			Reg. No.																						
MANIPAL INSTITUTE OF TECHNOLOGY (A constituent unit of MAHE, Manipal 576104)																									
III SEM B.Tech (BME) DEGREE MAKEUP EXAMINATIONS, DEC/JAN 2019-20 SUBJECT: DIGITAL ELECTRONICS (BME 2153) (REVISED CREDIT SYSTEM) Thursday, 26 th December, 2019: 8.30 am to 11.30 am.																									
														TIME: 3 HOURS							MAX. MARKS: 50				
																	Instru	iction	s to C	andid	ates:				
1. Ansv 2. Drav	ver ALL que v labeled dia	estions. grams where	ever necessar	у.																					
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1. Ansv 2. Drav 1A.	ver ALL que v labeled dia Depicting	estions. grams where he necessary	ever necessar	y. alcula	tions p	erforn	n the f	ollow	/ing:					04											

(*i*) 36 from 75 (*ii*) 98 from 72

(b) Convert into,

 $(i) (45.25)_{10} = ()_2$ $(ii) (324.32)_8 = ()_{10}$

1B. Simplify the following functions to a minimum number of literals using Boolean 03 simplifications.

$$(i) f(xyz) = (\bar{x} + xy\bar{z})(x + \bar{x}\bar{y}z) + (\bar{x} + xy\bar{z})$$

$$(ii) f(xyz) = \bar{x}\bar{y}z + y\bar{z} + \bar{x}yz + xyz$$

(*iii*)
$$f(xyz) = \overline{[\overline{x}(\overline{y} + \overline{z})(x + y + \overline{z})]}$$

- 1C. Realize a half adder and draw the circuit using only five numbers of two input NOR gates. 03
- 2A. Design and draw the circuit of 1 digit BCD adder. Explain its operation with suitable 04 examples.

- 2B Simplify the following function using Karnaugh map and realize using only NAND gates. 03 $F(ABCD) = \sum m(2,3,4,5,6,7,12,13)$
- 2C. Realize and draw the circuit of 2×4 line decoder using appropriate gates with active low 03 outputs and active low Enable line.
- 3A. Design and draw the decoder circuit for seven segment common cathode display for 04 displaying the numbers 0 to 7.
- 3B. Realize and draw the circuit of Octal to Binary Encoder using diode matrix. 03
- 3C Design and draw 8×1 Multiplexer to realize the following function. 03 $F(A, B, C, D) = \sum m(0, 1, 3, 5, 6, 7, 8, 9, 11, 12, 15$
- 4A. Realize and draw the circuit of a ROM to obtain the squares of Octal numbers (0 to7) 04
- 4B. Draw the circuit of a Master slave JK flip flop using NAND gates. Explain how the race 03 around condition is eliminated in this flip flop?
- 4C Draw the circuit of an asynchronous Decade counter using Toggle flip flops. Write the 03 count sequence and draw the timing waveforms.
- 5A. Design a synchronous counter to count the following count sequence using JK flip flops. 04 Also verify the counting with timing waveforms.
 000, 001, 011, 100, 101, 111, 000,
- 5B. Draw the circuit of a 4 bit shift register using D flip flops to operate as (i) SIPO (ii) SISO. 03Explain the operation with the appropriate truth table.
- 5C. Draw the circuit of a Mod-8 Johnson counter. List the legal and illegal count sequences. 03 Give a remedy circuit to avoid the illegal counts. Also draw the necessary decoder circuit to read the legal counts.