the manufacturing of single crystalline silicon.	14M	3	3
OR			
6. a) Write short notes on the preparation of multi-crystalline and amorphous Silicon.	8M	3	1
b) List out the various applications of solar energy.	6M	3	1
UNIT-IV			
7. a) Explain the preparation and p-n doping of polyaniline	10M	4	2
b) Discuss the difference between Bun-N rubber and Buna-S rubber.	4M	4	3
OR			
8. a) Write the preparation and properties of bakelite.	7M	4	1
b) What is mean by functionality? Explain with suitable examples.	7M	4	1
UNIT-V			
9. a) What are nanomaterial? Give examples	8M	5	1
b) Write short notes on i) nanoparticles, ii) nanocluster, iii) carbon nanotube (CNT)	6M	5	1
OR			
10. Explain the working principle and applications of scanning electron microscope (SEM)	14M	5	2

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R-19

Code: 19A522T

I B.Tech. II Semester Supplementary Examinations April 2023

Programming through Python

(Common to EEE and 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. Discuss in detail about the following
- a) Input error checking b) multi-way selection
- 14M CO1 L4
- OR**
2. a) List out arithmetic operators in python and illustrate them with examples 7M CO1 L2
- b) Describe and illustrate Boolean operators with examples. 7M CO1 L2

UNIT-II

3. Justify the use of list comprehensions in Python. 14M CO2 L5
- OR**
4. a) Summarize in detail about function routine. 14M CO2 L2
- b) Compare lists and tuples in Python 7M CO2 L3

UNIT-III

5. Explain the process of exception handling in detail. 14M CO3 L3
- OR**
6. a) Explain the use of modular design in software development 7M CO3 L2
- b) Write a python program to write some text into a file. 7M CO3 L2

UNIT-IV

7. Determine three fundamental features of object oriented programming 14M CO4 L3
- OR**
8. a) Justify the need of automatic garbage collection in python 7M CO4 L5
- b) Summarize the concept of memory allocation and de allocation. 7M CO4 L5

UNIT-V

9. Write an algorithm for Single Linked List-traversing and explain it with an example. 14M CO5 L5
- OR**
10. a) Define data structures and list out various types of data structures 7M CO5 L2
- b) Discuss about the common operations performed on data structures 7M CO5 L2

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. 42+8=50, will be treated as malpractice.

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R-19**Code: 19AC21T**

I B.Tech. II Semester Supplementary Examinations April 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)

Marks CO BL

UNIT-I

1. a) Solve $(D^2 + 5D + 6)y = e^x$ 7M CO1 L3
b) Solve $(D^2 + 4)y = \cos x$ 7M CO1 L3

OR

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

UNIT-II

3. Solve $(2x-1)^2 \frac{d^2y}{dx^2} + (2x-1) \frac{dy}{dx} - 2y = 8x^2 - 2x + 3$ 14M CO2 L3

OR

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

UNIT-III

5. Solve $x^2(y-z)p + y^2(z-x)q = z^2(x-y)$ 14M CO3 L3

OR

6. a) Form the partial differential equations by eliminating arbitrary functions from $z = f(x+at) + g(x-at)$ 7M CO3 L3
b) Solve $pyz + qzx = xy$ 7M CO3 L3

UNIT-IV

7. a) Find $\text{grad } f$ where $f = x^3 + y^3 + 3xyz$ 7M CO4 L2
b) Find the directional derivative of $w = x^2 - 2y^2 + 4z^2$ at $(1,1,-1)$ in the direction of $2\bar{i} + \bar{j} - \bar{k}$. 7M CO4 L2

OR

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

UNIT-V

9. 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

OR

10. Verify stokes theorem for the function $\bar{F} = x^2\bar{i} + xy\bar{j}$ 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

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.