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

Enrollment No.....

Faculty of Engineering / Science

End Sem (Odd) Examination Dec-2022

EN3ES16 / BC3ES08 / SC3ES05

Basic Electronics Engineering

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

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.

Q.1 i. Approximate value of silicon diode's forward barrier voltage is- **1**
(a) 0.3 V (b) 0.7 V (c) 1.1 V (d) 1.45 V

ii. Zener diode is used in- **1**
(a) Rectifiers (b) Clippers
(c) Voltage regulators (d) Amplifiers

iii. Which of these is not a terminal of BJT? **1**
(a) Gate (b) Collector (c) Base (d) Emitter

iv. FET is also known as- **1**
(a) Bipolar device
(b) Current controlled device
(c) Voltage controlled device
(d) Linear device

v. Walkie Talkie is an example of _____ mode of communication. **1**
(a) Simplex (b) Full duplex
(c) Half simplex (d) Half duplex

vi. According to sampling theorem, if fm is message signal frequency then sampling frequency should be at least- **1**
(a) fm/2 (b) fm (c) 2fm (d) 10fm

vii. 2's complement of 10110 is- **1**
(a) 01001 (b) 11000 (c) 10111 (d) 01010

viii. Which eqaution is true regarding DeMorgan's law? **1**
(a) (A+B)' = A*B (b) (A+B)' = A'*B'
(c) A*B = A'+B' (d) A*B = A + B

P.T.O.

ix. _____ is how close the measured values are to each other. **1**
(a) Accuracy (b) Precision (c) Sensitivity (d) Hysteresis

x. By connecting a shunt resistance, a PMMC meter can be converted in- **1**
(a) Ammeter (b) Voltmeter
(c) Multimeter (d) CRO

Q.2 i. What do you mean by semiconducting material? Give any two examples. **2**

ii. Draw and explain VI characteristics of PN junction diode. **3**

iii. Explain the working of half wave rectifier with schematic diagram, input-output voltage waveforms. Also derive expression for its ripple factor. **5**

OR iv. Discuss diode clipper circuit with appropriate example. **5**

Q.3 i. Explain the structure of BJT with respect to doping and size of various regions. **2**

ii. What are the factors which affect the stability of Q point of BJT? Enlist various biasing techniques of BJT. **3**

iii. Discuss common emitter configuration of BJT with the help of circuit diagram and input output VI characteristics. **5**

OR iv. With a neat sketch, describe the structure and working of n-channel JFET. Also draw drain characteristics curves. **5**

Q.4 i. Draw the schematic block diagram of communication system. Also discuss working of each block. **4**

ii. Discuss at least four needs of modulation in detail. **6**

OR iii. Explain amplitude modulation with the help of mathematical expressions and appropriate diagrams. **6**

Q.5 i. Convert $(57)_{10}$ into equivalent binary number. **2**

ii. Derive minimal expression for following function using K-map $F(x,y,z) = \Sigma_m (0,1,2,4.6)$ **3**

iii. Explain half adder and full adder with circuit diagram, truth table and boolean expressions. **5**

OR iv. Discuss Von Neumann architecture of computer in detail. **5**

Q.6 Attempt any two:

i. Write a detailed note on function generator. **5**

ii. Explain the working of voltmeter and ammeter. **5**

iii. Explain the construction and working of Cathode Ray Tube. **5**

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Scheme of Marking

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Note: The Paper Setter should provide the answer wise splitting of the marks in the scheme below.

Q.1	i)	b	**1**
	ii)	c	**1**
	iii)	a	**1**
	iv)	c	**1**
	v)	d	**1**
	vi)	c	**1**
	vii)	d	**1**
	viii)	b	**1**
	ix)	b	**1**
	x)	a	**1**
Q.2	i.	Definition 1 mark, 0.5 mark for each example	
	ii.	Diagram 1 mark, explanation 2 marks	
	iii.	2 marks circuit, 1 mark waveforms, 2 marks derivation	
OR	iv.	1 mark definition, 1 mark diagram, 1 mark working , 2 marks waveforms	
Q.3	i.	1 mark each for doping and size of regions	
	ii.	2 marks factors, 1 mark list	
	iii.	Circuit 2 marks, 1 mark theory, 2 marks VI characteristics	
OR	iv.	Structure 1 mark, working 2 marks, Characteristics 2 marks	
Q.4	i.	Diagram 2 marks, working 2 marks	
	ii.	1.5 mark for each need	
OR	iii.	2 marks for definition(theory), expression, waveforms each	
Q.5	i.	1 mark procedure, 1 mark correct result	
	ii.	2 marks for k map, 1 for minimal expression	
	iii.	Half adder: 2marks for circuit, 2 mark for expression, 1 marks for truth table. Same marking for full adder	
OR	iv	2 marks block diagram, 3 for explanation	
Q.6	i.	2 marks block diagram, 3 for explanation	
	ii.	2 mark diagram, 1 mark component explanation, 2 marks working	
	iii.	3 marks diagram, 2 for explanation	

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