B. E. ELECTRICAL ENGINEERING (PART TIME) 1ST YEAR 2ND SEMESTER EXAMINATION, 2018 Subject: Electronics-II Time: 3.0 Hours Full Marks: 100

No. of questions	Answer any Five (5) question: 5×20	Marks
· ·	* e	
1.	(a) Convert the following numbers:	(5x1)+(5+5)+5
	(i) $(1100.1011)_2 = ()_{10}$	5/
	(ii) $(105.15)_{10} = ()_2$	
	(iii) $(175)_{10} = ()_8$	
	(iv) $(158)_8 = ()_{10}$	8
	(v) $(F8E6.39)_{16} = ()_2$ (b) A sequential circuit has two D flip-flops A and B, two inputs x and y, and	
	one output z. The flip-flop input equations and the circuit output are as	
	follows:	
	$D_A = x'y + x A$	
	$D_{B} = x' B + x A$	
	z = B	
	(i) Draw the logic diagram of the circuit.	
	(ii) Tabulate the state table	
	(c) Design a combinational circuit with three inputs x, y, z and three outputs	
	A, B, C. When the binary input is 0, 1, 2, or 3, binary output is one greater	9
	than the input. When the binary input is 4, 5, 6, or 7, the binary output is one	<u> </u>
	less than the input.	
2.	(a) Express the Boolean function F=XY+X'Z in a product of maxterm form.	3+4+4+(4+5)
	(b) Find out the minimal SOP expression for the function	
	$F_1 = \Sigma \text{ m } (3,4,5,7,9,13,14,15)$	*1
	(c) Find out the minimal POS expression for the function	
	$F_2 = \Sigma \text{ m } (3,4,5,7,9,13,15)$	
	(b) Given the Boolean function $F(X, Y, Z, P) = \Sigma(1, 2, 3, 4, 5, 7)$	
	Minimise this function with K-map and Implement this function using two	
207	level forms (x) NAND-AND and (y) AND-NOR	2 : 4 : (2 : 2) : 2 : 5
3.	a) What are the advantages of digital systems over the analog systems?	3+4+(2+3)+3+5
	(b) Construct a full adder circuit using all NAND Gates	
	(c) What is the function of multiplexer (MUX)? Give the example where	
	MUX is used. (d) To realize the function $E = \sum_{i=1}^{n} (0.3.5.7)$ using 3 to 1 MHV.	8
	(d) To realize the function $F = \Sigma$ m (0,3,5,7) using 2-to-1 MUX	2
	(e) Implement the function F (D, C, B, A) = $CB'A+DC'A'+D'A$ using one 4-to-1 MUX and other assorted gates.	a
4.	a) What is the function of an oscillator?	2+3+5+(3+3+2)+2
	(b) Classify the oscillators in accordance with frequency generation.	
	(c) Established the condition of oscillation for a circuit.	

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	(d) Give the circuit diagram of a <i>RC phase shift oscillator</i> using <i>OPAMP</i> . Explain how oscillation principle is satisfied in this circuit? How the frequency of oscillation is determined for such oscillator?	
**	(b) Design a <i>RC phase shift oscillator</i> for $f_0 = 300$ MHz. Given that $C = 0.001 \ \mu F$.	
5.	 (a) What do you meant by multivibrator? Distinguish between different types of multivibrators. (b) Mention the area of application of multivibrator? (c) Gives the internal circuit diagram of IC 555 and specify the components and devices are used. (d) Explain the operation of Astable multivibrator using 555 IC with necessary circuit diagram. 	(2+3)+2+5+(4+4)
6.	(a) Give the circuit diagram of a Darlington Pair transistor. Mention the special features of this pair. Show that the current gain of this pair is equal to the product of the individual transistor current gain.(b) Describe how a transistorised series voltage regulator provides a steady state output voltage against the input voltage fluctuation?	(2+2+6)+10
7.	 (a) Define ripple of a rectifier system. How it is mathematically defined? Give the circuit diagram of full wave rectifier filter circuit and show that the ripple is considerably reduced with this circuit. (b) Which configuration of bipolar transistor configuration gives the voltage gain nearly equal to 1? Give the circuit diagram and output characteristics of this configuration. Where this type of configuration is used? 	(2+2+3+5)+(1+2 +3+2)
8.	 (a) Explain the operation of a 2 input TTL NAND gate with suitable circuit diagram. (b) Explain the operation of a 2-input CMOS NOR gate with suitable circuit diagram 	10+10

^{**} The symbol ' indicates the complement.