D 34390

FOURTH SEMESTER M.C.A. (SPECIAL) SUPPLEMENTARY DEGREE EXAMINATION, SEPTEMBER 2017

MCA 2K 405 C—OBJECT-ORIENTED PROGRAMMING STRUCTURES

(2000 Syllabus Year)

Time : Three Hours   Maximum : 100 Marks

Answer any **five** *questions.*
Each question carries 20 marks.

1. (a) How does Java virtual machine work ? What is its architecture ?

    (b) Write a windows application program that illustrates the use of custom drop down menu and custom menu bar.

2. (a) Explain in detail about the exception hierarchy with the various handling features.

    (b) What is the difference between Method overloading and Overriding ? Explain with suitable example.

3. (a) What are piped streams ? Explain the passing of data between pipes using piped streams.

    (b) What is the Java Media Framework ?

4. (a) What is Java Bean ? What are its components ?

    (b) What is JMAPI ?

5. Explain the following :—

    • Distributed Computing Environment.

    • Java RMI.

    • Random Number Servers.

    • IDL.

6. (a) Explain with example how transaction processing is handled in Java.

    (b) Explain the structure of a servlet program with a servlet template.

7. (a) How can the java.sql package be integrated with applets ? Explain with example.

    (b) Explain the following :—

    • Datagrams.

    • JAR.

[5 × 20 = 100 marks]

D 10979

FOURTH SEMESTER M.C.A. DEGREE (REGULAR/SUPPLEMENTARY) EXAMINATION, DECEMBER 2021

M.C.A.

MCA 18 405 E—SOFTWARE TESTING AND QUALITY ASSURANCE

(2018 Syllabus Year)

Time : Three Hours Maximum : 100 Marks

Answer **five** *full questions.*
Each question carries 20 *marks.*

1. What is meant by Software Quality ? Explain the Quality and cost factors in Software Quality measurement.

2. Write short notes on the following (a) Stress testing and User Acceptance Testing ; and (b) Gray Box Testing and Extreme Testing.

3. What are the various testing tools commonly used ? Explain.

4. Define Quality Assurance in Software Development Process. Explain the different activities involved in Quality Assurance Process.

5. (a) What is meant by Process Change management ? Discuss the advantages of integrated CMM Model.

   (b) Discuss the different types of CMM models.

6. What is the purpose of SQA ? Discuss the various matrices used for Software Quality Assurance.

7. Write short notes on (a) Test Data ; (b) WinRunner ; (c) Silk Test ; and (d) Testing Team.

D 10978

FOURTH SEMESTER M.C.A. DEGREE (REGULAR/SUPPLEMENTARY) EXAMINATION, DECEMBER 2021

M.C.A.

MCA 18 405 D—CLOUD COMPUTING

(2018 Syllabus Year)

Time : Three Hours   Maximum : 100 Marks

Answer any **five** *full questions.*
Each question carries 20 marks.

1. (i) Explain Cloud Infrastructure Management.

   (ii) Explain the broad approaches for migrating into the cloud.

2. (i) Describe the evolution of SaaS and challenges of SaaS paradigm.

   (ii) Describe the Enterprise cloud technology and the market evolution.

3. (i) How the cluster as a service is used for enhancing the cloud computing environment ?

   (ii) Explain the RVWS design with necessary diagrams.

4. (i) Explain MapReduce Model in detail.

   (ii) Explain the model for federated cloud computing.

5. (i) Explain the performance prediction for High Performance Computing (HPC) on clouds.

   (ii) Explain the current state of data security in the cloud.

6. (i) Write in detail on the Business to Business integration (B2Bi) services.

   (ii) Discuss the Workflow Management Systems.

7. (i) Describe the legal issues in cloud computing.

   (ii) Explain the pros and cons of content level security.

D 10977

Name..

Reg. No...................................

FOURTH SEMESTER M.C.A. DEGREE (REGULAR/SUPPLEMENTARY) EXAMINATION, DECEMBER 2021

M.C.A.

MCA 18 405 C—OPERATIONS RESEARCH

(2018 Syllabus Year)

Time : Three Hours

Maximum : 100 Marks

*Answer **five** full questions.*
Each question carries 20 marks.

1. (a) What is meant by Duality ? Explain the method to solve LPP by Duality

(10 marks)

   (b) Solve the following LPP by graphical method.

