

**MASTER OF COMPUTER APPLICATIONS DEGREE EXAMINATION,
AUGUST - 2021**

FIRST SEMESTER

Paper MCA 101 : DISCRETE MATHEMATICAL STRUCTURES

(Under C.B.C.S Revised Regulations w.e.f. 2020 - 2021)

(Common Paper to University and all Affiliated Colleges)

Time : 3 Hours

Max. Marks : 70

PART - A

(Compulsory)

Answer any **FIVE** of the following Questions. Each Question carries 2 marks. (5×2=10)

1.
 - a) Write about Propositional Logic and its operations in detail.
 - b) Prove that $\sqrt{2}$ is irrational by giving a proof by contradiction.
 - c) Write about Strong Induction with an example.
 - d) Write about Well-Formed Formulae in Propositional Logic.
 - e) How many one- to one functions are there from a set with m elements to one with n elements?
 - f) Write about the Subtraction Rule with an example.
 - g) What is the solution of the recurrence relation $a_n = a_{n-1} + 2a_{n-2}$ with $a_0 = 2$ and $a_1 = 7$?
 - h) Give a formula for the number of elements in the union of four sets.
 - i) Write about Ore's Theorem with proof.
 - j) Write about Connected Components. G with an example.

PART - B

Answer any **ONE** full question from **each** Unit. Each Question carries **12** marks.

(5×12=60)

UNIT - I

2. i) Construct truth table for $(P \wedge Q) \vee (\neg P \wedge Q) \vee (P \wedge \neg Q) \vee (\neg P \wedge \neg Q)$.
ii) Obtain the principal conjunctive normal formula for S, which is given by $(\neg P \rightarrow Q) \wedge (Q \rightleftharpoons P)$.

(OR)

- 3 i) Write about Rule of Inference? Show that S V R tautologically implied by $(P \vee Q) \wedge (P \rightarrow R) \wedge (Q \rightarrow S)$.
ii) Give a direct proof that if m and n are both perfect squares, then nm is also a perfect square. (An integer a is a perfect square if there is an integer b such that $a = b^2$).

UNIT - II

4. i) Use mathematical induction to show that $1 + 2 + 2^2 + \dots + 2^n = 2^{n+1} - 1$ for all non-negative integers n.
ii) Write about Recursively Defined Function in detail and Give a recursive definition of $\sum_{k=0}^n a_k$.

(OR)

5. i) Use structural induction to prove that $l(xy) = l(x) + l(y)$, where x and y belong to Σ^* , the set of strings over the alphabet.
ii) Write about Recursive Algorithms and Give a recursive algorithm for computing the greatest common divisor of two nonnegative integers a and b with $a < b$.

UNIT - III

6. i) Write about Pigeonhole Principle in detail? Show that how many cards must be selected from a standard deck of 52 cards to guarantee that at least three cards of the same suit are chosen?
ii) During a month with 30 days, a baseball team plays at least one game a day, but no more than 45 games. Show that there must be a period of some number of consecutive days during which the team must play exactly 14 games.

(OR)

7. i) Write about Binomial Theorem and What is the coefficient of $x^{12}y^{13}$ in the expansion of $(2x-3y)^{25}$?
- ii) Prove that the number of different permutations of n objects, where there are n_1 indistinguishable objects of type 1, n_2 indistinguishable objects of type 2, ..., and n_k indistinguishable objects of type k , is $\frac{n!}{n_1!n_2!\dots n_k!}$.

UNIT - IV

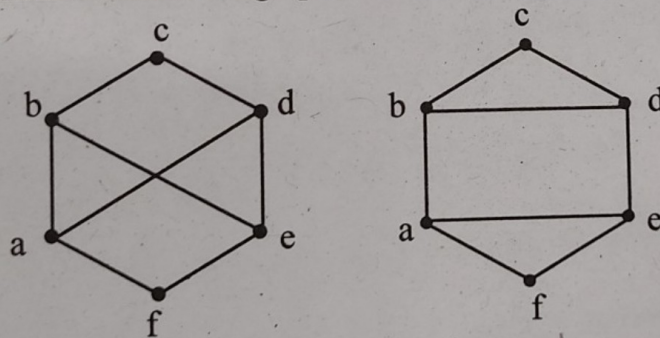
8. i) Find a recurrence relation and give initial conditions for the number of bit strings of length n that do not have two consecutive 0s. How many such bit strings are there of length five?
- ii) Find all solutions of the recurrence relation $a_n = 5a_{n-1} - 6a_{n-2} + 7^n$.

(OR)

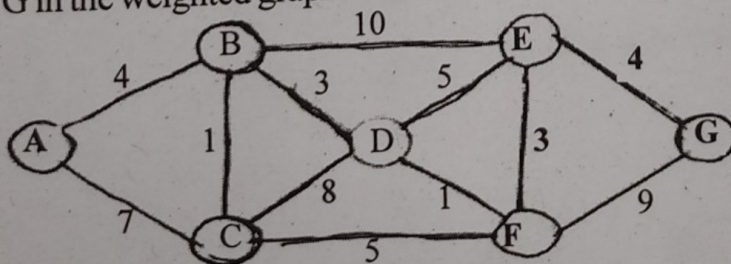
9. i) Discuss about Divide-and-Conquer Recurrence Relation. And give a big-O estimate for the number of comparisons used by a binary search using Master Theorem.
- ii) Solve the recurrence relation $a_k = 3a_{k-1}$ for $k = 1, 2, 3, \dots$ and initial condition $a_0 = 2$.

