



Enrollment No.....

Faculty of Science / Engineering

End Sem Examination Dec 2024

CA3CO18 Digital Electronics

Programme: BCA / BCA- Branch/Specialisation: Computer
MCA (Integrated) Application

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.

		Marks	BL	PO	CO	PSO
Q.1	i. What is the octal equivalent of the binary number 110101? (a) 65 (b) 45 (c) 32 (d) 15	1	2	5, 1	2	-
	ii. Convert the decimal number 45 to its binary equivalent. (a) 101110 (b) 101101 (c) 110101 (d) 1011010	1	2	5, 1	2	-
	iii. In an AND gate, the output is 1 only when: (a) Any input is 1 (b) All inputs are 1 (c) All inputs are 0 (d) Only one input is 0	1	1	5, 1	1	-
	iv. In Boolean algebra, the expression $A + 1$ simplifies to: (a) A (b) 0 (c) 1 (d) A'	1	1	5, 1	1	-
	v. How many select lines are needed for a 16-to-1 multiplexer? (a) 2 (b) 3 (c) 4 (d) 5	1	1	5, 1	1	-
	vi. Which flip-flop has two stable states and is known for its set-reset functionality? (a) J-K flip-flop (b) S-R flip-flop (c) D flip-flop (d) T flip-flop	1	1	5, 1	1	-

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	vii.	What is the role of a D/A converter?	1	1	5, 1	1	
		(a) Converts digital signals to analog					-
		(b) Converts analog signals to digital					
		(c) Amplifies signals					
	viii.	In a parallel-in-parallel-out shift register, data is:	1	1	5, 1	2	
		(a) Loaded serially and retrieved in parallel					-
		(b) Loaded and retrieved in parallel					
		(c) Loaded in parallel and retrieved serially					
	ix.	Which type of memory, loses its contents when power is turned off?	1	1	5, 1	4	
		(a) RAM					-
		(b) ROM					
		(c) PROM					
	x.	What is a memory cell?	1	1	5, 1	4	
		(a) The smallest unit of storage in a memory device					-
		(b) A type of RAM					
		(c) A unit of CPU processing					
Q.2	i.	Solve the following:	4	3	5, 1	2	
		(a) Convert the binary number 101101 to its decimal equivalent.					-
		(b) What is the 2's complement of the binary number 01101?					
		(c) Convert the decimal number 125 to binary					
	ii.	Discuss the following coding systems with an example.	6	1	5, 1	1	
		(a) ASCII code					-
		(b) BCD code					
		(c) Gray code					
OR	iii.	Explain half adder and full adder with its circuit diagram and truth table.	6	2	5, 1	2	-

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Q.3	i.	Explain the following logic gates with truth table and logic expression.	4	2	5, 1	2	
		(a) NAND gate					-
		(b) NOR gate					
	ii.	What do you mean by K-map? Simplify Boolean function $F(A,B,C,D)=\sum(0,1,2,5,6,7,8,9,10,14)$ using K-Map. Draw the logic circuit of a simplified expression.	6	3	5, 1	2	
OR	iii.	With the help of circuit diagram explain Diode and Transistor as a switch.	6	3	5, 1	2	-
Q.4	i.	Explain 4*1 multiplexer with its truth table, logic expression and its logic circuit.	4	2	5, 1	3	
							-
	ii.	Draw and explain the working of Master Slave JK flip flop.	6	2	5, 1	2	
							-
OR	iii.	Draw the circuit diagram and truth table of S-R Flip-Flop also explain its working.	6	2	5, 1	2	-
Q.5	i.	Draw and explain the working operation of Johnson counter.	4	2	5, 1	3	
							-
	ii.	Explain the construction and working of serial in serial out shift register.	6	2	5, 1	3	
							-
OR	iii.	What are A/D and D/A converters? Explain in detail.	6	2	5, 1	1	-
Q.6		Attempt any two:					
	i.	Explain the role of cache memory in computer with different types of cache memory.	5	2	5, 1	4	
							-
	ii.	Classify the different types of memory in computer systems, and briefly describe each type.	5	1	5, 1	4	
							-
	iii.	Explain physical memory and virtual memory.	5	1	5, 1	4	
							-

Marking Scheme
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Q.1	i)	What is the octal equivalent of the binary number 110101? A) 65	1
	ii)	Convert the decimal number 45 to its binary equivalent. B) 101101	1
	iii)	In an AND gate, the output is 1 only when: B) All inputs are 1	1
	iv)	In Boolean algebra, the expression $A + 1$ simplifies to: C) 1	1
	v)	How many select lines are needed for a 16-to-1 multiplexer? C) 4	1
	vi)	Which flip-flop has two stable states and is known for its set-reset functionality? B) S-R flip-flop	1
	vii)	What is the role of a D/A converter? A) Converts digital signals to analog	1
	viii)	In a parallel-in-parallel-out shift register, data is: B) Loaded and retrieved in parallel	1
	ix)	Which type of memory loses its contents when power is turned off? A) RAM	1
	x)	What is a memory cell? A) The smallest unit of storage in a memory device	1
Q.2	i.	One marks each $4 \times 1 = 4$ marks 45,10011,1111101,71	4
	ii.	2 marks each	6

OR	iii.	3 marks half adder (1 marks truth table,2 marks circuit diagram), 3 marks full adder(1 marks truth table,2 marks circuit diagram),	6
Q.3	i.	2 marks each	4
	ii.	k-map 1 mark simplification 3 marks logic circuit 2 marks	6
OR	iii.	3 marks each	6
Q.4	i.	Truth table (1 marks), logic expression (1 marks), logic circuit(2 marks),.	4
	ii.	2 marks diagram ,4 marks explanation	6
OR	iii.	2 marks circuit diagram ,1 mark truth table,3 marks explanation	6
Q.5	i.	2 marks circuit diagram, 2 marks explanation	4
	ii.	2 marks circuit diagram, 1 mark truth table ,3 marks explanation	6
OR	iii.	2 marks circuit diagram, 1 mark truth table ,3 marks explanation	6
Attempt any two			
Q.6	i.	Role of cache memory in computer :2marks different types of cache memory:3 marks	5
	ii.	Classification 2 marks ,description 3 marks	5
	iii.	2.5 each	5
