Reg. No. | | | | | | | | | | |

Repeater

[22MCAC105]

FIRST SEMESTER UNIVERSITY EXAMINATION, APRIL/MAY 2023

ADVANCED COMPUTER ARCHITECTURE

Time: 03 HOURS **Maximum Marks: 50**

SECTION – A

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

a. Describe the following addressing modes with example.

i. Direct and Indirect addressing mode.

ii. Relative and index addressing mode.

b. Find out the following conversions:

i. $(111011.101)_2=(?)_{10}$,

ii. $(7526.245)_{10}=(?)_2$

c. Briefly explain about memory address map in main memory.

d. Articulate Instruction Level Parallelism with example

e. Appraise Flynn categories of parallel architectures.

SECTION – B

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

a. Illustrate about Data Manipulation Instructions with examples.

b. What is the advantage of a DMA controller? Elaborate it with suitable diagram.

c. Appraise dynamic branch prediction with suitable diagrams.

SECTION – C

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

a. **i.** Find the product of -7_{10} and 6_{10} using booth's algorithm and explain it. **(6)**

ii. Briefly explain about data hazards and its solution. **(6)**

Reg. No. | | | | | | | | | | |

[22MCAC102]

FIRST SEMESTER UNIVERSITY EXAMINATION, APRIL/MAY 2023

ADVANCED COMPUTER NETWORKS

Time: 03 HOURS **Maximum Marks: 50**

SECTION – A

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

a. What are the types of transmission modes? Explain briefly.

b. Describe the operation of ARP Protocol.

c. List and explain the services offered by the network layer.

d. Draw UDP datagram format and explain its fields

e. How do we establish remote login? Explain briefly.

SECTION – B

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

a. Compare LAN, WAN and MAN.

b. How is the Cyclic Redundancy Check method used for error detection? Explain with an appropriate example.

c. How do you find the shortest path using Dijkstra's algorithm? Explain it.

SECTION – C

3. Answer the following question. 12 Marks

a. **i.** Describe the working principle of E-mail system. (06)

ii. Why do need domain name system? Justify. (06)

Reg. No. | | | | | | | | | | |

[22MCAC103]

FIRST SEMESTER UNIVERSITY EXAMINATION, APRIL/MAY 2023

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. Explain the process of priority-based scheduling.

b. Describe the structure of the file system in the operating system.

c. List out some advantages and disadvantages of the iOS operating system.

d. Write a command to create two files within a new directory and execute a command to display a list of files or directory with all properties along with inode number. Also write the output.

e. Write a shell script to get the age from the user and tell "you are eligible for vote" if they are exceeding 18 years, tell "you are eligible for vote as well as to compete in the election", in else part display "you are not eligible for vote "and "you are not eligible to compete in the election".

SECTION – B

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

a. Mention different scheduling algorithms and explain the shortest job first and priority-based scheduling algorithm.

b. Write a short note on memory management and file system in operating system.

c. Describe the features of android. Give some examples of android applications.

SECTION – C

3. Answer the following question. 12 Marks

a. Discuss the following concepts with respect to the Linux system

i. Kernel module (4)

ii. Process Management (4)

iii. Interprocess communication (4)

Reg. No. | | | | | | | | | | |

[20MCAC105]

