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Sri Adichunchanagiri Shikshana Trust (R.)
SJC INSTITUTE OF TECHNOLOGY
An Autonomous Institution under VTU from 2024-25
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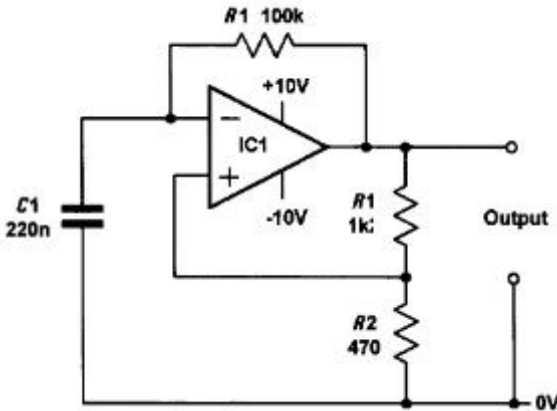
Department of ELECTRONICS AND COMMUNICATION

QUESTION BANK

COURSE TITLE	INTRODUCTION TO ELECTRONICS & COMMUNICATION		
COURSE TYPE	ESC		
COURSE CODE	1BESC104C		
ACADEMIC YEAR	2025-26	BATCH	2025-2029
SCHEME	NEP scheme (Effective from the academic year 2022 -2023)		
SEMESTER	I (AIML)		
FACULTY NAME and DESIGNATION	Dr. K. Ezhilarasan, Associate Professor		

Module -1			
Q. No.	Questions	Bloom's LL	COs
1.	Define the Following term: (i) Amplifier (ii) Rectifier	L1	CO1
2.	List the various types of amplifiers	L1	CO1
3.	Define the Following Parameter with respect to amplifier: (i) Gain (ii) input resistance (iii) output resistance	L1	CO1
4.	Define the Following term with respect to amplifier: (i) Frequency response (ii) Bandwidth (iii) Phase Shift	L1	CO1
5.	Draw the Negative Feedback Amplifier circuit and write the overall gain expression.	L1	CO1
6.	Explain half wave rectifier with all RC filter along with waveforms.	L2	CO1
7.	Explain half wave rectifier with all LC filter along with waveforms.	L2	CO1
8.	Draw the block diagram of regulated power supply and mention the functions of each block	L2	CO1
9.	Explain the various types of amplifiers.	L2	CO1
10.	Explain the voltage multiplier and interpret the output with the rectifier circuit	L2	CO1
11.	Explain the bi-phase Full Wave rectifier using center tapped transformer with input and output waveform	L2	CO1
12.	Explain the operation of Full Wave bridge rectifier with input and output waveform	L2	CO1

13	Illustrate the multistage amplifier with the various coupling device	L2	CO1
14	Explain the following in brief with respect to amplifier (i) Gain (ii) input and output resistance (iii) frequency response (iv) Bandwidth (v) Phase shift (vi) Negative feedback	L2	CO1
15	An amplifier produces an output voltage of 2.5 V for an input of 60 mV. If the input and output currents in this condition are, respectively, 5 mA and 220 mA, determine: (a) the voltage gain (b) current gain	L3	CO2
16	Compute the overall gain of negative feedback amplifier with a suitable block diagram.	L3	CO2
17	Make use of Zener voltage regulator and find the series resistance	L3	CO1
18	A mains transformer having a turn's ratio of 20:1 is connected to a 240 V r.m.s. mains supply. If the secondary output is applied to a half-wave rectifier, determine the peak voltage that will appear across a load.	L3	CO2
19	The R-C smoothing filter in 50 Hz mains operated half-wave rectifier circuit consists of $R_1 = 150 \Omega$ and $C_2 = 470 \mu F$. If 0.8 V of ripple appears at the input of the circuit, determine the amount of ripple appearing at the output.	L3	CO2
20	The L-C smoothing filter in 50 Hz mains operated half-wave rectifier circuit consists of $L_1 = 12 H$ and $C_2 = 1,200 \mu F$. If 1.5 V of ripple appears at the input of the circuit, determine the amount of ripple appearing at the output.	L3	CO2
21	A 7.5V Zener diode has a maximum rated power dissipation of 800 mW. If the diode is to be used in a simple regulator circuit to supply a regulated 7.5 V to a load having a resistance of 600Ω , determine a suitable value of series resistor for operation in conjunction with a supply of 12 V.	L3	CO2
22	Determine the voltage gain, input with feedback for Negative feedback amplifier having $A = -100$, $R_i = 10 k\Omega$ for feedback of (a) $\beta = -0.1$ and (b) $\beta = -0.5$.	L3	CO2
23	An amplifier produces an output voltage of 2.5 V for an input of 60 mV. If the input and output currents in this condition are, respectively, 5 mA and 220 mA, determine the (i) voltage gain (ii) current gain	L3	CO2
24	A half-wave rectifier is fitted with an R-C and L-C smoothing filter comprising $R = 200 \Omega$ and $C = 50 \mu F$. If 2 V of 400 Hz ripple appear at the input of the circuit, determine the amount of ripple appearing at the output and discuss the output.	L4	CO2
25	Analyze the output waveform of a half-wave rectifier and discuss how the ripple voltage can be minimized. What role does the filter capacitor play in this process?	L4	CO1

