

(S2)-321

SECTION - B

2. Find the Fourier coefficients of $x(t) = 1 + \sin 2\omega t + 2\cos 2\omega t + \cos(3\omega t + \pi/3)$.
3. State and prove convolution property of Laplace transform and then using this property, find Laplace transform of

$$\frac{s}{(s+1)(s+2)}$$

4. Find even and odd component of the following signals :

(i) $x(t) = \cos t + \sin t + \cos t \sin t$

(ii) $x(n) = \{1, 2, 1, 4, 5, 0, 3\}$

5. Discuss combinational probability and probability distribution function.
6. Obtain the trigonometric Fourier series for the half wave rectified sinewave.

SECTION - C

7. (i) What is the periodicity of $x(t) = e^{j100\pi t} + 30^\circ$
- (ii) Find the fundamental period of the signal $x(n) = 3e^{j3\pi(n+1/2)}$
- (iii) Is the system described by the equation $y(t) = x(2t)$ Time invariant or not? Why?
- (iv) What is the period T of the signal $x(t) = 2\cos(n/4)$?
8. Find the Fourier Transform of Rectangular pulse. Sketch the signal and Fourier transform.
9. Find the inverse Laplace transform of given function by using convolution theorem
 - (i) $x(s) = 1/(s^2 + a^2)^2$
 - (ii) $x(s) = s/(s+1)(s+2)$

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ECE / ETE) (Sem.-4)

DATA STRUCTURE AND ALGORITHMS

Subject Code : BTCS-301-18

M.Code : 77567

Date of Examination: 05-05-2025

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION - A

1. Write briefly :

a) Define asymptotic notation and give an example.

b) What is meant by "time space trade – off" in algorithm analysis?

c) What does LIFO stand for and how does it relate to stacks?

d) Define a circular queue and explain its advantage over a simple queue.

e) What is the role of a header node in a linked list?

f) How does a circular linked list differ from a singly linked list?

g) Define the term "height" of a tree. Illustrate.

h) What is the purpose of an AVL tree and how does it differ from a regular binary search tree?

i) How does bubble sort differ from selection sort in terms of approach?

j) What is hashing and why is it used in data structures?

SECTION - B

2. Describe the difference between Depth-First Search (DFS) and Breadth-First Search (BFS) in graph traversal. Include diagrams to illustrate both methods.
3. Outline the applications of binary trees in computing, providing examples where they are commonly used.
4. What is a doubly linked list? Explain how it supports bi-directional traversal and list the advantages over a singly linked list.
5. Discuss the basic operations on a circular queue with their algorithms. How does it prevent the overflow issue seen in simple queues?
6. What is a self-referential data structure? Explain how pointers are used to create such structures with an example in C++.

SECTION - C

7. Describe the operations on different types of queues (simple queue, circular queue and priority queue) in detail. For each type, explain the algorithm for insertion and deletion, discuss the complexity of these operations and provide examples with diagrams to visualize the process.
8. Write in detail about the concept and operations of a circular linked list. Describe the algorithms for insertion, deletion and traversal in a circular linked list, including the complexity analysis. Provide diagrams for each operation to show how the circular nature impacts the data structure's handling and efficiency.
9. Explain the structure and operations of an AVL tree. Write the algorithms for insertion and deletion, and discuss how the tree remains balanced through rotations. Include a complexity analysis and diagrams to illustrate various rotation scenarios (single and double rotations) to maintain balance.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(ECE / ETE) (Sem.-4)

ANALOG CIRCUITS

Subject Code: BTEC-401-18

M.Code: 77565

Date of Examination : 02-06-2025

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION - A

1. Write briefly:

- a) Compare BJT and FET amplifier.
- b) What do you mean by quiescent point of a transistor amplifier? Explain.
- c) Define I_{CBO} and I_{CEO} . HOW are they different? Discuss.
- d) Define harmonic distortion.
- e) List the various advantages CE amplifier
- f) Discuss the Barkhausen criterion w.r.t oscillators.
- g) Define Gain Margin.
- h) List the various advantages of negative feedback.
- i) List the various advantages of a power amplifier.
- j) What do you mean by the term efficiency? Discuss.

SECTION - B

2. Drive the expressions for the stability factors of a self-bias circuit. Hence discuss the choice of the circuit parameters for better stability w.r.t I_{CO} , V_{BE} and β .
3. The open loop gain of the amplifier changes by 20 percent due to change in the parameters of the active amplifying device. If a change of gain by 2 percent is allowable, what type of feedback has to be applied? If the amplifier gain with feedback is 10, find the minimum value of the feedback ratio and open loop gain.
4. Discuss the working principle of a Wein-Bridge Oscillator using its circuit diagram.
5. Draw and explain the circuit diagrams of class A power amplifiers in detail.
6. What do you mean by distortion in amplifiers? Discuss the origin of input and the output nonlinear distortions in transistor amplifiers. What is the desired position of the Q point for the minimum distortion and why?

SECTION - C

7. Explain the following :-
 - a) Colpitts oscillator
 - b) Multistage amplifier
8. Explain :-
 - a) Most commonly transistor amplifier.
 - b) Current shunt feedback
9. Discuss :-
 - a) Diode circuits
 - b) Class AB power amplifier

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Total No. of Questions : 09

MICROPROCESSORS AND MICROCONTROLLERS

Subject Code : BTEC-402-18

M.Code : 77566

Date of Examination : 06-06-2025

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
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3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION - A

1. Write briefly :

- What is the need of interrupts? Discuss.
- What do you mean by subroutine? What is its need?
- Discuss the function of HOLD and HLDA signals in 8085.
- What do you mean by cache memory? Discuss.
- Discuss how port 1 Pin configuration is different from Port 2 Pin configuration in 8051.
- What is the function of ANL C, bit instruction? Explain by considering an example.
- List the important properties of SRAM.
- Discuss the importance of flags in microcontrollers.
- Differentiate between LCALL and ACALL instructions.
- What do you mean by interfacing? Discuss.

SECTION - B

2. Compare in brief :
- Microprocessor and Microcontroller
 - SRAM and DRAM
3. Draw the flow chart and write a program using 8085 instructions to add all the six bytes of data are stored in a memory location starting at XX50H. Use register B to save any carries generated. Display the entire sum at two output ports.
4. What do you mean by an Instruction? Discuss the classification of instructions by considering suitable examples in 8085 microprocessor.
5. Write a program that continuously gets 8-bit from P0 and sends it to PI while simultaneously creating a square wave of 200 μ s period on pinP2.1. Use timer 0 to create the square wave. Assume that XTAL = 11.0592 MHz.
6. Write a program to interface LCD with microcontroller. Describe briefly the logic being used with the help of connection diagram.

SECTION - C

7. Draw the block diagram and explain the function of each block of 8085 microprocessor architecture in detail.
8. Discuss :-
- Comparison of RISC and CISC architecture.
 - Addressing modes of 8051 with examples.
9. Explain :-
- Stepper motor interfacing with 8051.
 - Memory organization in 8051.

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