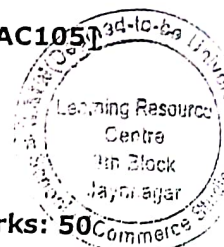# FIRST SEMESTER UNIVERSITY EXAMINATION, DECEMBER 2022

## ADVANCED COMPUTER ARCHITECTURE

Time: 03 HOURS

Maximum Marks: 50

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### SECTION – A

1. Answer any FOUR of the following questions.                                    4×5=20

   a. Discuss three and two address instruction with an example.

   b. Express $(55)_{10}$, $(-55)_{10}$ and $-(29)_{10}$ in 8 bit binary two's complement form.

   c. Differentiate between synchronous and asynchronous bus.

   d. Appraise the process of data dependencies.

   e. Elaborate pipelining process and issues.

### SECTION – B

2. Answer any TWO of the following questions.                                     2×9=18

   a. Articulate super scalar operations with suitable diagram.

   b. Find out X, Y and Z: **(i)** $(49.95)_{10}=X_{16}$, **(ii)** $(7B.2C)_{16}=Y_{10}$, **(iii)** $(1101100)_2=(Z)_{10}$

   c. Elaborate I/O processor with suitable diagram.

### SECTION – C

3. Answer the following question.                                                 12 Marks
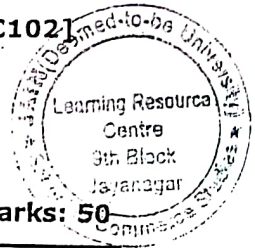
   a.  i. Explain distributed shared memory architecture with suitable diagram.   (6)

      ii. Articulate SISD architecture with diagram.                              (6)

## FIRST SEMESTER UNIVERSITY EXAMINATION, DECEMBER 2022

### ADVANCED COMPUTER NETWORKS

Time: 03 HOURS

Maximum Marks: 50

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### SECTION – A

1. **Answer any FOUR of the following questions.**                                   4×5=20

   a.   Write short notes on twisted pair transmission medium.

   b.   List the various error detection techniques. Explain parity check method.

   c.   Explain briefly the usage of ICMP Query messages.

   d.   Elaborate in detail the segmentation and reassembly in TCP.

   e.   What are the categories of web documents? Discuss briefly.

### SECTION – B

2. **Answer any TWO of the following questions.**                                   2×9=18

   a.   List the types of microwaves used in transmission. How microwaves are used for transmission?

   b.   Explain the Ethernet frame format with diagram. List the advantages of Ethernet.

   c.   Describe the forwarding of IP packets based on destination address.

### SECTION – C

3. **Answer the following question.**                                                12 Marks

   a.   i.   Describe the various phases of SMTP operation.                          (06)

        ii.  Why do we need MIME? Justify.                                          (06)

[22MCAC103]

**FIRST SEMESTER UNIVERSITY EXAMINATION, DECEMBER 2022**

**ADVANCED OPERATING SYSTEMS USING LINUX**

Time: 03 HOURS

Maximum Marks: 50

## SECTION – A

1. Answer any FOUR of the following questions.        4×5=20
   - a. Define interrupts. Explain its types with examples.
   - b. Discuss some characteristics of real-time operating system.
   - c. What is android? Give some examples of android applications.
   - d. Explain the UNIX architecture with neat diagram.
   - e. Write a shell script to find whether a given number is even or odd.

## SECTION – B

2. Answer any TWO of the following questions.        2×9=18
   - a. Explain the following commands with options and examples:
     - i. passwd
     - ii. mkdir
     - iii. more
     - iv. ls
   - b. Discuss the Basic Model of Real-Time Systems with a neat diagram.
   - c. i. Define Context switch and Bounded-buffer.
     - ii. Consider the following example where processes name and burst time are given where all processes arrival time is 0 (zero), draw the Gantt chart and calculate the average waiting time of processes using the Shortest Job First scheduling algorithm.

| Process | Burst time |
|---------|------------|
| P1 | 24 |
| P2 | 3 |
| P3 | 3 |

## SECTION – C

3. Answer the following question.        12 Marks
   - a. i. Write a shell script which will greet you "Good Morning"," Good Afternoon", "Good Evening' and "Good Night" according to current time. (6)
     - ii. Consider the set of processes whose arrival and burst time are given below, calculate the average waiting time and turnaround time using FCFS algorithm. (6)

| Process ID | Arrival time | Burst Time |
|------------|--------------|------------|
| P1 | 4 | 5 |
| P2 | 6 | 4 |
| P3 | 0 | 3 |
| P4 | 6 | 2 |
| P5 | 5 | 4 |

Reg. No. ☐☐☐☐☐☐☐☐☐☐

[22MCAC1041]
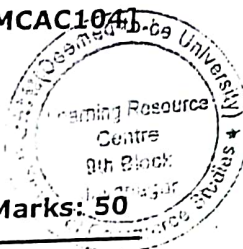
# FIRST SEMESTER UNIVERSITY EXAMINATION, DECEMBER 2022

## MATHEMATICAL FOUNDATION FOR COMPUTER APPLICATIONS

Time: 03 HOURS                                                                 Maximum Marks: 50

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### SECTION – A

1. **Answer any FOUR of the following questions.**                          4×5=20

   a. Draw the Hasse diagram for divisibility on the set
      i. $\{1, 2, 3, 4, 5, 6, 7, 8\}$.
      ii. $\{1, 2, 3, 5, 7, 11, 13\}$.
      iii. $\{1, 2, 3, 6, 12, 24, 36, 48\}$.
      iv. $\{1, 2, 4, 8, 16, 32, 64\}$.

   b. Show that $(p \wedge q) \to (p \vee q)$ is a tautology.

   c. A palindrome is a string whose reversal is identical to the string. How many bit strings of length n are palindromes?

   d. If the degree sequence of the simple graph G is 4, 3, 3, 2, 2, what is the degree sequence of 1G?

   e. A coin is tossed twice, determine the probability that at least one tail occurs?

### SECTION – B

2. **Answer any TWO of the following questions.**                           2×9=18

   a. Let R be the relation on the set of ordered pairs of positive integers such that $((a, b), (c, d)) \in R$ if and only if $a + d = b + c$. Show that R is an equivalence relation.

   b. Construct a combinatorial circuit using inverters, OR gates, and AND gates that produces the output $(p \wedge 1r) \vee (1q \wedge r)$ from input bits p, q, and r.

   c. Solve the recurrence relation $a_n = 6a_{n-1} - 11a_{n-2} + 6a_{n-3}$ with the initial conditions $a_0 = 2$, $a_1 = 5$, and $a_2 = 15$.

### SECTION – C

3. **Answer the following question.**                                       12 Marks

   a. i. Let G be a connected planar simple graph with e edges and v vertices. Let r be the number of regions in a planar representation of G. Then using mathematical induction prove that $r = e - v + 2$.                     (5)

   ii. Of the students in a college, it is known that 60% reside in hostel and 40% are day scholars (not residing in hostel). Previous year results report that 30% of all students who reside in hostel attain A grade and 20% of day scholars attain A grade in their annual examination. At the end of the year, one student is chosen at random from the college and he has an A grade, what is the probability that the student is a hostlier?                 (7)