   Find the maximum value of $Z = 5x_1 + 7x_2$
   subject to the constraints
   $$x_1 + x_2 \leq 4$$
   $$3x_1 + 8x_2 \leq 24$$
   $$10x_1 + 7x_2 \leq 35$$
   $$x_1, x_2 \geq 0.$$

(10 marks)

2. Use Simplex method to solve the LPP

   Maximize $Z = x_1 + 4x_2 + 5x_3$
   subject to the constraints
   $$3x_1 + 6x_2 + 3x_3 \leq 22$$
   $$x_1 + 2x_2 + 3x_3 \leq 14$$
   $$3x_1 + 2x_2 \qquad \leq 14$$
   and $x_1, x_2, x_3 > = 0.$

Turn over

3. (a) What is meant by unbalanced Assignment Problem ? How it can be solved ? (5 marks)

   (b) Solve the transportation problem when the unit transportation costs, demands and supplies are as given below :

		Destinations				
		D_1	D_2	D_3	D_4	Supply
Origins	O_1	6	1	9	3	70
	O_2	11	5	2	8	55
	O_3	10	12	4	7	70
	Demand	85	35	50	45	

(15 marks)

4. A company has 4 machines to do 3 jobs. Each job can be assigned to only one machine. The cost of each job on each machine is given below. Determine the job assignments that will minimize the total cost :

Machine

	W	X	Y	Z
A	18	24	28	32
B	8	13	17	18
C	10	15	19	22

5. Solve the following integer programming problem using Gomory's cutting plane algorithm :

Maximize $Z = 7x_1 + 9x_2$
subject to
$$-x_1 + 3x_2 \leq 6$$
$$7x_1 + x_2 \leq 35 \,;\, x_2 \leq 7$$
$$x_1, x_2 >= 0 \text{ non-negative integers.}$$

6. (a) Distinguish between Dynamic Programming and Linear Programming.

(5 marks)

(b) Use dynamic programming to solve :

Maximize $Z = Y_1 \cdot Y_2 \cdot Y_3$
subject to the constraints,
$$Y_1 + Y_2 + Y_3 = 5$$
$$Y_1, Y_2, Y_3 >= 0.$$

(15 marks)

7. (a) Explain the classification of Queuing System. (10 marks)

(b) Write short notes on (i) Markov Chains ; and (ii) Pure Birth System. (10 marks)

D 10976

Name...

Reg. No....................................

FOURTH SEMESTER M.C.A. DEGREE (REGULAR/SUPPLEMENTARY) EXAMINATION, DECEMBER 2021

M.C.A.

MCA 18 405 B—ANDROID APPLICATION PROGRAMMING

(2018 Syllabus Year)

Time : Three Hours

Maximum : 100 Marks

Answer **five** *full questions.*
Each question carries 20 marks.

I. (A) What is Android ? Explain the advantages of Android. (10 marks)

  (B) Define an Activity. Expalin how to define an Activity as launcher activity in application Manifest file. (2 + 8 = 10 marks)

II. (A) List the various components of Android SDK and explain their purpose. (10 marks)

  (B) Name 4 Layouts that Android supports with short descriptions for each. (10 marks)

III. (A) Name and describe 4 different storage methods used in Android.

  Write a code snippet to store "CALICUT UNIVERSITY" in a file called "University.txt" on the internal storage using FileOutputStream. (6 + 4 = 10 marks)

  (B) void onCreate (Bundle savedInstanceState) is the first method that is called when an activity is created in Android. Why savedInstanceState argument is passed to it; is expected to be NULL always ? (10 marks)

IV. (A) Write the Android code for sending SMS from the smart phone. (10 marks)

  (B) Define Content Provider in Android and explain the use of it. Explain steps to create your own content provider. (10 marks)

V. (A) Create an android app to send an email message. (10 marks)

  (B) Google Map also helps you to navigate on the route. Explain about 2 permissions need to be set in AndroidMenifest.xml file for accuracy ? (10 marks)

Turn over

VI. (A) List and explain methods available in HttpURLConnection class. (10 marks)

   (B) The Services can be started and Stopped. When the service is started by onStartCommand will return different service constants. Explain the code snippet of onStartCommand and list the different service constants returned. (10 marks)

VII. (A) Differentiate between Activities and Services components in Android with example. (10 marks)

   (B) Implement a manifest declared broadcast receiver "BroadReceiver and provide corresponding XML and JAVA code. (10 marks)

D 10975

FOURTH SEMESTER M.C.A. DEGREE (REGULAR/SUPPLEMENTARY) EXAMINATION, DECEMBER 2021

M.C.A.

