

Total No. of Questions: 6

Total No. of Printed Pages: 3



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

Enrollment No.....

Faculty of Science / Engineering
End Sem Examination Dec 2024

CA3CO18 Digital Electronics

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

[2]

$$1 \quad 1 \quad 5, \quad 1$$

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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 | | | | | |
| OR | 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 |
| | iii. | With the help of circuit diagram explain Diode and Transistor as a switch. | | | | |
| 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. | | | | |
| 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. | | | | |
| OR | iii. | What are A/D and D/A converters? Explain in detail. | 6 | 2 | 5,
1 | 1 |
| | | | | | | |
| Q.6 | Attempt any two: | | 5 | 2 | 5,
1 | 4 |
| | i. | Explain the role of cache memory in computer with different types of cache memory. | | | | |
| | 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. | | | | |

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Marking Scheme
CA3CO18 Digital Electronics

Q.1	i)	What is the octal equivalent of the binary number 110101?	1	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	
	A)	65						
	ii)	Convert the decimal number 45 to its binary equivalent.			i.	2 marks each		
	B)	101101			ii.	k-map 1 mark simplification 3 marks		
	iii)	In an AND gate, the output is 1 only when:				logic circuit 2 marks		
	B)	All inputs are 1			OR	iii.		
	iv)	In Boolean algebra, the expression A + 1 simplifies to:				3 marks each		
	C)	1			Q.4	i.		
	v)	How many select lines are needed for a 16-to-1 multiplexer?				Truth table (1 marks), logic expression (1 marks), logic circuit(2 marks),.		
	C)	4			ii.	2 marks diagram ,4 marks explanation		
Q.2	vi)	Which flip-flop has two stable states and is known for its set-reset functionality?	1		OR	iii.	2 marks circuit diagram ,1 mark truth table,3 marks explanation	
	B)	S-R flip-flop			Q.5	i.	2 marks circuit diagram, 2 marks explanation	
	vii)	What is the role of a D/A converter?				ii.	2 marks circuit diagram, 1 mark truth table ,3 marks explanation	
	A)	Converts digital signals to analog			OR	iii.	2 marks circuit diagram, 1 mark truth table ,3 marks explanation	
	viii)	In a parallel-in-parallel-out shift register, data is:						
	B)	Loaded and retrieved in parallel						
	ix)	Which type of memory loses its contents when power is turned off?					Attempt any two	
	A)	RAM			Q.6	i.	Role of cache memory in computer :2marks	
	x)	What is a memory cell?				ii.	different types of cache memory:3 marks	
	A)	The smallest unit of storage in a memory device				iii.	Classification 2 marks ,description 3 marks	
	i.	One marks each $4*1=4$ marks 45,10011,111101,71	4				2.5 each	
	ii.	2 marks each						
			6					
