

INTERNATIONAL CENTRE FOR APPLIED SCIENCES MAHE, MANIPAL B.Sc. (Applied Sciences) in Engg. End – Semester Theory Examinations – Nov./ Dec. 2020 III SEMESTER - ANALOG AND DIGITAL SYSTEM DESIGN (IMET 234) (Branch: Mechatronics)

Ti	ime: 3 Hours	Date: 30 November 2020	Max. Marks: 1	100
	 ✓ Answer any FIVE full ✓ Missing data, if any, m 	questions. ay be suitably assumed		
4 .	Minimize the entroy for			
1 A .	$\mathbf{F}(\mathbf{X} = \mathbf{X} = \mathbf{X} = \mathbf{X} = \mathbf{X}$	$\begin{array}{c} \text{from using K-map.} \\ 1 & 2 & 5 & 7 & 8 & 9 & 12 & 12 \\ \end{array}$		(10)
4.5	$F(A_1, A_2, A_3, A_4) = 2 m (1, 3, 5, 7, 8, 9, 12, 13) + 0 (14, 15).$			
1B.	Differentiate between combinational and sequential circuits.			(10)
	Explain the working of asynchronous sequential circuit with the block diagram.			
2A.	Convert the following wit	h truth table and excitation table.		
	(i) T flip-flop into	o JK flip-flop.		(10)
	(ii) JK flip-flop to	SR flip-flop.		
2B.	With the help of a block of	liagram explain the working of a 4-bit Du	al slope ADC.	(10)
3A.	Explain the working of a	4 bit R/2R ladder type DAC for the input	combinations of	
	1000, 0100, 0010 and	0001 with the help of appropriate circuit c	liagrams.	(10)
3B.	Explain the working of a D derive the output equation	Flip-flop with neat circuit diagram, truth tausing K-map.	able and also	(10)
4A.	Design a MOD – 7 asyncl	hronous counter using JK Flip flops.		(10)
4B.	Explain the working of a	Johnson counter with logic diagram, timir	ng diagram and the	()
	count table.			(10)
5A.	Implement the following Boolean function using an 8:1 multiplexer.			
	$F(A, B, C, D) = A\overline{B} + BD + \overline{B}C\overline{D}.$			
5B.	Explain the working of a Ring Counter with logic diagram, timing diagram and the			
	count table.			
6A.	Explain the working of a	2 bit binary adder with circuit diagram.		(10)

6B. Convert the following:

- (i) R =_____(ASCII code)
- (ii) $529.4610 = ___(2)$
- (iii) ABC.EF16 = ____(10)
- (iv) $42510 = ___(8)$
- (v) 1000.39062510 = (16)

7A.	Define a decoder. Explain the logic diagram of a 2 to 4 decoder with enable (E)	
	input and a truth table.	
7B.	Explain the working of an asynchronous Decade Counter.	
8A.	Draw the circuit diagram of a J-K Flip-flop using NAND gates and explain its working,	(10)
	and derive the characteristic equation using K-maps.	(10)
8B.	Describe the working of monostable multivibrator using 555 timer with internal block	
	diagram and output waveforms.	

(10)