FIRST SEMESTER UNIVERSITY EXAMINATION, APRIL/MAY 2023

MATHEMATICAL FOUNDATION FOR COMPUTER APPLICATIONS

Time: 03 Hours **Maximum Marks:70**

Note: Answer any FIVE full questions. **5 x 14=70**

1.	a.	Find the power set of each of these sets, i) {a} ii) {∅, {∅}}	02
	b.	State and prove De Morgan' theorem in Set Theory.	05
	c.	Use Warshall's algorithm to find the transitive closures of the relation on the set {1, 2, 3, 4, 5} containing the ordered pairs (1, 3), (2, 4), (3, 1), (3, 5), (4, 3), (5, 1),(5, 2), and (5, 4).	07
2.	a.	What is equivalence relation?	02
	b.	Define Partial Order Relation with example.	05
	c.	What is bijective function? Prove that f: R-> R, f(x) =3x+5 is bijective function. Also find inverse off.	07
3.	a.	Define Proposition with example.	02
	b.	What are tautology, contradiction and contingency in logic? Describe these concepts with examples.	05
	c.	Show that the premises "It is not sunny this afternoon and it is colder than yesterday," "We will go swimming only if it is sunny," "If we do not go swimming, then we will take a canoe trip," and "If we take a canoe trip, then we will be home by sunset" lead to the conclusion "We will be home by sunset."	07
4.	a.	How many ways are there to select five players from a 10-member tennis team to make a trip to a match at another school?	02
	b.	Describe Multiplication and Addition Principles of Counting with examples.	05
	c.	How many solutions are there to the equation? $x1 + x2 + x3 + x4 = 17$, where x1, x2, x3, and x4 are nonnegative integers?	07
5.	a.	State pigeonhole principle.	02
	b.	What is the solution of the recurrence relation $an = an-1 + 2an-2$ with $a0 = 2$ and $a1 = 7$?	05
	c.	Using Mathematical induction, prove that binomial theorem for positive integer index.	07

6.	a.	What is Graph? Define degree of a vertex in given graph.	02
	b.	State Handshaking Theorem in graph theorem. Explain this theorem using example.	05
	c.	What is planar graph? State Euler's theorem for planar graph. Verify this theorem to take 3 examples.	07
7.	a.	What is Histogram? Explain it with an example.	02
	b.	Find the Arithmetic Mean, Geometric Mean and Harmonic Mean of the data 2,3,5,6,2,.	05
	c.	Find Variance and Coefficient of Variation of the following data: 20,13,24,20,30.	07
8.	a.	What is transportation problem? Describe it in brief.	02
	b.	Explain North-West Corner Method and Matrix Method of Transportation Problem.	05
	c.	Explain Assignment Problem with an example.	07

Reg. No. | | | | | | | | | | |

[22MCAC104]

FIRST SEMESTER UNIVERSITY EXAMINATION, APRIL/MAY 2023

MATHEMATICAL FOUNDATION FOR COMPUTER APPLICATIONS

Time: 03 HOURS

Maximum Marks: 50

SECTION – A

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

a. Determine whether each of these functions is a bijection from R to R.
   i. $f(x) = -3x + 4$
   ii. $f(x) = -3x^2 + 7$

b. Explain the converse, contrapositive, and inverse of each of these conditional.

c. Prove that using Mathematical Induction 2 divides $n^2 + n$ whenever n is a positive integer.

d. Can a simple graph have 5 vertices and 12 edges? If so, draw it; if not, explain why it is not possible to have such a graph.

e. The probability that a student will pass the final examination in both English and Hindi is 0.5 and the probability of passing neither is 0.1. If the probability of passing the English examination is 0.75, what is the probability of passing the Hindi examination?

SECTION – B

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

a. Show that the relation R consisting of all pairs (x, y) such that x and y are bit strings of length three or more that agree in their first three bits is an equivalence relation on the set of all bit strings of length three or more. Also find al equivalence class.

b. Explain Disjunctive Syllogism and prove it.

c. Use generating functions to determine the number of different ways 12 identical action figures can be given to five children so that each child receives at most three action figures.

SECTION – C

3. Answer the following question. 12 Marks

a. i. An urn contains 5 red and 5 black balls. A ball is drawn at random, its colour is noted and is returned to the urn. Moreover, 2 additional balls of the colour drawn are put in the urn and then a ball is drawn at random. What is the probability that the second ball is red? (6)

   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? (6)

Reg. No. | | | | | | | | | | |

[22MCAC101]

FIRST SEMESTER UNIVERSITY EXAMINATION, APRIL/MAY 2023

OBJECT ORIENTED PROGRAMMING USING JAVA

Time: 03 HOURS **Maximum Marks: 50**

SECTION – A

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

a. Why do constructors not have any return type? Demonstrate it with a proper example.

b. How does finally block differ from finalize() method?

c. Differentiate between a Choice and a List with examples.

d. Which containers use a border layout as their default layout in Swing? Explain.

e. List the core interfaces of the Hibernate framework.

SECTION – B

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

a. Describe the benefits of inheritance. Sketch the various forms of inheritance with suitable code segments.

b. Compose the various techniques to handle Exceptions in Java. Assess with examples.

c. What is the difference between **'invokeAndWait'** and **'invokeLater'** in Java?

SECTION – C

3. Answer the following question. 12 Marks

a. i. Develop Hibernate application to manage product details like insert, update, delete and display from database using HQL. (06)

ii. Write a program to implement annotations in Hibernate. (06)