Academic year 2021-2022 (Odd Sem)

DEPARTMENT OF
ELECTRONICS & COMMUNICATION ENGINEERING

Date	19th JAN 2023	Maximum Marks	60
Course Code	22ES14C	Duration	110 Min
Sem	I Semester	Test-1	

Principles of Electronics Engineering

Sl. No.	Questions PART-A	M	BT	CO
1	The values of β that correspond to α value of 0.985 and 0.992 respectively are _____ and _____.	1	2	2
2	If a PNP transistor is operating as an open switch, its base-emitter junction is _____ biased.	1	1	1
3	Three amplifiers with voltage gain of 20, 100 and 2000 are connected in cascade, the overall gain in dB = _____.	1	1	1
4	In a regulated DC power supply the output voltage drops from 12V to 11.8V when the input voltage reduces by 10%. The line regulation is__	1	3	4
5	BJT is _____ controlled device.	1	2	1
6	The lower cut off frequency of an RC coupled amplifier is 300Hz.It has a voltage gain of 70 at 300Hz and has a bandwidth of 25KHz.The mid frequency gain of the amplifier = _____.	1	3	3
7	An NPN transistor has I_{co} = 25nA, I_B = 0, V_{CE} = 4V and I_C = 20μA. The value of β is____.	1	1	2
8	In NPN transistor, if V_B = 3V, V_E = 2V, V_C = 1V, the transistor is operating in _____ region.	1	1	4
9	Three amplifiers of voltage gains 20dB, 26dB and 32dB are cascaded to obtain an output voltage of 2V. Calculate the input voltage needed.	2	2	3

Academic year 2021-2022 (Odd Sem)

Sl. No.	Questions PART-B	M	BT	CO
1.a	A full wave bridge rectifier drives a load resistance of 330Ω in parallel with a filter capacitor, C. If the ac input to the rectifier is 100sin628t, calculate the capacitor value needed so that the ripple factor is 1%. Determine the output dc voltage, peak to peak ripple voltage and the load regulation.	6	3	3
1.b	Bring out the differences between Avalanche breakdown and Zener breakdown in PN junction diodes.	4	1	2
2.a	Draw the circuit diagram of a Full wave Bridge rectifier with filter and explain its operation along with waveform.	6	2	1
2.b	Briefly explain the three regions of operation of a BJT. Draw the output characteristics of a BJT.	4	2	1
3.a	Explain the working of RC coupled amplifier with the circuit diagram. Draw its frequency response.	6	1	1
3.b	An amplifier having a power gain of 17dB delivers a power output of 40W to a load of 1KΩ. Calculate i) the input power needed and (ii) the input voltage needed, if the voltage gain of the amplifier is 38dB.	4	3	3
4.a	Three amplifier stages are cascaded with $0.05V_{p-p}$ input providing $150V_{p-p}$ output. If the voltage gain of the first stage is 20 and the input to the third stage is $15V_{p-p}$. Find i) Overall gain in dB ii) Voltage gains of 2nd and 3rd stages iii) Input voltage to the second stage	6	4	3
4.b	With a neat diagram, illustrate the operation of Regulated Power Supply.	4	1	2
5.a	Design the Zener regulator for the give specification. Vin varies from 6.6V to 9.9V R_L varies from 66Ω to 165Ω V_z=3.3V I_z(min)=10mA Pd(max)= 660mW	6	3	4
5.b	Explain the working principles of the following. i) Photodiode ii) LED	4	2	2

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

Marks Distribution	Particulars		CO1	CO2	CO3	CO4	L1	L2	L3	L4	L5	L6
	Test	Max Marks	18	15	19	8	19	14	19	6	-	-

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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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Academic year 2022-2023 (Odd Sem)

DEPARTMENT OF Electronics and Communication Engineering			
Date	March 2023	**Maximum Marks**	60
Course Code	22ES14C	**Duration**	110 Mins
Sem	I Semester	CIE 3	

