NMAM INSTITUTE OF TECHNOLOGY, NITTE Off-Campus Centre of Nitte (Deemed to be University) I Sem B.Tech. (CBCS) Mid Semester Examinations - II, November 2022

EC1001-1 - BASIC ELECTRONICS Max. Marks: 20 **Duration: 1 Hour** Note: Answer any One full question from each Unit. PO* CO* BT* Marks Unit - I 1. a) With the help of a neat circuit diagram and waveforms, derive the expression for the output voltage of an Non-inverting amplifier 1 3 L*2 circuit using Op-Amp. Design a summer circuit using Op-Amp for the output voltage $V_o = -2 [0.1 V_1 + 0.5 V_2 + 2 V_3]$. Given the feedback 1 3 L3 resistor as 10 $k\Omega$. Draw the circuit diagram for the same. With neat circuit diagram and relevant waveforms, explain the operation of inverting comparator with negative reference 1 3 L2 6 voltage. b) For an IC timer based astable multivibrator, the duty cycle is D = 75% with f = 1 kHz, R_2 = 3.6 k Ω and C = 0.1 μ F. Calculate the 1 3 L3 4 ON period Ton and the value of R₁. Unit - II a) With the block diagram of a voltage series feedback system, 3. 1 4 L2 6 derive an expression for closed loop voltage gain. b) In a Hartley oscillator, the frequency of oscillation is 25 kHz. If 1 L3 4 $\mathcal{C}=0.02\mu F$, calculate L_1 and L_2 for 20% feedback. 4 With a neat circuit diagram explain the operation of Op- Amp RC 4. a) L2 4 1 6 phase shift oscillator. In a Colpitts oscillator, L = 5 mH. Find C_1 and C_2 if the frequency

1

4

L3

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

of oscillation is $f = 50 \, kHz$. Assume a feedback factor of 10%.

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Dι	Duration: 1 Hour EC1001-1 – BASIC ELECTRONICS			Max. Marks: 20		
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1	,	Unit – I Draw the circuit diagram of a Bridge rectifier. Explain the operation and sketch the input/output waveforms. Derive the expressions for average value of load current and RMS value of load current. For the given circuit in Fig 1. (b), find the current I and output	6	L*2	1	1
		voltage V _o . Fig. 1.(b), find the current rand output voltage V _o .	4	L3	1	1
			4	LO	•	•
2.	(a) b)	points on the graph and explain. Also draw the three types of diode equivalent circuits. A Zener voltage regulator has a source voltage of $V_s = 28 \text{ V}$ and a load resistance of $R_L = 1 \text{ k}\Omega$. The current through the series resistance is 78 mA and the reverse breakdown voltage of the	6	L2	1	1
		Zener diode is V _z = 10 V. What is the value of (i) The series resistance Rs that has to be connected in the circuit (ii) The value of the current through the Zener diode. Draw the circuit diagram for the given specifications.	4	L3	1	1
		Unit-II				
3.	a)	With a neat circuit diagram of a CE-RC coupled amplifier, explain the phase reversal concept with input/output waveforms. Briefly explain the significance of coupling and bypass				
	Tarle	capacitors.	6	L2	2	1
	b)	Find I_E , α and β of a transistor with I_C = 5.25 mA and I_B = 100 μ A. Find the new value of I_B for an I_C of 15 mA.	4	L3	2	1
4.		With neat connection diagrams, explain the operation of a n-channel JFET. Draw the drain and transfer characteristics.	6	L2		1
dri	b)	For an n-channel JFET, the drain current I_D is 2 mA when $V_{GS} = -4V$ and $V_P = -8V$. Calculate the current I_{DSS} at saturation level. What is the drain current when $V_{GS} = -2V$ for the same			2	1
		V _P ?	_ 4	L3	2	1
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