UNIT - V

10. i) Determine whether the graphs G and H shown in isomorphic.



- ii) Use Dijkstra's algorithm to find the length of a shortest path between the vertices A and G in the weighted graph shown below.

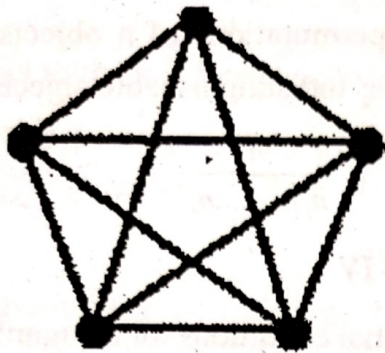


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(OR)

11. i) Determine whether the graph G shown below is planar graph or not.



- ii) Write about Graph Coloring and show how can the final exams at a university be scheduled so that no student has two exams at the same time?

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MASTER OF COMPUTER APPLICATIONS DEGREE EXAMINATION, AUGUST, 2021
FIRST SEMESTER

Paper - MCA102 : OBJECT ORIENTED PROGRAMMING WITH JAVA

(Under C.B.C.S Revised Regulations w.e.f. 2020 - 2021)

(Common Paper to University and all Affiliated Colleges)

Time : 3 Hours

Max. Marks : 70

PART - A

(Compulsory)

Answer any **FIVE** of the following Questions. Each Question carries **2** marks. (5×2=10)

1.
 - a) Why java is important to internet. Explain?
 - b) What are the uses of the keyword super in Java?
 - c) What is meant by checked exceptions? Explain with example.
 - d) Which method is used to obtain a thread status? Give an example.
 - e) Write a program to accept number from user and convert into binary by using wrapper class methods.
 - f) Discuss about Bit set class in detail.
 - g) Give the AWT hierarchy and list out event sources.
 - h) Why do applet classes need to be declared as public? Explain.
 - i) Discuss about Instance Methods in detail.
 - j) Write about Socket programming in details.

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(1)

[P.T.O.]

PART - B

Answer any ONE full question from each Unit. Each Question carries 12 marks. (5×12=60)

UNIT - I

2. i) Explain about the OOP concepts:
- i) Classes and objects.
 - ii) Inheritance
- ii) Explain the data types available in Java.

(OR)

- 3 i) What is meant by constructors? Explain overloading of constructors.
- ii) Write about Final with inheritance with an example program.

UNIT - II

4. i) Discuss the role of packages in Java and how packages are used in Java with an.
- ii) What is an exception? Explain various types of exceptions.

(OR)

5. i) Write a java program that creates a thread by extending the thread class.
- ii) Define multithreading. Explain with an example of an application that needs multithreading.

UNIT - III

6. i) Write about Boolean class in detail by explaining with an appropriate example.
- ii) Write about Stack and write a java program to implement Stack using Arrays.

(OR)

7. i) Write a short note on byte stream and character stream.
- ii) Describe the various methods defined by input stream and output stream.

UNIT - IV

8. i) Explain about the ways to create an applet with example.
ii) How to pass parameters to an applet? Explain with an example.

(OR)

9. i) Write java program to create main menu and drawing rectangle.
ii) Write a short note on delegation event model.

UNIT - V

10. i) Write about Internet Address class and methods with an example program.
ii) With an example program briefly explain about Client-Server interconnection in detail.

(OR)

11. i) Explain the basic steps in developing JDBC applications.
ii) Explain about the procedure of preparing SQL statements in detail.
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**MASTER OF COMPUTER APPLICATIONS DEGREE EXAMINATION,
AUGUST - 2021**

FIRST SEMESTER

Paper - MCA 103 : COMPUTER ORGANIZATION

(Under C.B.C.S. Revised Regulations w.e.f. 2020-2021)

(Common Paper to University and all Affiliated Colleges)

Time : 3 Hours

Max. Marks : 70

PART - A

(Compulsory)

Answer any **FIVE** of the following Questions. Each Question carries **2** marks. ($5 \times 2 = 10$)

1.
 - a) Write a short notes on Counters.
 - b) Define SR-Flip-Flops with circuit diagram.
 - c) Explain memory reference instructions with example.
 - d) List out Main Memory operations in Computer organization.
 - e) Explain Asynchronous Data Transfer.
 - f) What is the use of a Priority Interrupt?
 - g) Explain Virtual Memory And its advantages.
 - h) Describe cache mapping techniques.
 - i) Describe Data Hazards briefly.
 - j) Write short notes on Hardware control.

PART - B

Answer any **ONE** full question from each Unit. Each Question carries **12** marks.