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

		M	BT	CO
	PART-A			
1	Convert the binary number $(1010101)_2$ to octal.	1	1	2
2	One's complement of 1011 is _____.	1	1	1
3	The Hexadecimal equivalent of $(536)_8$ is _____.	1	2	2
4	Represent octal number $(321)_8$ and find its decimal equivalent.	1	2	2
5	In an AM system, the modulating frequency is 10KHz and the modulation index is 0.9. The required bandwidth is _____.	1	1	1
6	The total power delivered by an AM wave is 2640Watts.If the modulation index=0.8, the power in each side band=_____.	2	3	3
7	The frequency to which the incoming signal is changed in super heterodyne receiver is called_____ frequency.	1	2	1
8	In an AM modulation, a carrier signal of 1MHz is modulated by a sine wave of 600Hz and the depth of modulation is 70%. The transmission efficiency is _____.	1	2	1
9	The device which converts energy from one form to another form is called_____.	1	1	1
	PART-B			
1.a	Subtract the given number using 2's complement Method i. $(9)_{10}$-$(7)_{10}$ ii. $(3)_{10}$-$(6)_{10}$	4	2	2
b	Perform the Following: i. Convert $(475.25)_8$ to its decimal equivalent ii. Convert $(3509)_{10}$ to its hexadecimal equivalent	6	2	2
2a	What is modulation and explain the need for modulation.	5	1	3
2b	Draw the block diagram of a general communication system and explain the each block in detail.	5	3	1
3a	A carrier of 2MHz has 1kW of its power amplitude modulated with a sinusoidal signal of 2KHz. The depth of modulation is 60%. Calculate the sideband frequencies, the signal bandwidth, the power in the sidebands and the total power in the modulated wave.	5	2	2
3b	Draw the digital communication block diagram and explain the function of each block in detail.	5	3	4
4a	Differentiate between RISC and CISC architecture.	4	2	1
4b	With the help of block diagram, explain the working of super heterodyne receiver	6	3	3
5a	Explain the following with examples: i. Active Sensor ii. Passive Sensor	4	2	3
5b	Explain the working principle of the following sensors and mention its	6	1	3

	applications. i. Humidity Sensor ii. Ultrasonic Sensor		

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

Marks Distribution	Particulars		CO1	CO2	CO3	CO4	L1	L2	L3	L4	L5
	Quiz	Max Marks	5	3	2	-	4	4	2	-	-
	Test	Max Marks	11	23	16	-	16	19	15	-	-

22ES14C

USN | R | V | C | E | 2 | 2 | B | A | I | 0 | 5 | 4 |

RV COLLEGE OF ENGINEERING®

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I Semester B. E. Examinations May-2023

Common to AI / AS/ BT / CH / CS / CY / CD / EE / IM / IS / ME / CV

PRINCIPLES OF ELECTRONICS ENGINEERING (ELECTIVE)

Time: 03 Hours ***Maximum Marks: 100***

Instructions to candidates:

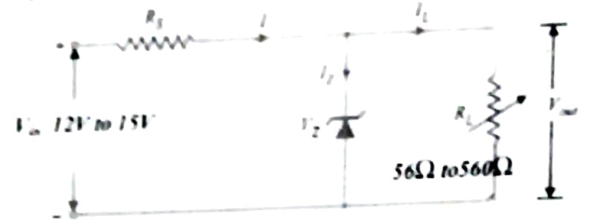
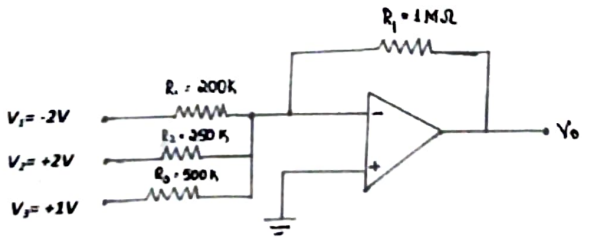
1. Answer all questions from Part A. Part A questions should be answered in first three pages of the answer book only.
2. Answer FIVE full questions from Part B. Question number 2 is compulsory. Choose any one full question from 3 or 4, 5 or 6, 7 or 8 and 9 or 10.

PART-A

1	1.1	The output voltage of a regulated DC power supply changes from $20V$ to $19.7\,V$ when the load is increased from zero to maximum. Then the load regulation is _____.	02
	1.2	A transistor amplifier connected in CE mode has the value of β as 100 and I_B as $50\mu A$, then the value of I_E and α are _____ and _____ respectively.	02
	1.3	An amplifier has a voltage gain of 100 at $1KHz$. The gain falls by $6dB$ at $1MHz$. If the input is $3mW$ at $2MHz$, then the output voltage is _____.	02
	1.4	In an RC phase shift oscillator using an ideal voltage amplifier, the frequency of oscillation is $2KHz$. If $R = 6.25\Omega$, the value of C is _____.	01
	1.5	A non-inverting amplifier using an op-amp has $R_i = 10K\Omega$ and $R_f = 40K\Omega$. The closed loop gain is _____.	01
	1.6	An operational amplifier has a differential gain of 100 and a common mode gain of 0.01.Then its $CMRR$ is _____ dB.	01
	1.7	The ones's complement of 01011 is _____.	01
	1.8	The decimal equivalent of $(321)_8$ is _____.	01
	1.9	The minimum number of NOR gates required to realize XOR gates is _____.	01
	1.10	For an AM signal, the bandwidth is $10KHz$ and the highest frequency component present is $705KHz$. The carrier frequency used for this AM signal is _____.	02
	1.11	A carrier of peak voltage $15\,V$ is used to transmit a message signal. If the modulation index is 70%, then the peak voltage of the modulating signal is _____.	01
	1.12	The carrier amplitude after AM varies between $4V$ and $1V$. The depth of modulation is _____.	01
	1.13	A $400W$ carrier is modulated to a depth of 75%. Assuming the modulating signal to be sinusoidal, the total power in the amplitude-modulated wave is _____.	01
	1.14	A part of the transducer which responds to a change in the physical phenomenon is called _____.	01

