Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIRST SEMESTER MCA DEGREE EXAMINATION, JULY 2018

Course Code: RLMCA109

Course Name: DIGITAL FUNDAMENTALS

Max. Marks: 60 Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks Marks

1	a)	Convert the hexadecimal number 8A9D into binary number system.	(1.5)
	b)	Convert the decimal number 2378 to Binary Coded Decimal.	(1.5)
2		What is the key feature of cell adjacency in Karnaugh map?	(3)
3		Prove that $A + \bar{A}B = A + B$.	(3)
4		Show how a full adder can be converted to a full subtractor with the addition of one inverter circuit.	(3)
5		Design the circuit of a half adder using only NAND gates.	(3)
6		Derive the excitation table of RS flip-flop from the truth table of RS flip-flop.	(3)
7		Mention any four applications of shift registers.	(3)
8		Differentiate synchronous and asynchronous counters.	(3)

PART B

Answer six questions, one full question from each module and carries 6 marks

Module I

9	a)	Perform the following number conversions.	
		i) Decimal number 65.42 into binary number.	(2)
		ii) Octal number 4653 into decimal number.	(2)
	b)	Represent the positive binary number 110011011100000_2 to a single precision floating point binary number.	(2)

OR

10	a)	Convert the decimal numbers 56 and -27 to binary and add using the 2's complement form.	(4)
	b)	Given the signed binary number in 1's complement form as 10111111, determine its decimal value.	(2)

Module II

11		Find the simplified expression for the following Boolean expressionusing Karnaugh map. Y = ABC′D + B′D + A′D′ + B′CD	(6)

OR

12		Explain the universal gate. Implement the basic gates with any one of the universal gates.	(6)

Module III

13		Design a full adder using a decoder.	(6)

OR

14 Explain the internal construction of 4 X1 multiplexer. How do you implement a function F(W,X,Y,Z) =Σ(0,1,3,4,8,9,15) using this multiplexer with X,Y,Z connected to selection lines S_2 ,S_1 and S_0 respectively. (6)

Module IV

15 Derive a D flip-flop from RS flip-flop. (6)

OR

16 Design JK flip-flop using NAND gates and explain its working. (6)

Module V

17 Draw the circuit and explain the working of an asynchronous decade counter. (6)

OR

18 Mention the different types of shift register. With a circuit diagram explain any one shift register. (6)

Module VI

19 Describe the architecture of Arduino. (6)

OR

20 Mention the components of motherboard and explain any four among them. (6)

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