MCA 18 405 D—INFORMATION RETRIEVAL

(2018 Syllabus Year)

Time : Three Hours   Maximum : 100 Marks

Answer any **five** *full questions.*

1. (a)   Explain the model of information Retrieval System with the help of a block Diagram.

    (b)   Discuss the conflation algorithm and explain how it facilitate fast retrieval process.

2. (a)   Explain inverted file system.

    (b)   Distinguish between suffix trees and suffix arrays.

3.   Discuss the various performance measures in related with data retrieval

4. (a)   What is meant by ontology ? Explain how to create a domain specific ontology.

    (b)   Explain ontology life cycle

5.   Discuss in detail the various methods for information retrieval in audio and video Documents

6.   Explain how information is retrieved in following methods.

      (a)   Boolean Search.

      (b)   Serial Search.

      (c)   Cluster based retrieval.

7.   Write short notes on the following :

      (a)   Index term weighting.

      (b)   Probabilistic Indexing.

      (c)   Single Pass Algorithm.

FOURTH SEMESTER M.C.A. DEGREE (REGULAR/SUPPLEMENTARY) EXAMINATION, DECEMBER 2021

M.C.A.

MCA 18 404—PRINCIPLES OF ACCOUNTING AND FINANCIAL MANAGEMENT

(2018 Syllabus Year)

Time : Three Hours   Maximum : 100 Marks

Answer **five** *full questions.*
Each question carries 20 marks.

1. a) Explain Accounting Concepts and Conventions.

   b) Describe classification of Mutual fund schemes.

2. a) The following is the Trial Balance of Ganesh as on 31st March 2019 :

Particulars	Dr. (Rs.)	Cr. (Rs.)
Sundry debtors	18,000	
Stock in hand on 1.4.2018	24,000	
Cash in hand	2,000	
Purchases	75,000	
Sales		1,25,000
Returns	4,000	1,500
Discount	3,000	2,000
Sundry creditors		12,000
Land and building	35,000	
Furniture	5,000	
Advertisement	3,000	
Rent		1,500
Carriage	3,000	
Bills receivable	8,000	
Bills payable		5,000
Duty and clearing charges	4,000	
Factory expenses	7,000	
Electricity and water	3,250	
Office expenses	7,500	
Sales expenses	4,250	
Wages	6,500	
Plant and Machinery	20,000	
Capital		85,500
Total	23,25,000	23,25,000

Turn over

Adjustments :

    (1) Closing stock is valued at Rs. 30,000.

    (2) Depreciate : Plant, and machinery at 10 % ; Land and building at 5 % and Furniture at 20 %.

    (3) Wages outstanding amounts to Rs. 1,500.

    (4) Rent accrued but nor received amounts to Rs. 500.

    (5) 1/3 of advertisements paid is for next year.

Prepare Trading and Profit and Loss Account for the year ending 31st March 2019 and a Balance Sheet as on that date.

  b) Explain Accounting Standards in India.

3. a) The following is the Balance Sheet of New India Ltd. For the year ending December 31st, 2019 :

Liabilities	Amount	Assets	Amount
9 % Preference Share Capital	5,00,000	Goodwill	1,00,000
Equity Share Capital	10,00,000	Land and Building	6,50,000
8 % Debentures	2,00,000	Plant	8,00,000
Long term Loan	1,00,000	Furniture and fixture	1,50,000
Bills Payable	60,000	Bills Receivable	70,000
Sundry Creditors	70,000	Sundry Debtors	90,000
Bank Overdraft	30,000	Bank balance	45,000
Outstanding expenses	5,000	Short term investments	25,000
		Prepaid expenses	5,000
		Stock	30,000
Total	19,65,000		19,65,000

From the balance sheet calculate :

    i) Current Ratio ;

   ii) Acid Test Ratio ;

  iii) Absolute Liquid Ratio ;

  iv) And give your comments on these ratios.

  b) Discuss the scope and objectives of Financial Management.

