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ELECTRONICS

Paper : III

(CBCS Scheme 2020-21 onwards)

**Time : 3 Hours**

Maximum Marks : 70

PART-A

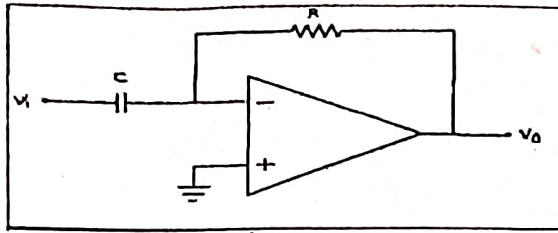
Answer all the sub divisions.

(15×1=15)

- 1.
- i) In monolithic ICs components are fabricated by _____ process.
 - a) Evaporation.
 - b) Sputtering.
 - c) Diffusion
 - d) Oxidation.
 - ii) Which one of the following is the ideal characteristics of an Op-Amp?
 - a) Input resistance is zero
 - b) Output resistance is zero.
 - c) Open loop gain is zero
 - d) None of these
 - iii) Slew rate of Practical Op-Amp IC 741 is _____.
 - a) $0.5\text{V}/\mu\text{s}$
 - b) $1\text{V}/\mu\text{s}$
 - c) 0.5V/ms
 - d) 1V/ms
 - iv) The supply voltage of $\pm 15\text{ V}$ is applied to an Op-Amp, the maximum peak to peak output voltage is approximately :
 - a) 0V
 - b) $+12\text{V}$
 - c) -15V
 - d) 30V

[P.T.O.]

v) Identify the given circuit :



- a) Differentiator.
 - b) Integrator.
 - c) Voltage follower
 - d) Summing amplifier.
- vi) Schmitt trigger circuit is used to _____.
- a) Generate triangular waves.
 - b) Convert sine wave to cosine wave.
 - c) Convert any periodic waveform to rectangular wave.
 - d) Convert any periodic waveform to sinewave.
- vii) Unity gain amplifier using Op-Amp is also called as :
- a) Comparator.
 - b) Integrator.
 - c) Voltage follower.
 - d) Difference amplifier.
- viii) Band pass filter has.
- a) Two stop band and one pass band
 - b) One stop band and one pass band
 - c) Two stop band and two pass band
 - d) Only pass band.
- ix) An instrumentation amplifier has a high.
- a) Output impedance.
 - b) Power gain.
 - c) CMRR.
 - d) Supply voltage.
- x) The Wein bridge oscillator using Op-Amp makes use of _____.
- a) RC Phase shift network.
 - b) Inverting amplifier.
 - c) Non-inverting amplifier.
 - d) Voltage follower.
- xi) The resolution of 8 bit ADC/DAC is
- a) 562
 - b) 256
 - c) 625
 - d) 265



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- xii) Maximum number of elements in the array declaration `int[5][8]` is :
- a) 16
 - b) 40
 - c) `strlen32`
 - d) 35
- xiii) Which of the following string function is used to join the two strings?
- a) `strcpy ()`
 - b) `strcmp ()`
 - c) `strlen ()`
 - d) `strcat ()`
- xiv) Which of the following is a collection of different data types?
- a) `string`.
 - b) `array`.
 - c) `structure`
 - d) `files`
- xv) A Pointer is
- a) A keyword used to create variable
 - b) A variable that store address of Instruction.
 - c) A variable that store address of other variable.
 - d) All the above.

PART - B

Answer any five question.

(5×7=35)

2. a) Classify Integrated circuits based on scale of integration.
b) Draw the Block diagram of an Op-Amp and explain the function of each block. (3+4)
3. a) Mention ideal characteristics of an Op-Amp.
b) With the circuit, obtain the expression for the output voltage of an Op-Amp integrator. (2+5)
4. a) Draw the circuit of a subtractor circuit using Op-Amp.
b) With a circuit diagram, explain the working of a First - order low pass filter. Write the expression for voltage gain and cut - off frequency. (2+5)
5. Draw the circuit diagram of RC Phase shift Oscillator and explain its working. Write the expression for frequency of Oscillator. (7)
6. a) Mention the types of PCB design.
b) Explain the steps involved in fabrication of PCB. (2+5)

[P.T.O.]