(5×12=60)

UNIT - I

2. i) Draw and implement Decoders and Shift registers?
ii) What is multiprocessor system? Explain the advantages of multi processors over Uniprocessors?

(OR)

3. i) Draw and Explain the block diagram of simple computer with functional units?
ii) Explain the organization of registers?

UNIT - II

4. i) Define and explain Instruction Format and its types.
ii) Explain micro instruction sequencing in detail?

(OR)

5. i) What is instruction cycle? Briefly explain with the help of state diagram.
ii) What is an Addressing Mode? Explain any three Addressing Modes with example.

UNIT - III

6. i) With a neat sketch explain the working principle of DMA.
ii) Discuss about strobe control with a neat diagram.

(OR)

7. i) What is interrupt? Give the steps for handling interrupt?
ii) What are handshaking signals? Explain the handshake control of data transfer during input and output operation?

UNIT - IV

8. i) Design fast adder and explain its function?
ii) What are memory management requirements? Explain.

(OR)

9. i) Describe booth multiplication algorithm with example.
ii) Explain about integer division.

UNIT - V

10. i) Describe the steps involved in the execution of a complete instruction.
ii) How to improve system performance? Explain.

(OR)

11. i) Explain the basic organization of Micro programmed control unit?
ii) What is a Pipeline? Explain the four stages of Pipeline with its instruction execution steps and hardware organization.

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**MASTER OF COMPUTER APPLICATIONS DEGREE EXAMINATION,
AUGUST - 2021**

FIRST SEMESTER

Paper - MCA 104: OPERATING SYSTEMS

(Under C.B.C.S. Revised Regulations w.e.f. 2020-2021)

(Common Paper to University and all Affiliated Colleges)

Time : 3 Hours

Max. Marks : 70

PART - A

(Compulsory)

Answer any **FIVE** of the following Questions. Each Question carries 2 marks. $(5 \times 2 = 10)$

1. a) Explain Computer System Operation.
- b) What are Virtual Machines? Give a brief explanation.
- c) Write a brief note on Scheduling criteria to compare CPU scheduling algorithms.
- d) How to recover from a Deadlock? Explain.
- e) Define Swapping and Thrashing.
- f) What is meant by File recovery?
- g) Write a brief note on I/O Hardware.
- h) List out the steps in DMA transfer.
- i) What are the Advantages of Linux systems?
- j) What is meant by User Authentication? What is its importance?

PART - B

Answer any **ONE** full question from **each** Unit. Each Question carries 12 marks.

$(5 \times 12 = 60)$

UNIT - I

2. Explain Operating System Components and Services in detail.

(OR)

3. i) Describe the Operations on Processes.
- ii) Briefly explain about Multithreading Models.

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(1)

[P.T.O.]

UNIT - II

4. Describe any two of CPU Scheduling algorithms in detail with example.

(OR)

5. What is a Critical Section Problem? Explain a Dining Philosophers Problem. Write a Monitor solution to the Dining Philosopher Problem with necessary explanation.

UNIT - III

6. What is meant by Virtual Memory? Explain in detail about Demand Paging and the steps in handling a Page fault in Demand Paging.

(OR)

7. Elaborate on various File Access Methods with advantages and disadvantages of each.

UNIT - IV

8. Describe in detail about Kernel I/O substem.

(OR)

9. Explain about Disk Management with necessary illustrations.

UNIT - V

10. Elaborate on Program Threats and System Threats.

(OR)

11. Describe about File Systems in Linux environment.

MASTER OF COMPUTER APPLICATIONS DEGREE

EXAMINATION - AUGUST, 2021

FIRST SEMESTER

Paper MCA 105A: ACCOUNTING AND FINANCIAL MANAGEMENT

(Under C.B.C.S Revised Regulations w.e.f. 2020-2021)

(Common Paper to University and all Affiliated colleges)

Time : 3 Hours

Max. Marks : 70

PART - A

(Compulsory)

Answer any **FIVE** of the following Questions. Each Question carries **2** marks. **(5×2=10)**

1. a) What is accounting equation?
- b) State the importance of Ledger.
- c) Define the concept of cost accounting.
- d) Cost Centre
- e) Quick assets
- f) Solvency ratios
- g) Reorder quantity
- h) Permanent working capital.
- i) Budgetary control
- j) Forecast

PART - B

Answer any **ONE** full question from each Unit. Each Question carries **12** marks

(5×12=60)

UNIT - I

2. i) What is financial accounting? Write a note on the importance of Financial Accounting.
- ii) How many branches are there in accounting? Discuss.

(OR)

3. i) Explain the 'Accounting Cycle'.
- ii) What are the differences between the Journal and Ledger?

UNIT - II

4. i) Describe the objectives of cost accounting.
ii) What are the elements of cost? Explain with examples.

(OR)

5. i) What are the advantages of cost accounting?
ii) Explain cost-volume profit analysis.

UNIT - III

6. i) What is ratio analysis? Explain the significance of ratio analysis.
ii) From the following details, prepare statement of Proprietor's Fund:

- a) Stock velocity 6 times
- b) Debtors's velocity 2 months
- c) Capital turnover 2 times
- d) Creditor's velocity 73 days
- e) Fixed assets turnover 4 times
- f) Gross profit Ratio 20 %

Gross profit was Rs.60,000. Reserves and surplus amounted to Rs.20,000. Closing Stock was Rs.5,000 in excess of opening stock.

