ROLL NO.

Code: AC103/AT103

Subject: ANALOG & DIGITAL ELECTRONICS

# AMIETE – CS/IT (New Scheme)

Time: 3 Hours

# DECEMBER 2016

Max. Marks: 100

# PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

### NOTE: There are 9 Questions in all.

- Question 1 is compulsory and carries 20 marks. Answer to Q. 1 must be written in the space provided for it in the answer book supplied and nowhere else.
- The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.
- Out of the remaining EIGHT Questions answer any FIVE Questions, selecting at least TWO questions from each part. Each question carries 16 marks.
- Any required data not explicitly given, may be suitably assumed and stated.

Q.1 (	Choose the correct or the best alternative in the following:			
а	a. A Zener Diode is useful as a			
	<ul><li>(A) Regulator</li><li>(C) Switch</li></ul>	<ul><li>(B) Amplifier</li><li>(D) Oscillator</li></ul>		
b	b. Level shifter circuit is also known a	S		
	<ul><li>(A) clamper circuit</li><li>(C) diode</li></ul>	<ul><li>(B) clipper circuit</li><li>(D) transistor</li></ul>		
C	. Current gain of BJT in common base is			
	<ul> <li>(A) α</li> <li>(C) γ</li> </ul>	<ul><li>(B) β</li><li>(D) None of these</li></ul>		
Ċ	d. Early effect in BJT refers to			
	<ul><li>(A) Base Width Modulation</li><li>(C) Avalanche Breakdown</li></ul>	<ul><li>(B) Zener Breakdown</li><li>(D) None of these</li></ul>		
e	A Hartley oscillator uses which feedback?			
	<ul><li>(A) Inductive</li><li>(C) Resistive</li></ul>	<ul><li>(B) Capacitive</li><li>(D) Coupled Inductive Capacitive</li></ul>		
f	Convert $(238)_{10} = ( \_ )_{16}$ .			
	<ul><li>(A) 2C</li><li>(C) 4F</li></ul>	<ul><li>(B) EE</li><li>(D) 7E</li></ul>		
g	g. Which code is used for solving k-Map?			
	<ul><li>(A) Binary</li><li>(C) Octal</li></ul>	<ul><li>(B) Gray</li><li>(D) Hammings</li></ul>		

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h. Convert 0111 Gray code into equivalent binary code.

<b>(A)</b>	1010	<b>(B)</b> 0100
<b>(C)</b>	0111	<b>(D)</b> 1000

i. If there is a 1:64 Demultiplexer, then how many select lines will be there?

	<ul><li>(A) 4</li><li>(C) 8</li></ul>	<ul><li>(B) 6</li><li>(D) None of these</li></ul>
j.	a + ab is equivalent to	
	<ul> <li>(A) a</li> <li>(C) a + b</li> </ul>	( <b>B</b> ) $\dot{\bf b}$ ( <b>D</b> ) $\ddot{\bf a} + {\bf b}$

PART A Answer at least TWO questions. Each question carries 16 marks.

Q.2	a.	If two Ge diodes are connected across a voltage of 10 V and a resistance of 100 Ω. What will be voltage across each diode in below cases? (i) When connected back to back (ii) When both are forward biased (iii) When both are reverse biased	f [ <b>10</b> ]
	b.	Derive the relationship between density of holes and electron in doped and undoped semiconductor material.	l (6)
Q.3	a.	State and explain the working of Bridge wave rectifier (Full wave) with the of waveforms.	help ( <b>8</b> )
	b.	Explain working of zener diode as voltage regulator.	(8)
Q.4	a.	Explain the concept of collector to Base Bias.	(8)
	b.	An n-p-n transistor has $\beta = 50$ and $I_{CO} = -2\mu A$ . CE configuration is used with $V_{CE} = -12V$ and collector load resistor of 4 k ohms. What is the minimum base current value required to saturate the transistor? (8)	
Q.5	a.	Explain the circuit and working of Hartley Oscillator.	(8)
	b.	Explain the block diagram and equivalent circuit for voltage series feedback Derive expression for Amplifier gain with and without feedback.	(8)

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# PART B

Answer at least TWO	questions. Each	question	carries 16	marks.

Q.6	a.	Realize OR, AND and NOT gates with the help of switch and lamp logic.	
	b.	Convert the following (i) $(6715)_8 = ( )_{10}$ (ii) $(2.333)_{10} = ( )_2$ (iii) $(0.11001100)_2 = ( )_8$ (iv) $(1.5)_{10} = ( )_2$	(8)
Q.7	a.	Determine the min Term and max Term present in the boolean expression $f(a,b,c) = a + bc$	(8)
	b.	Realize all basic gates individually(i) using NOR gates only(ii) using NAND gates only	4+4)
Q.8	a.	Draw and explain the working of Full adder. Design the same.	(8)
	b.	Compare Decoder and Demultiplexer. Give a design of making 1:8 Demux with the help of two 1:4 Demux.	
Q.9	a.	What is the difference between Latch and a flip-flop?	(4)
	b.	How we can realize D & T flip flops from J-K flip flop?	(4)
	c.	Explain the working and circuit diagram of Ring counter.	(8)

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