	1.15	The elements which exhibit Piezo-electric qualities are called	01
	1.16	A Hall effect transducer is used to measure a magnetic field of $0.5 wb/m^2$, Bismuth slab of $2mm$ thickness with a Hall coefficient of $1*10^{-6} Vm/(A-wb/m^2)$, and current $3A$ is used. Then the corresponding output voltage is _____.	01

PART-B

2	a	Draw the circuit of a full wave bridge rectifier and describe its working with suitable Waveforms.	06
	b	In a Zener regulator circuit shown in Fig 2b, design the value of R, so that the circuit performs satisfactorily under all given conditions. $I_{zmin} = 5mA, P_{d(max)} = 2.5\,W$ and $Vz = 5.6V$.	
			
		Fig 2b	06
	c	An amplifier having a power gain of $17dB$ delivers a power output of $40W$ to a load of $1K\Omega$. Calculate i) The input power needed ii) The input voltage needed Assume voltage gain of the amplifier is $38dB$.	04
3	a	Draw the circuit of an integrator using an op-amp and derive the expression for the output voltage.	06
	b	Calculate the output voltage of a three-input summing amplifier shown in Fig 3b	
			
		Fig 3b	06
	c	Mention any four advantages of negative feedback.	04
		OR	
4	a	Explain the operation of RC phase shift oscillator with a neat diagram and also mention the gain equation.	06
	b	Design a scaling adder circuit using an op-amp to obtain an output expression. $Vo = -(3V_1+4V_2+5V_3)$ where V_1, V_2, V_3 are the inputs. Assume the value of feedback resistor as $10K\Omega$.	05
	c	Draw the circuit of a differentiator using an op-amp. Derive the expression for the output voltage.	05

5	a	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.	05
	b	Simplify the logic expression and implement the logic circuit using *NOR* Gate. $Y = \overline{(A + \overline{B} + C)(\overline{A} + B + C)(A + B)}$	05
	c	Simplify the logic expression using *K* map and implement the logic circuit using *NAND* Gate. $F(A,B,C,D) = \Sigma m(0,1,3,5,7,8,9,11,13,15)$	06
		OR	
6	a	Simplify the logic expression and implement the logic circuit using *NAND* Gate $Y = (A + \overline{B} + C)(\overline{A} + B + \overline{C})(A + \overline{B})$	06
	b	Simplify the logic expression using *K* map and implement the logic circuit using basic Gates. $F(A,B,C,D) = \Sigma m(0,1,2,5,7,8,9,10,13,15)$	06
	c	Realize the $EX - NOR$ function using a minimum number of *NOR* gates only.	04
7	a	With the help of a neat block diagram explain the working of a Superheterodyne receiver.	06
	b	A carrier of $2MHz$ has $1KW$ of its power amplitude modulated with a sinusoidal signal of $2KHz$. The depth of modulation is 60%. Calculate the sideband frequencies, bandwidth, power in sidebands, total power, and efficiency.	06
	c	Write any four differences between Harvard and Von-Neumann *CPU* architecture.	04
		OR	
8	a	With the help of a block diagram, explain the working of a digital communication system.	06
	b	For an *AM* signal $V_{AM} = 10(1 + 0.5sin6280t)sin(62.8 \times 10^6 t)$. Calculate the sideband frequencies, bandwidth, amplitude of each sideband, Total power, and efficiency.	06
	c	List any four differences between *RISC* and *CISC*.	04
9	a	With the help of a neat diagram, discuss the working principle of *LVDT*.	08
	b	Explain the working principle of ultrasonic sensors and Humidity sensors mentioning their respective applications.	08
		OR	
10	a	Explain the working of a piezo-Electric Transducer with relevant equations.	06
	b	Briefly explain the working of capacitive transducers.	06
	c	Mention any four differences between active and passive transducers.	04