RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College under University of Calcutta)

FIRST YEAR B.A./B.SC. FIRST SEMESTER (July – December) 2014 Mid-Semester Examination, September 2014

Date : 15/09/2014

COMPUTER SCIENCE (Honours) Paper : I

Time : 11 am – 1 pm

Full Marks : 50

[Use a separate answer book for each group]

<u>Group – A</u>

(Answer any three questions)

1.	a)	Express the boolean function $f = xy + x'z$ into it's canonical product of sum form using boolean algebra.	[3]
	b)	Briefly describe ASCII code.	[2]
2.	a)	 The state of a 12-bit register is 100010010111. What is it's content if it represents i) three decimal digits in BCD? ii) three decimal digits in the excess-3 code? iii) three decimal digits in the 84-2-1 code? 	±1±11
	b)	What is the difference between weighted code and non-weighted code number systems, explain with example.	[2 ¹ /2]
3.	a)	Using K-Map minimize the following Boolean function : $F(A,B,C,D) = \Sigma (0,2,3,5,7,8,10,11,13,15)$	[3]
	b)	Evaluate the value of subtraction of 240(BCD) from 375(BCD)	[2]
4.	a) b)	Draw the circuit of even parity checker for transmission of 3-bit message. Write down the De-Morgan's law for Boolean algebra and prove it.	[3] [2]
		<u>Group – B</u>	
		(Answer <u>any seven</u> questions)	
5.	a) b)	Implement the boolean function $F(A,B,C) = \Sigma(1,3,5,7)$ using a 4×1 multiplexer. What is the difference between a latch and a flip flop?	[3] [2]
6.	a) b) c)	What is the advantage of a priority encoder? Explain controlled inverter. Mention one application of exclusive- OR gate.	[2] [2] [1]
7.	a) b)	Differentiate between control flow and data flow architecture with an example. "Zero address instruction is used in implied addressing mode"— Justify.	[3] [2]
8.	a) b)	Differentiate between level triggered and edge triggered flip-flop. What are asynchronous inputs of flip flop? Why are they used?	[2] [2+1]
9.	a) b)	Design a mod-7 ripple counter using positive edge triggered T-flip flop. What is the advantage of master-slave flip flop?	[3½] [1½]
10.	a) b)	What is a universal shift register? Realise a D-flip flop using J-K flip flop.	[1½] [3½]
		P.7	Г.О→

11. a)	Write one application of counter.	[2]
b)	Realise a full subtractor using necessary multiplexers and logic gates.	[3]
12. a)	Design a code converter which will convert a XS-3 number to its binary equivalent.	[3]
D)	Derive the characteristic equation for a 1-flip flop.	[2]
13. a)	Prove that NOR gate is universal.	[3]
b)	Explain race condition.	[2]

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