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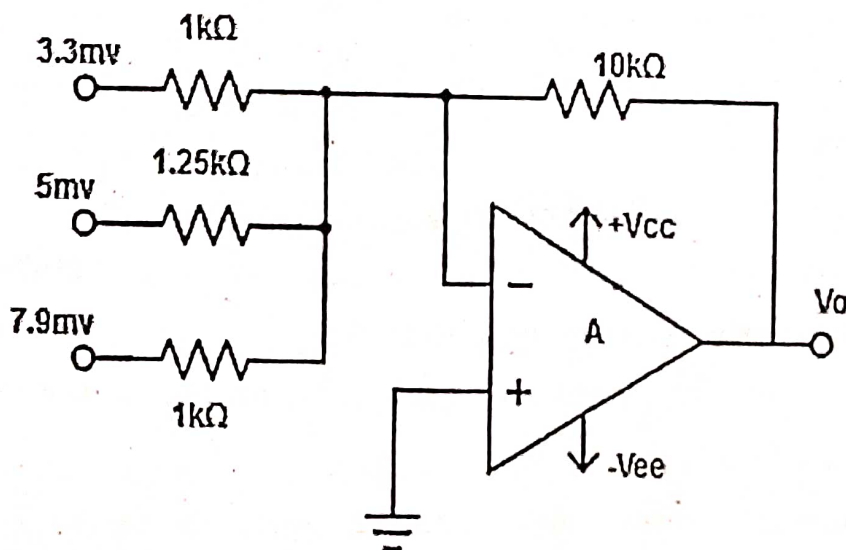
7. a) Explain the following library functions in C.
- i) `printf()`
 - ii) `scanf()`
 - iii) `sqrt()`
 - iv) `getch()`
- b) What is an array? How to access array elements in C? (4+3)
8. a) With an example, explain switch statement in C.
- b) Differentiate break and continue statement with an example. (3+4)
9. Explain how to initialize structure variables with an example. (7)

PART - C

Answer any Four questions.

(4×5=20)

10. Determine the output voltage of the given circuit. Name the circuit.



11. Design and draw a circuit diagram of a high pass filter for a cut - off frequency of 10KHz with a pass band gain of 4. Assume $R_f = 5K\Omega$, $C = 0.01\mu F$.
12. Write a short note on single sided and double sided PCBs.
13. Write a C program to generate Fibonacci series up to limit N.
14. Write a C program to calculate factorial of a given number.
15. Write a C program to find transpose of a given matrix.



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III Semester B.Sc. Degree Examination, April - 2022

ELECTRONICS

Linear Integrated Circuits and "C" - Programming

(CBCS Scheme Repeaters 2018-19 onwards)

Paper : III



Time : 3 Hours

Maximum Marks : 70

Instructions to Candidates:

Answer all questions from Part A, any five questions from Part B & any four from Part -C. Answer all questions part A in one page, same question answered multiple times will not be considered.

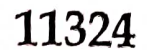
PART -A

Answer all the subdivisions.

(15×1=15)

1. i. Integrated circuits are generally made of _____
 - a. Silicon
 - b. Germanium
 - c. Copper
 - d. None of these
- ii. Slew rate of IC 741 operational amplifiers is around :
 - a. $0.5 \text{ V}/\mu\text{s}$
 - b. $1 \text{ V}/\mu\text{s}$
 - c. 0.5 V/ms
 - d. 1 V/ms
- iii. A certain non-inverting amplifier has R_i of $1 \text{ K}\Omega$ and R_f of $100 \text{ K}\Omega$. The closed-loop voltage gain is :
 - a. 100,000
 - b. 1000
 - c. 101
 - d. 100
- iv. When a square wave is applied to an Integrator circuit, output will be :
 - a. cosine wave
 - b. sine wave
 - c. triangular wave
 - d. spike waveform
- v. An OPAMP Wien Bridge Oscillator employs :
 - a. Positive feedback
 - b. Negative feedback
 - c. Both Positive and Negative feedback
 - d. None of the above

[P.T.O.]



