

Code: MCA23A102

ST. PHILOMENA'S COLLEGE (AUTONOMOUS), MYSURU
I Semester MCA C1 Internal Assessment – April 2024

Title of the Paper: **Operating System and Linux**

Time: 75 minutes

Maximum Marks: 30

Answer any SIX questions

6 × 5 = 30

1. What is cache memory? Briefly explain the design issues of cache memory.
2. What are the five major activities of an operating system in regard to file management?
3. List five services provided by an operating system. Explain how each provides convenience to the users.
4. Define Process. What common events lead to the creation of a process?
5. Explain the categories of system programs.
6. What is multiprocessor system? Explain its types and advantages.
7. Briefly explain the IO communication techniques.
8. Explain the concept of batch systems and multiprogrammed systems.

Code: MCA23A202

ST. PHILOMENA'S COLLEGE (AUTONOMOUS), MYSURU
I Semester MCA C1 Internal Assessment – April 2024

Title of the Paper: Business Systems

Time: 75 minutes

Maximum Marks: 30

Answer any SIX questions

6 × 5 = 30

1. Define an information system. Provide three real-world examples of information systems.
2. Explain the conceptual framework with a figure.
3. Describe the fundamental roles of information systems in business, including a figure.
4. Discuss the types of information systems, accompanied by a figure.
5. Elaborate on the development of information system solutions.
6. What are the challenges of IT Careers?
7. Define a system and explain system characteristics in detail.
8. Provide a detailed explanation of information system resources.

Code: MCA23A101

ST. PHILOMENA'S COLLEGE (AUTONOMOUS), MYSURU

I Semester MCA C1 Internal Assessment – April 2024

Title of the Paper: Data Structures and Problem Solving in C

Time: 75 minutes

Maximum Marks: 30

Answer any SIX questions

 $6 \times 5 = 30$

1. Explain the basic structure of a C program.
2. Define controlled statements. Explain nested if-else and continue statements with syntax and provide an example for each.
3. Define an array. How is an array represented? How many types of arrays do we have?
4. Explain call by value and call by reference with examples.
5. Define a pointer. How do you declare and initialize a pointer?
6. Explain ADT in detail.
7. Explain calloc and realloc with examples.
8. Define a stack. Explain push, pop and display operations in stacks with syntax.

St. Philomena's College (Autonomous), Mysore
Department of MCA

I Semester - C1 Component IA Test April - 2024

Subject: Computer organization & Architecture

Date : 18th April 2024

Time : 1:30 – 2:45 pm Duration : 75 Minutes

Max. Marks: 30

PART A Answer any Three of the following

6X3=18

- 1a. Represent the Decimal number 8620 in i) BCD ii) Excess -3 iii) 2421
iv) Binary
- 1b. What is duality principle ? Explain with an example .
2. Perform subtraction for the following binary numbers using i) 2's complement
ii) 1's complement. Check the answer by straight subtraction.
a) $11010 - 1101$ b) $100 - 110000$
3. Simplify the following Boolean function to the specified number of literals.
i) $[(CD)' + A]' + A + CD + AB$ 3 Literals
ii) State & prove De-morgan's laws
4. Express the following function in sum of minterms & product of maxterms
 $F(A,B,C,D) = D(A' + B) + B'D$
5. Simplify the Boolean function to get both SOP & POS using K MAP
 $F = \Sigma (0,1,2,8,12,13,14) + dc(3,5,10,15)$

PART B Answer any 1

9 marks

6. What is Decimal adder ? Explain the design & implementation of Decimal adder
Clearly explaining the equation required for correction ?
7. Design & implement 4 bit magnitude comparator using Algorithmic procedure &
general standard notations.

COMPULSORY

8. What is MUX ? Explain the principle of operation of 4:1 MUX 3 marks

St. Philomena's College (Autonomous), Mysore

Department of MCA

I Semester - C1 Component IA Test April - 2024

Subject: Mathematical Foundations for Computer Science

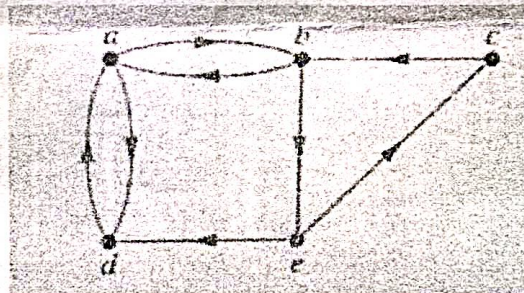
Time: 75 Minutes

Max. Marks: 30

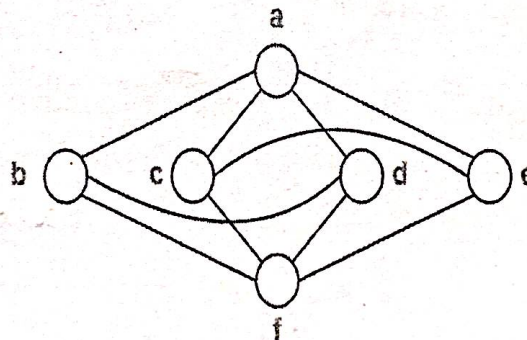
I. Answer any SIX of the following

6X5=30

1. If $A = \{1, 2, 3, 4\}$, $B = \{2, 5\}$ and $C = \{3, 4, 7\}$, determine $A \times B$; $B \times A$; $A \cup (B \times C)$; $(A \cup B) \times C$; $(A \times C) \cup (B \times C)$; Is $A \times B = B \times A$?
2. Define injective, surjective and bijective functions with example.
3. Find the indegrees and outdegrees of the vertices of the digraph shown below.



4. Find the chromatic number of the following graph.



St. Philomena's College (Autonomous), Mysore

Department of MCA

I Semester - C1 Component IA Test

Subject: Computer Networks

Date : 18th April 2024

Time: 10 – 11:15 am **Duration :** 75 Minutes

Max. Marks: 30

PART A Answer any four of the following

5x4 = 20

1. What is data communication? Explain the characteristics of a data communication system?
2. Define network topology ? Explain any four network topologies with one advantage & one disadvantage.
3. What is protocol layering ? What is it's need ? Explain the principles of layering with diagrams ?
4. What is addressing? Explain clearly the different types of addresses used in TCP/IP protocol suite with a neat diagram.
5. Define the following :
 - i) Period ii) Frequency iii) Wavelength iv) Bitrate
6. What is Transmission impairment ? List & explain the causes in brief.

PART B Answer any two of the following

7.
 - i) A color image uses 16 bit to represent a pixel. What is the maximum number of colors that can be represented? 2
 - ii) For n devices in a network what is the number of cables & I/O PORTS required in Mesh , Ring and Star topologies ? 3
8.
 - a) What is the phase shift for the following ? 3
 - i) Sine wave with MAX amplitude at time 0 ii) A Sine wave with MAX amplitude after 3/4 cycle & increasing iii) A Sine wave with MAX amplitude after 1/4 cycle
 - b) The frequency & amplitudes of sine waves are given below. Plot both time & frequency domain representations. i) Frequency 3 , 8v ii) Frequency 6 ,12v iii) Frequency 9 ,15v 2
9.
 - a) What is the bit rate for each of the following signals ? 3
 - i) A signal in which 1 bit lasts .001s ii) A signal in which 1 bit lasts 2ms
 - iii) A signal in which 10 bit lasts 20 Microsecs.
 - b) If the peak voltage value of a signal is 20 times the peak voltage of the noise , what is SNR & SNR in Db 2