(OR)

7. i) How do you classify ratios? Explain with examples.
ii) Current ratio = 2.5; quick ratio = 1.5; operating capital = Rs.30,000, Calculate the stock value.

UNIT - IV

8. i) Enumerate the cardinal principles of working capital management.
ii) What is weighted average method?

(OR)

9. i) Discuss the technique of forecasting working capital requirements of a firm.
ii) Are the gross and net concepts of working capital exclusive? Explain.

UNIT - V

10. i) What is flexible budget? Explain.
ii) Distinguish between budgeting and budgetary control.

(OR)

11. i) State the essentials of a good budgetary control system.
ii) Explain the latest developments in the field of budgeting and budgetary control.
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MASTER OF COMPUTER APPLICATIONS DEGREE EXAMINATION

APRIL/MAY - 2023

FIRST SEMESTER

Paper: MCA 105A: ACCOUNTING AND FINANCIAL MANAGEMENT

(Under C.B.C.S Revised Regulations w.e.f. 2020-2021)

(Common paper to University and all Affiliated Colleges)

Time : 3 Hours

Max. Marks : 70

PART - A (Compulsory)

Answer any FIVE of the following questions. Each question carries 2 marks.

(5×2=10)

1. a) ✓ Concept of financial Accounting.
- b) ✓ Trading Account
- c) ✓ Definition of cost Accounting.
- d) Nature of cost Accounting.
- e) Optional capital structure.
- f) ✓ Liquidity Ratio
- g) Fixed capital
- h) ✓ Concept of working capital
- i) Budgetary control
- j) Zero Based Budgeting.

PART - B

Answer any ONE full questions from each Unit. Each question carries 12 marks.

(5×12=60)

UNIT-I

2. ✓ i) Examine the significance of financial Accounting
- ii) Enter the following transactions in the journal of priyanka for the month of march 2006.

2006	Rs.
Jan 1 Started business with cash	40,000
Jan 1 Paid into bank	20,000
Jan 2 Goods purchased for cash	15000
Jan 3 Purchase furniture and payment made by cheque	5000
Jan 5 Sold goods for cash.	8500
Jan 8 Sold goods to Vinay Krishna	4000
Jan 10 Goods Purchased From Ravi	7000
Jan 12 Goods returned to Ravi	1000
Jan 18 Cash Received from vinay	2500
Jan 21 With drawn from Bank for personal use	1000

(OR)

3. i) Explain about various branches of Accounting in brief.
- ii) The following are the balances of Sri Gupta as on 30th June 2006. Prepare final Accounts.

Particulars	Dr	Cr
Cash in hand	540	
Cash at bank	2630	
Purchases	40675	
Insurance	600	
Returns inward	680	
Wages	8480	
patents	7500	
Salaries	15000	
General Expenses	3000	
Drawings	5245	
Fuel & Power	4730	

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Carriage on Sales	3200
Carriage on Purchases	2040
Stock (1st July 2005)	5760
Buildings	22000
Free hold land	10000
Machinery	20000
Investments	10000
Debtors	14500
Sales	98780
Return outwards	500
Capital	62000
Creditors	6300
Rent	9000
	1,76,580
	1,76,580

Adjustments:-

- a) Stock on hand on 30-6-2006 is Rs. 6800/-
- b) Provide Depreciation on machinery @10% and patents @20%
- c) Salaries out standing Rs. 1500/-
- d) Insurance includes premium of Rs. 170/- on a policy expiring on 31-12-2006
- e) Bad Debts Rs. 725/-, rent received in advance Rs. 1000/-
- f) Interest on Investments of Rs. 2000 is accrued.

UNIT -II

4. i) Define 'Cost'. What are the various elements of Cost?
- ii) Prepare a model of cost sheet of your choice.

(OR)

5. i) Define 'Inventory'. Explain in detail about EOQ.
- ii) Give a classification of cost.

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(3)

UNIT - III

- 6✓ i) What are the different types of Ratios?
- ii) Outline the limitations of Ratios.

(OR)

- 7. i) What factors are influencing the capital structure of a large scale financial organisation?
- ii) Evaluate the need for financial Analysis.

UNIT -IV

- 8✓ i) Define 'working capital'. Discuss its need and importance.
- ii) What are the different types. of working capital?

(OR)

- 9. i) Outline the various determinants of working capital
- ii) What factors are influencing the working capital of an organization?

UNIT-V

- 10. i) Define 'Budget' what process is involved in the preparation of a Budget?
- ii) What is a master Budget? What are its contents?

(OR)

- 11✓ i) Distinguish between fixed budget and flexible Budget.
- ii) What are the types of budgeting methods?

