RV Educational Institutions ®
RV College of Engineering ®

Autonomous Institution Affiliated to Visvesvaraya Technological University, Belagavi

Approved by AICTE, New Delhi

Academic year 2022-2023 (Odd Sem)

DEPARTMENT OF Electronics and Communication Engineering			
Date	23/02/2023	**Maximum Marks**	60
Course Code	22ES14C	**Duration**	120 Mins
Sem	I Semester	CIE2	

PRINCIPLES OF ELECTRONICS ENGINEERING

Instructions to candidates:

i. *Part A must be answered within the first two pages of manuscript.*

ii. *Assume the suitable data for missing values*

	PART-A	M	BT	CO
1	The Slew rate of an Op-Amp is 3V/μsec with a peak value of voltage as 2V. Calculate the maximum output frequency so that the output is not distorted.	1	2	2
2	If one of the input to a 2-input EX-NOR gate is connected to 0, then it can be used to _____	1	1	1
3	The canonical sum of product form of the function y(A,B) = A + B is _____	1	2	2
4	Prove that $AB + BC + B\bar{C} = AB + B$	1	3	2
5	The gain of a voltage follower is _____	1	1	1
6	An op-Amp has a differential gain of 86dB and Common mode gain of 20dB. The CMRR in dB is _____	1	2	3
7	The minimum number of NAND gates required to realize XOR gates is _____	1	2	1
8	State the necessary and sufficient conditions to obtain sustained oscillations	2	1	1
9	In a 3 variable K-map, if all the cells contain 1's then the output is _____	1	1	1
	PART-B			
1a	Explain the operation of RC phase shift oscillator with a neat diagram and also mention the gain equation.	6	2	2
b	Prove that the stability of the gain of an amplifier improves with negative feedback by a factor (1+Aβ) where A is the open loop gain of the amplifier and β is the feedback factor.	4	3	2
2a	Simplify the logic expression using K map and implement the logic circuit using NAND Gate. $F = \sum m(0,1,2,3,,5,7,8,9,,10,12,13)$	6	4	3
2b	List at least four important characteristics of an ideal op–amp and indicate their typical values for a general purpose commercial op–amp.	4	1	1
3a	Simplify the following expressions: i. $Y = (A + B)(A + \bar{B})(\bar{A} + B)$ ii. $Y = XY + XYZ + XY\bar{Z} + \bar{X}YZ$	5	3	2
b	Design an adder circuit using an op-amp to obtain an output expression. $V_0=2(0.1\ V_1+0.5\ V_2+20\ V_3)$ where V_1, V_2, V_3 are the inputs. Assume the value of feedback resistor as 10KΩ.	5	4	4
4a	Define Slew rate and CMRR with necessary expressions	4	1	1
b	An amplifier has a gain of 50 dB. The bandwidth of 250KHz, distortion of 12%, an input impedance of 30KΩ, and an output impedance of 2KΩ. If the voltage series negative feedback of 2.9% is given to this amplifier, calculate the gain, input impedance, output impedance, bandwidth, and distortion of the amplifier with negative feedback.	6	4	3

5a	Write the truth table for SUM and CARRYOUT of a full adder. From the truth table, obtain the logic expressions for the same and then realize the full adder using 2 half adders.	6	3	3
5b	Draw the circuit of an inverting amplifier and explain the working of the same with suitable expressions	4	3	3

BT-Blooms Taxonomy, CO-Course Outcomes, M-Marks

Particulars			CO1	CO2	CO3	CO4	L1	L2	L3	L4	L5	L6
Marks Distribution	Quiz	Max Marks	5	4	1	-	5	4	1	-	-	-
	Test	Max Marks	8	15	22	5	8	6	19	17	-	-

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