Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Engineering / Science
End Sem Examination Dec-2023
EN3ES16 / BC3ES08 Basic Electronics Engineering

Programme: B.Tech./ B.Sc. Branch/Specialisation: All

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

Q.1 i. At room temperature, the energy gap (E_G) between conduction and valence bands of semiconductor is approximately equal to- **1**
(a) 0 ev (b) 0.5 ev (c) 1 ev (d) 1.5 ev

ii. Reverse saturation current I_O is of the order of (for Silicon and Germanium respectively)- **1**
(a) nA, nA (b) nA, µA (c) µA, µA (d) µA, nA

iii. For amplification purpose, a transistor is used in- **1**
(a) Forward active mode (b) Saturation mode
(c) Cut-off mode (d) All of these

iv. Which type of transistor is known as NORMALLY-OFF transistor? **1**
(a) Depletion-Type MOSFET in depletion mode
(b) Depletion-Type MOSFET in enhancement mode
(c) Enhancement-Type MOSFET
(d) None of these

v. Sampling theorem states- **1**
(a) $f_s \geq 2f_m$ (b) $f_s \leq 2f_m$ (c) $f_s < 2f_m$ (d) $f_s > 2f_m$

vi. Condition for modulation (f_c=Carrier signal frequency, f_m=Message signal frequency)- **1**
(a) No any condition (b) $f_c \leq f_m$
(c) $f_c > f_m$ (d) $f_c = f_m$

vii. 1's complement can be easily obtained by using- **1**
(a) Multiplexer (b) Subtractor
(c) Comparator (d) Adder

viii. The decimal number 10 is represented in its BCD form as- **1**
(a) 10100000 (b) 01010111 (c) 00010000 (d) 00101011

P.T.O.

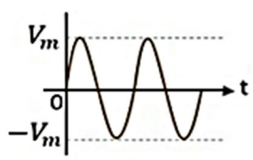
ix. Which of the following device is used to measure power in A.C. circuits? **1**
(a) Wattmeter (b) Voltmeter (c) Ohmmeter (d) Ammeter

x. Which of the following determines light intensity in a CRT? **1**
(a) Fluorecent screen (b) Current
(c) Momentum of electrons (d) Voltage

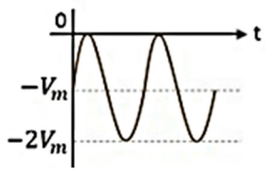
Q.2 i. Define barrier potential. **2**

ii. What is effect of temperature on conductivity of intrinsic and extrinsic semiconductor? Explain. **3**

iii. Draw and explain the circuit required to produce the output given in Fig. (b) When input is waveform given in Fig. (a). **5**

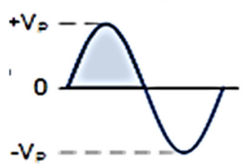


Input Waveform
Fig. (a)

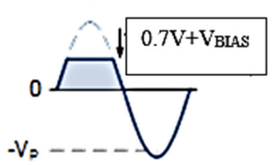


Output Waveform
Fig. (b)

OR iv. Draw and explain the circuit required to produce the output given in Fig. (b) When input is waveform given in Fig. (a). **5**



Input Waveform
Fig. (a)



Output Waveform
Fig. (b)

Q.3 i. What is Early-Effect? **2**

ii. Explain transistor biasing modes with circuit diagram for NPN transistor. **3**

iii. Explain input and output characteristics of common base transistor. **5**

OR iv. Explain construction and working of Enhancement-Type MOSFET (N-Channel). **5**

Q.4 i. Explain amplitude modulation with the help of diagram. **3**

ii. Draw block diagram of communication system and explain the functioning of each block. **7**

OR iii. Explain 'Need for Modulation' and give advantages of modulation. **7**

Q.5 i. Define minterms and maxterms with example. **4**

ii. Explain half adder and full adder in detail. **6**

OR iii. Simplify the expression $Y = \sum_m (3,4,5,7,9,13,14,15)$ using the K-map method. **6**

Q.6 i. Give difference between accuracy and precision. **2**

ii. Explain types of multimeter. **3**

iii. Draw block diagram of CRO and explain the functioning of each block. **5**

OR iv. Explain measurement of voltage, frequency and phase angle using CRO with the help of diagram. **5**

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Scheme of Marking

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Q.1	i)	c) 1 ev		**1**
	ii)	b) nA, µA		**1**
	iii)	a) Forward active mode		**1**
	iv)	c) Enhancement-Type MOSFET		**1**
	v)	a) $f_s \geq 2f_m$		**1**
	vi)	c) $f_c > f_m$		**1**
	vii)	b) Subtractor		**1**
	viii)	c) 00010000		**1**
	ix)	a) Wattmeter		**1**
	x)	c) Momentum of electrons		**1**
Q.2	i.	Definition		**2**
	ii.	Intrinsic Semicondutor-	1.5 Marks,	**3**
		Extrinsic Semicondutor-	1.5 Marks	
	iii.	Circuit Diagram-	2 Marks,	**5**
		Explanation-	3 Marks	
OR	iv.	Circuit Diagram-	2 Marks,	**5**
		Explanation-	3 Marks	
Q.3	i.	Early-Effect-2 Marks		**2**
	ii.	1 Mark for each mode		**3**
	iii.	Input Characteristics-	2.5 Marks,	**5**
		Output Characteristics-	2.5 Marks	
OR	iv.	Construction-	2 Marks,	**5**
		working of Enhancement-Type MOSFET-	3 Marks	
Q.4	i.	Explanation of amplitude modulation-	2 Marks,	**3**
		Diagram-	1 Mark	
	ii.	Block diagram of communication system-	2 Marks,	**7**
		explanation of the functioning of each block-	5 Marks	
OR	iii.	'Need for Modulation'-	5 Marks,	**7**
		Advantages-	2 Marks	
Q.5	i.	Minterms-	2 Marks,	**4**
		Maxterms-	2 Marks	
	ii.	Half adder-	3 Marks	**6**
		Full adder-	3 Marks	
OR	iii.	Y = A'CD+ABC+AC'D+A'BC'- 6 Marks		**6**
Q.6	i.	Difference between Accuracy and Precision-	2 Marks	**2**
	ii.	Analog-	1.5 Marks,	**3**
		Digital-	1.5 Marks	
	iii.	Block diagram of CRO-	2 Marks,	**5**
		explanation of the functioning of each block-	3 Marks	
OR	iv.	measurement of voltage-	2 Marks,	**5**
		frequency-	1.5 Marks,	
		phase angle-	1.5 Marks	

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