

# 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

Duration: 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 $L = 3\text{mH}$ . 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 $R_F = 10\text{k}\Omega$ .	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 $V_1 = 0.6\text{mV}$ , $V_2 = -0.7\text{mV}$ , the output is 9V. When $V_1 = V_2 = 2\text{mV}$ , 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 $R_A = R_B = 10\text{k}\Omega$ and $C = 0.1\mu\text{F}$ . Calculate the frequency of the out waveform.	4	L3	3	1

P.T.O.

7. a) Convert  
 (i)  $110101.011101_{(2)}$  to decimal  
 (ii)  $5678_{(10)}$  to hexadecimal.  
 b) Simplify  $F = \bar{A}BC\bar{D} + BC\bar{D} + B\bar{C}\bar{D} + B\bar{C}D$  using Boolean algebra.  
 c) Write the truth table, Boolean expression for sum and carry output and the logic diagram for a full adder.
8. a) Convert  
 (i)  $6C3_H$  to decimal. (ii)  $1010110.10011_{(2)}$  to hexadecimal  
 b) Perform binary addition of  
 i)  $1000101$  and  $1010111$   
 ii)  $15$  and  $18$   
 iii)  $24$  and  $31$   
 c) Implement XOR gate using basic gates.

10 L3  
 6 L3  
 4 L2

10 L3

6 L3  
 4 L3

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

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