MASTER OF COMPUTER APPLICATIONS DEGREE EXAMINATION

APRIL- 2023

FIRST SEMESTER

Paper - MCA 103: COMPUTER ORGANIZATION

(Under C.B.C.S Revised Regulations w.e.f. 2020-2021)

(Common paper to University and all Affiliated Colleges)

Time : 3 Hours

Max. Marks : 70

PART - A

(Compulsory)

Answer any FIVE of the following questions. Each question carries 2 marks.

(5×2=10)

1.
 - a) Write about Multiprocessors and Multi computers.
 - b) What is a flipflop? Mention various types of flipflops.
 - c) Write about Register transfer notation.
 - d) Explain the significance of Program counter.
 - e) Explain about hardware interrupt.
 - f) Write about the functions of Input-Output interface.
 - g) Describe the function of Virtual memory.
 - h) Explain about Hit rate and Miss penalty.
 - i) Why Micro is programmed control used instead of hardwired control in the control unit?
 - j) What is Pipelining? Mention its advantages.

PART - B

Answer any ONE full questions from each Unit. Each question carries 12 marks.

(5×12=60)

UNIT-I

2.
 - i) Explain the differences between Programmable Logic Array (PLA) and Programmable Array Logic (PAL)
 - ii) What is a Register? Explain various types of shift registers.

(OR)

- 3✓ i) Explain the basic functional units of a computer.
- ii) Explain about Bus structures.

UNIT-II

- 4. i) What is an addressing mode? Explain different types of addressing modes.
- ii) Explain about BIG-ENDIAN and LITTLE-ENDIAN assignment

(OR)

- 5✓ i) Explain basic instruction types in computer organization.
- ii) Explain about branching of instructions and condition code flags.

UNIT-III

- 6✓ i) Explain the use of interrupts in operating systems.
- ii) Explain about Direct memory access with circuit diagram.

(OR)

- 7. i) Describe briefly about Universal Serial Bus.
- ii) Explain about Programmed I/O.

UNIT-IV

- 8✓ i) What is a cache memory? Explain various mapping techniques used in cache memory.
- ii) Explain Booth Multiplication algorithm.

(OR)

- 9. i) Explain the differences between Static RAM and Dynamic RAM.
- ii) Explain the procedure to perform Arithmetic operations on floating point numbers.

UNIT-V

- 10✓ i) Describe about hardwired control unit with diagram.
- ii) Explain various data hazards in pipelining.

(OR)

- 11. i) Explain various steps involved in the execution of a complete instruction.
- ii) Explain the bus organization of data path with neat diagram.

MASTER OF COMPUTER APPLICATIONS DEGREE EXAMINATION,

APRIL - 2023

FIRST SEMESTER

PAPER - MCA 102 : OBJECT ORIENTED PROGRAMMING WITH JAVA

(Under C.B.C.S Revised Regulations w.e.f. 2020-2021)

(Common paper to University and all Affiliated Colleges)

Time : 3 Hours

Max. Marks : 70

PART - A (Compulsory)

Answer any FIVE of the following questions. Each question carries 2 marks.

(5×2=10)

1. a) What are Encapsulation, Inheritance and Polymorphism?
- b) What is the difference between an Inner Class and a Sub-Class? And how do you access a Sub-Class?
- c) What is multi-threading? Give a practical example of its usage.
- d) What are the performance implications of Interfaces over abstract classes?
- e) Does Importing a package imports its sub-packages as well in Java?
- f) What are the restrictions imposed on Java applets?
- g) How is an object serialized in java? When should we use serialization?
- h) Is there any way to skip Finally block of exception even if some exception occurs in the exception block?
- i) When is the constructor of a class invoked?
- j) What is the applet class loader and applet security manager? Can you connect an applet to a database? How?

PART - B

Answer any ONE full question from each Unit. Each question carries 12 marks.

(5×12=60)

UNIT-I

2. i) What is the usage of enumerated data type? Give examples.

- ii) What is a constructor? What is its requirement in programming? Explain with a program.

(OR)

3. i) Write a program to find the transpose of a given matrix.
ii) Explain the scope and life time of the variable. Is Constructor overriding possible in Java?

UNIT -II

4. i) What is interthread communication. Describe producer-consumer pattern using inter-thread communication
ii) Illustrate the use of static nested classes.

(OR)

5. i) What are the different types of exceptions? Write a single program with at least 4 exceptions.
ii) With suitable program segments describe the usage of 'super' keyword

UNIT -III

6. i) Write a program to copy the contents of file to file 2. Read the names of files as command line arguments
ii) What is a vector? How does it differ from array, list?

(OR)

7. i) Write a program to count the number of repetitions of each letter in a given string and display the same as output in ascending order.
ii) Explain the methods of stack class

UNIT -IV

8. i) Write an applet to display the mouse cursor position in that applet window
ii) Explain about the adapter class with an example.

(OR)

9. i) What are the various layout managers used in Java?
ii) Write an Applet to draw a smiley picture accept user name as a parameter and display welcome message.

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(2)

UNIT-V

10. Explain about two way communication between client and server using a program.

(OR)

11. i) Explain different stages in JDBC Program
ii) How can you improve the performance of a JDBC Program.

