PAPER ID-411214

Subject Code: KEC201T

Roll No: | | | | | | | | | | | | | |

BTECH

(SEM II) THEORY EXAMINATION 2023-24

EMERGING DOMAIN IN ELECTRONICS ENGINEERING

TIME: 3 HRS **M.MARKS: 100**

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 10 = 20**

Q no.	Question	Marks	CO
a.	Draw the V-I characteristics of a semiconductor diode	02	1
b.	Explain the principle of operation of tunnel diodes.	02	1
c.	Explain the transfer characteristic of JFETs.	02	2
d.	Differentiate between common base, common emitter and common collector configurations of a BJT.	02	2
e.	Define an IoT (Internet of Things) system.	02	3
f.	Briefly explain Bluetooth technology	02	3
g.	What is the difference between SSI and MSI ICs?	02	4
h.	Describe the concept of Karnaugh Map (K-map) minimization.	02	4
i.	What are the goals of data communication networks?	02	5
j.	Why is modulation necessary in communication systems?	02	5

SECTION B

2. Attempt any *three* of the following: **3 x 10 = 30**

Q no.	Question	Marks	CO
a.	Explain the avalanche breakdown mechanism in Zener diodes. Under what conditions does avalanche breakdown occur, and how does it impact the performance of the diode?	10	1
b.	Explain the operation of a BJT in the active, cutoff, and saturation regions. Discuss the amplification action of a BJT.	10	2
c.	Explain the basic structure and operation of an operational amplifier (Op-Amp). What are the key characteristics that make Op-Amps suitable for a wide range of applications?	10	3
d.	Describe the fundamental logic gates used in digital electronics. Provide truth tables and Boolean expressions for each gate.	10	4
e.	Describe the basic components of a satellite communication system. Explain the function of each component.	10	5

SECTION C

3. Attempt any *one* part of the following: **1 x 10 = 10**

Q no.	Question	Marks	CO
a.	Describe the working of a full-wave rectifier. Compare its performance with a half-wave rectifier in terms of efficiency, ripple factor, and output waveform.	10	1
b.	Describe the construction, working principle, and applications of Light-Emitting Diodes (LEDs).	10	1

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4. Attempt any *one* part of the following: 1 x 10 = 10

Q no.	Question	Marks	CO
2	Describe the construction and operation of a Junction Field Effect Transistor (JFET). How does the JFET control current flow using an electric field?	10	2
b.	Discuss the construction and operation of Metal-Oxide-Semiconductor Field Effect Transistors (MOSFETs).	10	2

5. Attempt any *one* part of the following: 1 x 10 = 10

Q no.	Question	Marks	CO
a.	Explain the working principle of an integrator circuit using an Op-Amp. What are its applications?	10	3
b.	Describe the role of microprocessors and microcontrollers in IoT systems. Discuss the significance of Wi-Fi technology in IoT systems.	10	3

6. Attempt any *one* part of the following: 1 x 10 = 10

Q no.	Question	Marks	CO
a.	Explain the characteristics and typical applications of SSI, MSI, LSI, and VLSI ICs.	10	4
b.	i. convert 4057.06_8 to decimal ii. convert 378.93_{10} to octal iii. $5C7_{16}$ to decimal	10	4

7. Attempt any *one* part of the following: 1 x 10 = 10

Q no.	Question	Marks	CO
a.	Explain the basic principles of radar communication. How does radar detect and track objects?	10	5
b.	Explain the general model of wireless communication. Discuss the evolution from early mobile radio systems to modern standards like LTE and 5G.	10	5