Module -2			
Q. No.	Questions	Bloom's LL	COs
1	Define operational amplifier and how it can work as a comparator.	L1	CO1
2	What is an Oscillator? List the conditions for sustained oscillations.	L1	CO1
3	Mention the ideal and practical characteristics of Op-Amp.	L1	CO1
4	Summarize the applications of Op-Amp as (i) Voltage follower (ii) Differentiator and (iii) Integrator (iv) Comparator (v) Summing amplifier	L2	CO1
5	Explain the operation of three-stage ladder RC network oscillator with neat circuit diagram.	L2	CO1
6	Explain Wein bridge oscillator with a neat circuit diagram	L2	CO1
7	Explain crystal-controlled oscillator.	L2	CO1
8	A perfect rectangular pulse is applied to the input of an operational amplifier. If it takes 8 μ s for the output voltage to change from -10 V to +10 V, determine the slew rate of the device.	L3	CO2
9	Construct the circuit of an inverting amplifier based on an operational amplifier. Label your circuit and identify the components that determine the closed-loop voltage gain.	L3	CO1
10	An operational amplifier with negative feedback applied produces an output of 1.5 V when an input of 7.5 mV is present. Determine the closed-loop voltage gain.	L3	CO2
11	With block diagram explain the positive feedback and write the equation for overall gain.	L3	CO1
12	An amplifier with a gain of 8 has 10% of its output fed back to the input. Determine the gain of the stage (a) with negative feedback, (b) with positive feedback.	L3	CO2
13	Determine the periodic time and frequency of the output signal produced by the oscillator circuit shown in below figure. 	L3	CO1
14	Determine the peak-peak voltage developed across C1 in the oscillator circuit shown below.	L3	CO1

15	Build a comparator using Op-amp and explain the operation with suitable waveforms.	L3	CO1
16	During measurements on an operational amplifier under open-loop conditions, an output voltage of 12 V is produced by an input voltage of 1 mV. Determine the open-loop voltage gain expressed in dB.	L3	CO1
17	An operational amplifier has an input resistance of 10MΩ. Determine the input current when an input voltage of 6 mV is present.	L3	CO1
18	Estimate the value of output voltage for the summing amplifier shown below.	L5	CO1
19	Explain the single stage astable oscillator with a neat diagram and also compute the Time constant.	L2	CO1

Module -3 Boolean Algebra and Logic Circuits, Combinational logic			
Q. No.	Questions	Bloom's LL	COs
1.	Subtract using 2's and 10's Complement method for the following i) $(101110100-10100100)_2$ ii) $(8751 - 9432)_{10}$	L3	CO2
2.	Subtract the complement method for the following i) $(4456.65 - 3434.74)_{10}$ using 10's complement ii) $(10110 - 11010)_2$ using 2's complement	L3	CO2
3.	Convert the following numbers to their equivalent number and show the steps. (i) $(10110001101011.11110010)_2 = (?)_8$	L3	CO2

	(ii) $(10110.011)_2 = (?)_{10}$ (iii) $(864.952)_{10} = (?)_8$		
4.	Convert the following and show the steps. i) $(10110011010111.111100110)_2 = (?)_{16}$ ii) $(111101.011)_2 = (?)_{10}$ iii) $(2835.815)_{10} = (?)_8$	L3	CO2
5.	Convert the following and show the steps. i) $(981.6875)_{10} = (?)_2$ ii) $(10110001101011.11110010)_2 = (?)_{16}$ iii) $(675.897)_2 = (?)_2$	L3	CO2
6.	State and Prove De-morgan's theorem for two input variables	L2	CO2
7.	Analyze and prove De-Morgan's Theorem for 3 variables with its truth table and logic diagram	L4	CO2
8.	Classify the following laws of Boolean Algebra with examples i) Commutative Law ii) Distributive Law iii) Associative Law	L4	CO2
9.	Categorize the following laws of Boolean Algebra with examples i) Distributive Law ii) Absorption Law iii) Associative Law	L4	CO2
10.	Express the following using Canonical form. i) $F1 = A + \overline{B}C$ in a minterms form ii) $F2 = (X+\overline{Y})(X+Z)$ in a max terms form	L2	CO2
11.	Simplify the following expressions using Boolean algebra and also draw the logic diagram i) $F1 = (A + \overline{B}C)(\overline{A}B + \overline{C})$ ii) $F2 = (\overline{A+B})(\overline{A+C})(\overline{B+C})$	L4	CO2
12.	Simplify the following Boolean expression and prove LHS= RHS by using the truth table. i) $(X + Y)(X + Z) = X + YZ$ ii) $XY + XZ + Y\overline{Z} = XZ + Y\overline{Z}$	L4	CO2
13.	Construct Half Adder and Obtain the expression for Sum and carry	L3	CO2
14.	Construct the Full Adder with its logic diagram and deduce the expression for Sum and carry, with its truth table, logic diagram.	L3	CO2
15.	Construct Full adder with two half adders, write the equation for Sum, and Carry with its truth table and draw its logic diagram	L3	CO2
16.	Examine the clocked SR flip-flop with a logic diagram, truth table and Characteristic table and Equation.	L4	CO2
17.	Examine the D flip-flop with a logic diagram, truth table and Characteristic table and Equation.	L4	CO2
18.	Construct the clocked JK flip flop with logic diagram, truth table and Characteristic table and Equation.	L4	CO2
19.	Construct the clocked T flip-flop with a logic diagram, truth table and Characteristic table and Equation.	L4	CO2
20.	Explain the NOR & NAND based latch.	L2	CO2