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(3)

**MASTER OF COMPUTER APPLICATIONS DEGREE EXAMINATION -
APRIL/MAY - 2023**

FIRST SEMESTER

Paper- MCA 101 : DISCRETE MATHEMATICAL STRUCTURES

(Under C.B.C.S Revised Regulations w.e.f 2020-2021)

(Common Paper to University and all Affiliated colleges)

Time : 3 Hours

Max. Marks : 70

PART-A

(Compulsory)

Answer any FIVE of the following questions. Each question carries 2 marks.

(5×2=10)

1. a) Over the Universe of animals, Let $P(x)$: x is whale; $Q(x)$: x is a fish; $R(x)$: x lives in a water. Translate the following into English.

$$\exists x(\neg R(x))$$

$$\exists x(Q(x) \wedge \neg P(x))$$

$$\forall x(P(x) \wedge R(x)) \rightarrow q(x)$$

- b) Define conjunctive and disjunctive normal forms.
- c) Show that $(P \rightarrow Q) \wedge (P \vee Q)$ is a contingency
- d) What is meant by strong induction?
- e) How many committees of five with given chairperson can be selected from 12 persons?
- f) Find the co-efficient of x^{10} in $\frac{(x^3 - 5x)}{(1-x)^3}$
- g) Solve $a_k = 3a_{k-1}$, for $k \geq 1$ with $a_0 = 2$
- h) Define planar graph and bi-partite graph.
- i) Define in - degree and out degree of a directed graph.
- j) What is meant by Handshaking property of a graph?

PART-B

Answer any ONE full question from each Unit. Each question carries 12 mark
(5×12=60)

UNIT-I

2. a) Show that $R \rightarrow S$ can be drawn from the premises $P \rightarrow (Q \rightarrow S)$, $\neg R \vee P$ and Q .
- b) Verify that $[(p \leftrightarrow q) \wedge (q \leftrightarrow r) \wedge (r \leftrightarrow p)] \equiv [(p \rightarrow q) \wedge (q \rightarrow r) \wedge (r \rightarrow p)]$, for Primitive statements p, q, r .

(OR)

3. a) Prove the following by using a "direct proof":
 - i) If m is even integer, then prove $m+7$ is odd
 - ii) If k and l are odd integers, prove that $k+l$ is even.
- b) Prove that the following argument is valid:

$$\begin{aligned} & \forall x [p(x) \rightarrow q(x)] \\ & \forall x [q(x) \rightarrow r(x)] \\ \therefore & \forall x [p(x) \rightarrow r(x)] \end{aligned}$$

UNIT-II

4. a) Show that $3^{4n+2} + 5^{2n+1}$ is multiple of 14 for all positive integral value of 'n' Including zero by mathematical induction.
- b) Give a recursive algorithm for computing the greatest common divisor of two Nonnegative integers a and b with $a < b$.

(OR)

5. a) Use the well-ordering property to prove the division algorithm.
- b) Write a recursive algorithm for computing $b^n \bmod m$, where b, n , and m are integers with $m \geq 2$, $n \geq 0$, and $1 \leq b < m$.

UNIT-III

6. a) Find the co-efficient of x^{18} in $(x + x^2 + x^3 + x^4 + x^5)(x^2 + x^3 + x^4 + x^5 + \dots)^5$
- b) What is the minimum number of students required in a discrete mathematics class to be sure that at least six will receive the same grade, if there are five possible grades, A, B, C, D, and F?

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(2)

(OR)

7. There are 21 consonants and 5 vowels in the English alphabets. Consider only 8 letters with 3 different vowels and 5 different consonants.

- i) How many of such words can be formed?
- ii) How many begin with 'a' and end with 'b'?
- iii) How many contain the letters a, b, and c?

UNIT-IV

8. A survey on sample 25 new cars being sold out at a local auto dealer was conducted to see which of three popular options Air conditioner (A), Radio (R), Power Windows (W) were already installed. The survey found 15 had Air Conditioners, 12 had Radios, and 11 had power Windows. 5 had Air Conditioner and Power Windows, 9 had Air conditioner and Radio, 4 had Radio and Power Windows. Three had all three options. Find number of cars which had:

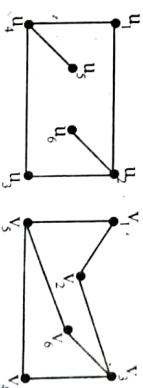
- i) Only one of the option
- ii) at least one of the option
- iii) None of the options. Use principle of inclusion exclusion.

(OR)

9. a) Solve recurrence relation $a_n = 3a_{n-1} - 2a_{n-2}$ for $n \geq 2$
- b) How many integral solutions are there to $x_1 + x_2 + x_3 + x_4 + x_5 = 20$ where each $x_i \geq 2$?

UNIT-V

10. a) Verify the following graphs are isomorphic or not.



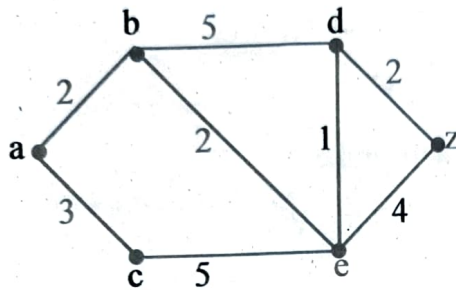
- b) Show that a non-empty connected graph is Eulerian if and only if all its vertices are of even degree.

