Total No. of Questions: 6 *Total No. of Printed Pages:2*

Enrollment No.....

Faculty of Science

End Sem (Even) Examination May-2018

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. Decimal equivalent of the binary 001100 is: **1**
(a) 12 (b) 13 (c) 14 (d) 15

ii. The radix of the hexadecimal number system is: **1**
(a) 10 (b) 8 (c) 2 (d) 16

iii. If the input to a NOT gate is LOW, what is the output: **1**
(a) HIGH (b) LOW (c) MIDDLE (d) UNDEFINED

iv. The Boolean expression for a 3-input OR gate is : **1**
(a) ABC (b) A+B+C (c) A+BC (d) AB+C

v. The single bit storage is called: **1**
(a) Register (b) Counter (c) Flip-Flop (d) Memory

vi. The group of equal-sized registers form: **1**
(a) Counter (b) Latch (c) Memory (d) Bus

vii. The group of parallel wires is called: **1**
(a) Bus (b) Flip-Flop (c) Latch (d) CPU

viii. The bus carrying instruction codes is: **1**
(a) Address Bus (b) Data Bus
(c) Control Bus (d) None of these

ix. The single-chip CPU is called: **1**
(a) Microcontroller (b) Microcomputer
(c) Supercomputer (d) Microprocessor

x. A program which converts high level language program into machine language program: **1**
(a) Assembler (b) Compiler (c) Linker (d) Loader

P.T.O.

Q.2 i. Convert the Gray code 101010 into its binary equivalent. **2**

ii. What is Excess-3 Code? Give examples. Show how it is useful for BCD addition. **3**

iii. Convert following: **5**
(a) $(237)_8$ → ($)_{16}$
(b) $(23.85)_{10}$ → ($)_8$

OR iv. Convert following: **5**
(a) $(2A7)_{16}$ → ($)_{10}$
(b) $(13.75)_8$ → ($)_2$

Q.3 Attempt any two:

i. What is De Morgan's Theorems? Explain. **5**

ii. Explain half adder in detail. **5**

iii. Explain Encoders giving examples. **5**

Q.4 i. What is meant by D-Flip flop? Explain. **2**

ii. Draw and explain a Mod-10 Synchronous Counter. **8**

OR iii. What is shift register? Explain different types of shift registers. How Ring Counters are made using shift registers? **8**

Q.5 i. Draw block diagram of a computer showing its basic functional units. Also explain the functions of each unit. **3**

ii. What is register transfer language? What are Micro-operations? Explain different types of Micro-operations giving suitable examples. **7**

OR iii. Evaluate X= A*B+C*(D+E) using zero, one, two, and three address instruction machines. **7**

Q.6 i. What is assembly language programming? Explain instruction format and addressing modes. **4**

ii. What are branching instructions in assembly language? Describe any five branching assembly language instructions. **6**

OR iii. What are logical instructions in assembly language? Describe any five logical assembly language instructions. **6**

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Marking Scheme

BC3CO06 Digital Electronics and Computer Architecture

Q.1	i.	Decimal equivalent of the binary 001100 is: (a) 12		**1**
	ii.	The radix of the hexadecimal number system is: (d) 16		**1**
	iii.	If the input to a NOT gate is LOW, what is the output: (a) HIGH		**1**
	iv.	The Boolean expression for a 3-input OR gate is : (b) A+B+C		**1**
	v.	The single bit storage is called: (c) Flip-Flop		**1**
	vi.	The group of equal-sized registers form: (c) Memory		**1**
	vii.	The group of parallel wires is called: (a) Bus		**1**
	viii.	The bus carrying instruction codes is: (b) Data Bus		**1**
	ix.	The single-chip CPU is called: (d) Microprocessor		**1**
	x.	A program which converts high level language program into machine language program: (b) Compiler		**1**
Q.2	i.	Full marks for complete conversion		**2**
	ii.	Definition Excess-3 Code	1 mark	**3**
		Examples	1 mark	
		Explanation	1 mark	
	iii.	Convert following:		**5**
		(a) $(237)_8$ → ($)_{16}$	2.5 marks	
		(b) $(23.85)_{10}$ → ($)_8$	2.5 marks	
OR	iv.	Convert following:		**5**
		(a) $(2A7)_{16}$ → ($)_{10}$	2.5 marks	
		(b) $(13.75)_8$ → ($)_2$	2.5 marks	
Q.3		Attempt any two:		
	i.	Statement of De Morgan's Theorems	2 marks	**5**
		Explanation	3 marks	
	ii.	Blok diagram & description	2 marks	**5**
		Truth table	1 mark	
		Logical expression & logical diagram	2 marks	
	iii.	Blok diagram & description	3 marks	**5**
		Examples	2 marks	
Q.4	i.	D-Flip flop		**2**
		Blok diagram	1 mark	
		Characteristic table	1 mark	
	ii.	Mod-10 Synchronous Counter		**8**
		State diagram	2 marks	
		Truth table	2 marks	
		Logical expression	2 marks	
		Logical diagram	2 marks	
OR	iii.	Definition of shift register	1 mark	**8**
		Types of shift registers with diagram	4 marks	
		Ring Counters with truth table	3 mark	
Q.5	i.	Blok diagram	1 mark	**3**
		Examples	2 marks	
	ii.	Register transfer language	2 marks	**7**
		Micro-operations	2 marks	
		Types of Micro-operations	3 marks	
OR	iii.	Evaluate X= A*B+C*(D+E) using zero, one, two, and three address instruction machines. 1.75 marks for each evaluation (1.75 marks * 4)		**7**
Q.6	i.	Assembly language programming	1 mark	**4**
		Instruction format	1 mark	
		Addressing modes	2 marks	
	ii.	Branching instructions in assembly language	1 mark	**6**
		Any five types with examples(1 mark * 5)	5 marks	
OR	iii.	Logical instructions in assembly language	1 mark	**6**
		Any five logical assembly language instructions	5 marks	

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