21.	Write the symbol and truth table for 2 input NAND, NOR, XOR and XNOR	L1	CO2
22.	Write the symbol and truth table for 2 input AND, OR and NOT	L1	CO2

Module -4			
Q. No.	Questions	Bloom's LL	COs
1.	Discuss the Major applications areas of embedded systems with an example	L2	CO3
2.	Mention some of the major applications of embedded systems with an example.	L2	CO3
3.	Define Embedded Systems. Classify embedded systems in detail.	L2	CO3
4.	Classify embedded systems based on generation and deterministic behavior.	L2	CO3
5.	Compare Embedded and general computing systems	L4	CO3
6.	Compare RISC and CISC processor	L4	CO3
7.	Distinguish between microprocessor and microcontroller	L4	CO3
8.	Comprehend the elements of embedded system with a neat diagram. (OR) Explain the elements of the embedded system with a neat block diagram.	L2	CO3
9.	Classify the various embedded system units and communication protocols in automotive applications.	L4	CO3
10.	Explain the operation of the washing machine with a functional block diagram (OR) Investigate the operation of the washing machine using a functional block diagram.	L2	CO3
11.	Discuss the Key Players of the Automotive Embedded Market in detail	L2	CO3
12.	Discuss the key players in the automotive embedded market in silicon and tool and platform providers.	L2	CO3
13.	Discuss the different types of communication protocols employed in automotive domains	L2	CO3

Module -5			
Q. No.	Questions	Bloom's LL	COs
1	Explain the Modern communication system with a neat block diagram (OR) Explain the Elements of communication system in detail	L2	CO4
2	What is Modulation? Explain the need of Modulation	L2	CO4

3	Discuss the block diagram of Analog Transmitter section	L2	CO4
4	Sketch the waveform for Amplitude Modulation and discuss	L3	CO4
5	Discuss the block diagram of Analog Receiver section	L2	CO4
6	Sketch the waveform for Frequency Modulation and discuss	L3	CO4
7	Explain the different types of channels used in the communication system with an example.	L2	CO4
8	What Multiplexing? Explain the different types of multiplexing in the analog communication	L2	CO4
9	Discuss the followings with respect to communication (i) Noise (ii) Multiplexing (iii) Transducer	L2	CO4
10	Analyze various digital modulation techniques used in digital communication and sketch the waveforms.	L4	CO4
11	Analyze the various radio propagation based on ground, sky, and space waves.	L4	CO4
12	Explain and sketch the waveform for AM and FM waveforms.	L2	CO4
13	Sketch the waveform for digital modulation techniques for the message data stream 11001100	L3	CO4
14	List the advantages of digital communication over analog communication.	L4	CO4
15	Discuss the various types of multiple access (FDMA, TDMA, and CDMA) in digital communication.	L2	CO4
16	Define the followings (i) Communication (ii) Frequency modulation (iii) Amplitude modulation	L1	CO4

Note:

- Questions shall be framed by consolidating comprehensively from the following sources
 - Exercise problems of text books/ references
 - Previous year question VTU exam Question paper. (Mark the year/exam beside the question)
 - Questions by Experts during Interview/Academic Audit
 - Internet sources/ other Universities examination question papers.
 - Own / experience.
 - Gate questions mentioning the year.
- Questions shall follow all the Bloom's learning levels with appropriate action verbs
- There shall be a total of minimum 50 questions considering minimum 10 questions from each module, of which, 3 questions each at L1 and L2, 2 questions at L3, 1 question each at L4 and L5/L6.
- Ensure the coverage of all COs.