The diagram shows a Zener diode connected in series with a load resistor. The input voltage is 10V, and the output voltage is 5V.

- a. 10V
 - b. 5V
 - c. -5V
 - d. 50V
- vii. Instrumentation amplifier is an extension of :
- a. Inverting amplifier
 - b. Non-inverting amplifier
 - c. Summing amplifier
 - d. Difference amplifier
- viii. Which multivibrator is referred as one - shot multivibrator?
- a. Astable
 - b. Monostable
 - c. Bistable
 - d. Both (a) and (b)
- ix. In the standard library of C programming language, clrscr() is a member function of which of the following header file?
- a. conio.h
 - b. stdio.h
 - c. ctype.h
 - d. math.h
- x. Identify the wrong keyword in C:
- a. void
 - b. goto
 - c. var
 - d. long
- xi. What is the output of this statement "printf("%d", a++),"?
- a. The value of (a+1)
 - b. The value of (a+2)
 - c. Current value of a
 - d. Error message.
- xii. Which of the following string function is used to join the two strings?
- a. strcpy
 - b. strcmp
 - c. strlen
 - d. strcat
- xiii. Which of the following operator takes only integer operand?
- a. +
 - b. *
 - c. /
 - d. %



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- xiv. The process in which a function calls itself directly or indirectly is called?
- a. Recursion
 - b. Precedence
 - c. Associativity
 - d. Union
- xv. Which operator connects the structure name to its member name?
- a. logical operator (&&)
 - b. dot operator (.)
 - c. pointer operator (&)
 - d. Arrow operator (->)

PART - B

Answer any five question.

(5×7=35)

2. a) Explain the terms Epitaxial growth and Oxidation with respect to the fabrication of a Monolithic IC.
- b) Describe with relevant diagrams, steps involved in the fabrication of a monolithic IC by considering an NPN transistor. (2+5)
3. a) Mention any four ideal characteristics of an OPAMP.
- b) Draw the circuit of an inverting OPAMP and derive an expression for the voltage gain.
4. a) Sketch a labelled frequency response characteristics of low pass and high pass filter.
- b) Draw the circuit diagram and explain the working of a Schmitt trigger. (2+5)
5. Draw the circuit diagram of Astable Multivibrator. Explain its working and draw the relevant waveforms. (7)
6. a) Explain the different datatypes used in C language.
- b) Explain the following functions in C language : getch (), clrscr (), sqrt (). (4+3)
7. Explain the following operators in C language with an example for each.
- a) Logical operators.
 - b) Relational operators.
 - c) Conditional operator. (7)
8. a) Write the syntax of for loop statement and explain its working with an example.
- b) Explain break and continue statement in C language. (3+4)
9. a) What is structure in C? Write the syntax for defining a structure and give an example.
- b) What is a union? How does it differ from structure. (4+3)

[P.T.O.]



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PART - C

Answer any Four questions.

(4×5=20)

10. Design and draw an inverting adder using an OPAMP to satisfy the output expression $V_{out} = -(V_1 + 2V_2 + 4V_3)$. Assume $R_f = 10K\Omega$.
 11. Design and draw a circuit diagram of a high pass filter for a cut - off frequency of 10KHz with a pass band gain of 4. Assume $C = 0.01\mu F$.
 12. An OPAMP Wien Bridge Oscillator uses $R = 4.7K\Omega$, $C = 0.01\mu F$. Determine frequency of oscillations. Calculate R_f if $R_1 = 2.2K\Omega$. Draw the circuit diagram.
 13. Write a C program to find minimum and maximum of N.
 14. Write a C program to generate Prime numbers up to an integer N.
 15. Write a C program to find GCD of two integer number.
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