(OR)

12-00-1-01R

(3)

11. a) Find the length of a shortest path between a and z in the given weighted graph.



- b) Show that "Every simple planar graph is 5-colorable."

**MASTER OF COMPUTER APPLICATIONS DEGREE EXAMINATION,
APRIL - 2023**

FIRST SEMESTER

PAPER - MCA 104: OPERATING SYSTEMS

(Under C.B.C.S Revised Regulations w.e.f. 2020-2021)

(Common Paper to University and all Affiliated Colleges)

Time : 3 Hours

Max. Marks : 70

PART - A (Compulsory)

Answer any FIVE of the following questions. Each question carries 2 marks.

(5×2=10)

1. a) ✓ What is a monitor? What are its uses?
- b) Write about different states in a process life cycle. Draw the diagram for state transition.
- c) What is a critical region? Give an example.
- d) What is Belady's anomaly? Explain
- e) ✓ What is multi-threading? What are its uses?
- f) Write about File system mounting.
- g) ✓ What is meant by Paging? How do you decide on the size of the page?
- h) Discuss about four OS system threats.
- i) ✓ What is the difference between kernel mode and user mode?
- j) ✓ What is a system call? When is system calls used?

PART - B

Answer any ONE full question from each Unit. Each question carries 12 marks.

(5×12=60)

UNIT-I

2. i) Write about Inter Process Communication.
- ii) What is the difference between shared memory model and message passing model.

(OR)

3. i) Write about the Operating System Structure.
- ii) Write about the difference between Network Operating System and Distributed operating System.

UNIT - II

4. i) Why do we need to schedule processes?
- ii) What are FCFS and SJF scheduling algorithms? Explain with an example each, What are their advantages and limitations?

(OR)

5. i) What are semaphore and mutex? Explain.
- ii) Discuss the dining philosophers problem and a solution for it.

UNIT - III

6. i) What is Virtual Memory? How is it implemented?
- ii) What is a page fault? Consider page reference string 1, 3, 0, 3, 5, 6, 3 with 3 page frames. Find the number of page faults using FIFO.

(OR)

7. Discuss about:
 - i) Contiguous allocation,
 - ii) Linked allocation, and
 - iii) indexed allocation methods for files management.

UNIT - IV

8. i) Explain Seek Time, Rotational Latency, Transfer Time and Disk Access Time.
- ii) Write about FCFS and SSTF methods for disk scheduling. State the advantages and disadvantages of each.

(OR)

9. i) Write about transforming I/O requests to hardware operations.
- ii) Write about Buffering and Caching and I/O scheduling.

12-00-1-04R

(2)

UNIT-V

10. i) How is Access Control implemented in OS?
- ii) What are access lists and capability lists? Where and how are they used?

(OR)

11. i) What is Boot Sector Virus?
- ii) Write about Unix System Security,

12-00-1-04R

(3)

MASTER OF COMPUTER APPLICATIONS DEGREE EXAMINATION

APRIL- 2023

FIRST SEMESTER

Paper - MCA 103: COMPUTER ORGANIZATION

(Under C.B.C.S Revised Regulations w.e.f. 2020-2021)

(Common paper to University and all Affiliated Colleges)

Time : 3 Hours

Max. Marks : 70

PART - A

(Compulsory)

Answer any FIVE of the following questions. Each question carries 2 marks.

(5×2=10)

1.
 - a) Write about Multiprocessors and Multi computers.
 - b) What is a flipflop? Mention various types of flipflops.
 - c) Write about Register transfer notation.
 - d) Explain the significance of Program counter.
 - e) Explain about hardware interrupt.
 - f) Write about the functions of Input-Output interface.
 - g) Describe the function of Virtual memory.
 - h) Explain about Hit rate and Miss penalty.
 - i) Why Micro is programmed control used instead of hardwired control in the control unit?
 - j) What is Pipelining? Mention its advantages.

PART - B

Answer any ONE full questions from each Unit. Each question carries 12 marks.

(5×12=60)

UNIT-I

2.
 - i) Explain the differences between Programmable Logic Array (PLA) and Programmable Array Logic (PAL)
 - ii) What is a Register? Explain various types of shift registers.

(OR)

- 3✓ i) Explain the basic functional units of a computer.
- ii) Explain about Bus structures.

UNIT-II

- 4. i) What is an addressing mode? Explain different types of addressing modes.
- ii) Explain about BIG-ENDIAN and LITTLE-ENDIAN assignment

(OR)

- 5✓ i) Explain basic instruction types in computer organization.
- ii) Explain about branching of instructions and condition code flags.

UNIT-III

- 6✓ i) Explain the use of interrupts in operating systems.
- ii) Explain about Direct memory access with circuit diagram.

(OR)

- 7. i) Describe briefly about Universal Serial Bus.
- ii) Explain about Programmed I/O.

