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

Enrollment No.....

Faculty of Science

End Sem (Even) Examination May-2019

BC3CO06 Digital Electronics and Computer Architecture

Programme: B.Sc. (CS) Branch/Specialisation: 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. Convert $(214)_8$ into decimal: **1**

(a) $(140)_{10}$ (b) $(141)_{10}$ (c) $(142)_{10}$ (d) $(130)_{10}$

ii. Which of the following is an invalid BCD code? **1**

(a) 0011 (b) 1101 (c) 0101 (d) 1001

iii. The NOR gate output will be high if the two inputs are. **1**

(a) 00 (b) 01 (c) 10 (d) 11

iv. A full adder logic circuit will have **1**

(a) Two inputs and one output

(b) Three inputs and three outputs

(c) Two inputs and two outputs

(d) Three inputs and two outputs

v. The truth table for an S-R flip-flop has how many VALID entries? **1**

(a) 1 (b) 2 (c) 3 (d) 4

vi. A decimal counter has _____ states. **1**

(a) 5 (b) 10 (c) 15 (d) 20

vii. Computers invariably use RAM for **1**

(a) High complexity (b) High resolution

(c) High speed main memory (d) High flexibility

viii. The software used to drive microprocessor-based systems is called: **1**

(a) Assembly language (b) Firmware

(c) Machine language code (d) BASIC interpreter instructions

P.T.O.

	ix.	The instructions like MOV or ADD are called as _____ (a) OP-Code (b) Operators (c) Commands (d) None of these	**1**
	x.	Which bus is unidirectional? (a) Data bus (b) Control bus (c) System bus (d) Address bus	**1**
Q.2	i.	Define ASCII (American Standard Code for Information Interchange) Code.	**2**
	ii.	Explain Excess3 Code and Gray Code with example.	**3**
	iii.	Convert $(225)_{10}$ in to hexa, binary and octal numbers.	**5**
OR	iv.	Solve this 112-222 using 9s and 2s complements and 10s method.	**5**
Q.3	i.	Write down any two differences between combinational and sequential circuits.	**2**
	ii.	Design EX-OR and EX-NOR gates using NAND gate.	**3**
	iii.	Solve the following expression (a) $X.Y + X(Y + Z) + Y(Y + Z)$ (b) $(X + Y)(X + \bar{Y})(X + \bar{Z})$	**5**
OR	iv.	Design full subtractor using half subtractor and draw its truth table also derive the expression for difference and borrow.	**5**
Q.4	i.	Design the truth table of D flip flop.	**2**
	ii.	What is Race around condition and how it is Eliminated?	**3**
	iii.	Design and explain mod-6 asynchronous Counter also draw the output waveform.	**5**
OR	iv.	Draw the circuit of Serial-in-serial-out and parallel-in-serial-out shift registers, also explain its working principle.	**5**
Q.5	i.	Explain the Bus structures in a simple processor.	**2**
	ii.	Draw the basic structure of computers functional units.	**3**
	iii.	Defined the following terms for simple processor: (a) RAM (b) ROM (c) Memory address (d) Interrupt (e) Addressing mode	**5**
OR	iv	Draw and explain Architecture of a simple processor.	**5**

Q.6	i.	What is conditional and unconditional statements explain with examples.	**2**
	ii.	Write down any six differences between Synchronous & Asynchronous data transfer techniques.	**3**
	iii.	The contents of accumulator are 6AH and register C is A7H. Write a program to add the contents of two registers and comment on the result.	**5**
OR	iv.	Write an assembly language program using instructions to multiply two unsigned 8 bit binary numbers using add algorithm. Also, explain working of the algorithm with an example.	**5**

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Marking Scheme

BC3CO06 Digital Electronics and Computer Architecture

Q.1	i.	Convert $(214)_8$ into decimal: (a) $(140)_{10}$		**1**
	ii.	Which of the following is an invalid BCD code? (b) 1101		**1**
	iii.	The NOR gate output will be high if the two inputs are. (a) 00		**1**
	iv.	A full adder logic circuit will have (d) Three inputs and two outputs		**1**
	v.	The truth table for an S-R flip-flop has how many VALID entries? (c) 3		**1**
	vi.	A decimal counter has _____ states. (b) 10		**1**
	vii.	Computers invariably use RAM for (c) High speed main memory		**1**
	viii.	The software used to drive microprocessor-based systems is called: (a) Assembly language		**1**
	ix.	The instructions like MOV or ADD are called as _____ (a) OP-Code		**1**
	x.	Which bus is unidirectional? (d) Address bus		**1**
Q.2	i.	American Standard Code for Information Interchange Code.		**2**
	ii.	Excess3 Code with example Gray Code with example	1.5 marks 1.5 marks	**3**
	iii.	Convert $(225)_{10}$ in to hexa, octal numbers. Convert $(225)_{10}$ in to binary	4 marks 1 mark	**5**
OR	iv.	112-222 using 9s and 10s method Solve this 112-222 using 2s complements	4 marks 1 mark	**5**
Q.3	i.	Any two differences b/w combinational and sequential circuits. 1 mark for each points	 (1 mark * 2)	**2**
	ii.	EX-OR gates using NAND gate. EX-NOR gates using NAND gate	1.5 marks 1.5 marks	**3**
	iii.	Solve the following expression (a) $X.Y + X(Y + Z) + Y(Y + Z)$ (b) $(X + Y)(X + \bar{Y})(X + \bar{Z})$	 2.5 marks 2.5 marks	**5**
OR	iv.	Design full subtractor using half subtractor Its truth table Derive the expression for difference and borrow.	2 marks 1 marks 2 marks	**5**
Q.4	i.	Truth table of D flip flop.		**2**
	ii.	Race around condition How it is Eliminated	2 marks 1 mark	**3**
	iii.	Design mod-6 asynchronous Counter Explanation mod-6 asynchronous Counter Output waveform	1 mark 2 marks 2 marks	**5**
OR	iv.	Circuit of Serial-in-serial-out shift registers and working principle Circuit of Parallel-in-serial-out shift registers and working principle.	2.5 marks 2.5 marks	**5**
Q.5	i.	Bus structures in a simple processor.		**2**
	ii.	Basic structure of computers functional units.		**3**
	iii.	Defined the terms for simple processor: 1 mark for each	 (1 mark * 5)	**5**
OR	iv	Architecture of a simple processor diagram Explanation Architecture of a simple processor	2 marks 3 marks	**5**
Q.6	i.	Conditional statements with examples Unconditional statements with examples	1 mark 1 mark	**2**
	ii.	Any six differences between Synchronous & Asynchronous data transfer techniques. 0.5 mark for each difference	 (0.5 mark * 6)	**3**
	iii.	Program to add the contents of two registers and comment on the result.		**5**
OR	iv.	Write an assembly language program and working of the algorithm with an example.		**5**

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