7. a) Convert
   (i) $110101.011101_{(2)}$ to decimal
   (ii) $5678_{(10)}$ to hexadecimal. 10 L3
   b) Simplify $F = \overline{A}\,BC\overline{D} + BC\overline{D} + B\overline{C}\,\overline{D} + B\overline{C}\,D$ using Boolean algebra. 6 L3
   c) Write the truth table, Boolean expression for sum and carry output and the logic diagram for a full adder. 4 L2

8. a) Convert
   (i) $6C8_{(H)}$ to decimal. (ii) $1010110.10011_{(2)}$ to hexadecimal 10 L3
   b) Perform binary addition of
   i) 1000101 and 1010111
   ii) 15 and 18
   iii) 24 and 31 6 L3
   c) Implement XOR gate using basic gates. 4 L3

BT* Bloom's Taxonomy, L* Level; CO* Course Outcome; PO* Program Outcome

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NMAM INSTITUTE OF TECHNOLOGY, NITTE

(An Autonomous Institution affiliated to VTU, Belagavi)

First / Second Semester B.E. (Credit System) Degree Examinations

Make up / Supplementary Examinations - September 2021

20EC112 / 19EC112 / 17EC112 – BASIC ELECTRONICS

ration: 3 Hours | Max. Marks: 100

*Note: Answer any **Five full** questions.*

		Marks	BT*	CO*	PO*
a)	Explain briefly the PN Junction diode characteristics.	4	L*2	1	1
b)	Explain Zener diode voltage regulator with neat circuit diagram.	6	L2	1	1
c)	Draw the circuit diagram of RC coupled amplifier and explain the significance of each component. Draw the input and output waveform.	10	L2	2	1
a)	With a neat circuit diagram and wave forms, explain the working principle of Full wave rectifier.	8	L2	2	1
b)	Explain the circuit of CB configuration and sketch the input and output characteristics.	8	L2	2	1
c)	With the symbol and characteristics, explain the working of LED.	4	L2	1	1
a)	With a neat block diagram explain voltage series feedback concept and derive the expression for gain.	10	L3	1	1
b)	In a Colpitts oscillator L= 3mH. Calculate the value of each capacitor required to generate oscillations of 2 MHz frequency. Assume $C_1=C_2$	10	L2	1	1
a)	Explain the working principle and construction of n Channel JFET with neat symbol, circuit diagram and also draw its characteristics.	10	L2	2	1
b)	List the ideal characteristics of an OPAMP.	4	L1	3	1
c)	Design an adder using OPAMP to obtain an output voltage given by $V_o = -(0.2V_1+0.6V_2+3V_3)$. Choose $R_F = 10k\Omega$.	6	L3	3	1
a)	Distinguish between BJT and FET.	4	L2	2	1
b)	Draw and explain the transfer characteristics and drain characteristics of n-channel E-MOSFET and plot the characteristics.	10	L2	3	1
c)	In OPAMP when $V_1=0.6mV$, $V_2 = -0.7mv$, the output is 9V. When $V_1=V_2= 2$ mV, the output is 13 mV. Calculate CMRR of it in dB. The voltage V_1 is non inverting input and V_2 is inverting input of the OPAMP.	6	L3	3	1
a)	Derive an expression for output voltage of an OPAMP having configurations as (i) Non-inverting amplifier (ii) Integrator	10	L2	4	1
b)	With a neat circuit diagram explain the working principle of SCR as Two-Transistor model and its characteristics.	6	L2	4	1
c)	An IC 555 timer is configured as astable multivibrator with $R_A=R_B=10k\Omega$ and $C=0.1\mu F$. Calculate the frequency of the out waveform.	4	L3	3	1

P.T.O.