

Hi-Tech Institute of Engineering & Technology	
DEPARTMENT OF APPLIED SCIENCE	
2nd MODEL PAPER, ODD SEMESTER-2023-24,	
Semester: 1st	Course/Branch: B.Tech
Subject Code: BEC 101	Subject Name: FUNDAMENTALS OF ELECTRONICS ENGINEERING
Faculty Name: Ms. Jyoshita	
Time: 3: 00 Hours	Total Marks: 70

Note: Attempt all Sections. If you require any missing data, then choose suitably.

SECTION A

1. Attempt all questions in brief. 2X7=14

Q No.	Question	Marks	CO
a.	Define pinch –off voltage for JEFT.	2	1
b.	Why varactor diode is called varicap? Explain.	2	1
c.	Explain voltage follower circuit using op-pam..	2	3
d.	Convert $(67)_{10}$ into octal..	2	4
e.	State the basic difference between Bluetooth and wi-fi technology	2	5
f.	Draw the V-I characteristics of an ideal diode in forward and reverse bias conditions.	2	1
g.	Calculate the transmission efficiency if the modulation factor is 0.5.	2	2

SECTION B

2. Attempt any three of the following: 7X3= 21

Q No.	Question	Marks	CO
a.	Determine the value of the ripple factor for a half wave rectifier and a full wave rectifier.	7	1
b.	Describe the construction of a non polar junction transistor . Draw well labeled input and output characteristics of a npn transistor in Common Emitter configuration..	7	2
c.	With the help of a neat diagram, explain the working of op-pam as a differentiator..	7	3
d.	i. Subtract using 1's complement : $(10111)_2 - (11011)_2$ ii. Find the base x if $(134)_x = (245)_8$	7	4
e.	Explain satellite and Radar syste using proper block diagram	7	5

SECTION C

3. Attempt any one part of the following: 7X1= 7

Q No.	Question	Marks	CO
a.	Explain Amplitude modulation . Derive the expression for the total power radiated by the modulated signal. Also calculate modulation efficiency	7	1
b.	Define voltage multiplier. Draw the circuit and explain the working of voltage tripler and Quadrupler circuit.	7	1

4. Attempt any *one* part of the following:

7X1= 7

Q No.	Question	Marks	CO
a.	An audio frequency signal $10 \sin 6 \pi * 400t$ is used to amplitude modulate a carrier of $25 \sin 4 \pi * 10^5 t$. Calculate i. Modulation index ii. Amplitude of each side band iii. Bandwidth iv. Transmission efficiency	7	2
b.	AM radio transmitter radiates 6KW power when modulation percentage is 70%. Determine the carrier power.	7	2

5. Attempt any *one* part of the following:

7X1= 7

Q No.	Question	Marks	CO
a.	Explain the working of op-amp as an integrator and derive its output operation.	7	3
b.	Draw a neat circuit diagram of bridge rectifier and explain its operation with output waveform. Derive the average value of current and voltage..	7	3

6. Attempt any *one* part of the following:

7X1= 7

Q No.	Question	Marks	CO
a.	Simplify the following Boolean expression using k-map: $F(A,B,C,D) = \sum (1,2,4,6,7,8,13) + d(3,9,14,15)$	7	4
b.	Implement XOR and EX-OR Gates using NAND and NOR Gates	7	4

7. Attempt any *one* part of the following:

7X1= 7

Q No.	Question	Marks	CO
a.	Explain elements of a communication system along with its block diagram.	7	5
b.	Differentiate between CDMA and GSM..	7	5