UNIT-IV

- 8✓ i) What is a cache memory? Explain various mapping techniques used in cache memory.
- ii) Explain Booth Multiplication algorithm.

(OR)

- 9. i) Explain the differences between Static RAM and Dynamic RAM.
- ii) Explain the procedure to perform Arithmetic operations on floating point numbers.

UNIT-V

- 10✓ i) Describe about hardwired control unit with diagram.
- ii) Explain various data hazards in pipelining.

(OR)

- 11. i) Explain various steps involved in the execution of a complete instruction.
- ii) Explain the bus organization of data path with neat diagram.

MASTER OF COMPUTER APPLICATIONS DEGREE EXAMINATION

APRIL/MAY - 2023

FIRST SEMESTER

Paper: MCA 105A: ACCOUNTING AND FINANCIAL MANAGEMENT

(Under C.B.C.S Revised Regulations w.e.f. 2020-2021)

(Common paper to University and all Affiliated Colleges)

Time : 3 Hours

Max. Marks : 70

PART - A (Compulsory)

Answer any FIVE of the following questions. Each question carries 2 marks.

(5×2=10)

1. a) ✓ Concept of financial Accounting.
- b) ✓ Trading Account
- c) ✓ Definition of cost Accounting.
- d) Nature of cost Accounting.
- e) Optional capital structure.
- f) ✓ Liquidity Ratio
- g) Fixed capital
- h) ✓ Concept of working capital
- i) Budgetary control
- j) Zero Based Budgeting.

PART - B

Answer any ONE full questions from each Unit. Each question carries 12 marks.

(5×12=60)

UNIT-I

2. ✓ i) Examine the significance of financial Accounting
- ii) Enter the following transactions in the journal of priyanka for the month of march 2006.

UNIT - III

- 6✓ i) What are the different types of Ratios?
- ii) Outline the limitations of Ratios.

(OR)

- 7. i) What factors are influencing the capital structure of a large scale financial organisation?
- ii) Evaluate the need for financial Analysis.

UNIT - IV

- 8✓ i) Define 'working capital'. Discuss its need and importance.
- ii) What are the different types. of working capital?

(OR)

- 9. i) Outline the various determinants of working capital
- ii) What factors are influencing the working capital of an organization?

UNIT-V

- 10. i) Define 'Budget' what process is involved in the preparation of a Budget?
- ii) What is a master Budget? What are its contents?

(OR)

- 11✓ i) Distinguish between fixed budget and flexible Budget.
- ii) What are the types of budgeting methods?

MASTER OF COMPUTER APPLICATIONS DEGREE EXAMINATION,

APRIL - 2023

FIRST SEMESTER

PAPER - MCA 104: OPERATING SYSTEMS

(Under C.B.C.S Revised Regulations w.e.f. 2020-2021)

(Common Paper to University and all Affiliated Colleges)

Time : 3 Hours

Max. Marks : 70

PART - A (Compulsory)

Answer any FIVE of the following questions. Each question carries 2 marks.

(5×2=10)

1. a) ✓ What is a monitor? What are its uses?
- b) Write about different states in a process life cycle. Draw the diagram for state transition.
- c) What is a critical region? Give an example.
- d) What is Belady's anomaly? Explain
- e) ✓ What is multi-threading? What are its uses?
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- h) Discuss about four OS system threats.
- i) ✓ What is the difference between kernel mode and user mode?
- j) ✓ What is a system call? When is system calls used?

PART - B

Answer any ONE full question from each Unit. Each question carries 12 marks.

(5×12=60)

UNIT-I

2. i) Write about Inter Process Communication.
- ii) What is the difference between shared memory model and message passing model.

**MASTER OF COMPUTER APPLICATIONS DEGREE EXAMINATION -
APRIL/MAY - 2023**

FIRST SEMESTER

Paper- MCA 101 : DISCRETE MATHEMATICAL STRUCTURES

(Under C.B.C.S Revised Regulations w.e.f 2020-2021)

(Common Paper to University and all Affiliated colleges)

Time : 3 Hours

Max. Marks : 70

PART-A

(Compulsory)

Answer any FIVE of the following questions. Each question carries 2 marks.

(5×2=10)

1. a) Over the Universe of animals, Let $P(x)$: x is whale; $Q(x)$: x is a fish; $R(x)$: x lives in a water. Translate the following into English.

$$\exists x(\neg R(x))$$

$$\exists x(Q(x) \wedge \neg P(x))$$

$$\forall x(P(x) \wedge R(x)) \rightarrow q(x)$$

- b) Define conjunctive and disjunctive normal forms.
- c) Show that $(P \rightarrow Q) \wedge (P \vee Q)$ is a contingency
- d) What is meant by strong induction?
- e) How many committees of five with given chairperson can be selected from 12 persons?
- f) Find the co-efficient of x^{10} in $\frac{(x^3 - 5x)}{(1-x)^3}$
- g) Solve $a_k = 3a_{k-1}$, for $k \geq 1$ with $a_0 = 2$
- h) Define planar graph and bi-partite graph.
- i) Define in - degree and out degree of a directed graph.
- j) What is meant by Handshaking property of a graph?