4. a) Define Budgetary control. Explain the steps in Budgetary Control.

 b) Discuss the nature and scope of Standard costing.

5. a) Define Marginal Costing. Explain the advantages and limitations of Break-even analysis ?

 b) From the following data, Calculate

   (1) Contribution ; (2) P/V Ratio ; and (3) Break-Even Point.

	Rs.
Sales	10,00,000
Variable Cost	7,60,000
Fixed Cost	1,20,000

6. Prepare Cost Sheet showing the following information :

 a) Prime cost ; b) Factory cost ; c) Cost of production ; d) Total cost ; and e) Profit.

The following information has been obtained from the cost of Modern Works Ltd., for three months ending 31st March 2019 during which 100 units are produced and all the units are sold @ Rs. 3,000 per unit.

	Rs.
Direct Materials consumed	1,62,000
Depreciation on plant	6,000
Repairs to plant	2,000
Factory rent and taxes	7,000
Indirect materials	11,000
Indirect labour	9,000
Direct labour	28,000
Depreciation on furniture	3,000
Printing and stationery	1,500
Office salaries	14,500
Warehouse rent	2,400
Advertising	2,000
Salesmen's salary and commission	2,600

Turn over

7. a) Describe Operating cycle. Explain the factors affecting Working Capital.

   b) From the following information, prepare Comparative Balance Sheet of X Ltd :

Particulars	31.03.2018 (Rs.)	31.03.2019 (Rs.)
Share Capital	5,00,000	10,00,000
Reserves and Surplus	3,00,000	2,00,000
Long term Borrowings	5,00,000	8,00,000
Trade payables	2,00,000	4,00,000
Tangible Assets	8,00,000	14,00,000
Intangible assets	2,00,000	3,00,000
Inventories	4,00,000	5,00,000
Cash and cash equivalents	1,00,000	2,00,000

   (5 × 20 = 100 marks)

D 10973

FOURTH SEMESTER M.C.A. DEGREE (REGULAR/SUPPLEMENTARY) EXAMINATION, DECEMBER 2021

M.C.A.

MCA 18 403—COMPUTATIONAL INTELLIGENCE

(2018 Syllabus Year)

Time : Three Hours Maximum : 100 Marks

Answer any **five** *full questions.*
Each question carries 20 marks.

1. (a) What is the use of predicate calculus in artificial intelligence ? (10 marks)

    (b) Define the state space representation of TIC-TAC-TOE. (10 marks)

2. (a) What is the purpose of unification ? Give one example of unification. (10 marks)

    (b) List some applications of And/Or graph. (10 marks)

3. (a) Explain in detail hill climbing search strategy. (10 marks)

    (b) What are the steps in the means-ends analysis process of problem-solving ? (10 marks)

4. (a) What do you mean by forward reasoning explain with example ? (10 marks)

    (b) With an example explain depth first search. (10 marks)

5. (a) With an example explain min-max algorithm. (10 marks)

    (b) What are the characteristics of expert systems ? (10 marks)

6. (a) With neat diagram explain the components of expert system shell. (10 marks)

    (b) Explain about the different expert system tools. (10 marks)

7. (a) Explain in detail about Hopfield network. (10 marks)

    (b) Briefly explain the concept of genetic programming. (10 marks)

D 10972

(Pages : 2)

Name.......................................

Reg. No...............................

FOURTH SEMESTER M.C.A. DEGREE (REGULAR/SUPPLEMENTARY) EXAMINATION, DECEMBER 2021

M.C.A.

MCA 18 402—DESIGN AND ANALYSIS OF ALGORITHM

(2018 Syllabus Year)

Time : Three Hours

Maximum : 100 Marks

Answer **five** *full questions.*
Each question carries 20 marks.

1. (a) What is RAM model of computation ?   (10 marks)

   (b) Why is time and space complexity of an algorithm important ? Find the time complexity of the code given below :

   ```
   int sum (int A[ ], int n)

       {

           int sum = 0, i;

       for (i = 0 ; i < n ; i++)

               sum = sum + A[i];

           return sum;

       }.
   ```

                                                                             (10 marks)

2. (a) Explain the Substitution Method for Solving Recurrences.   (10 marks)

   (b) Find a tight asymptotic lower bound for the following recurrence :

   $$T(n) = 4T\left(\frac{n}{2}\right) + n^2.$$

                                                                             (10 marks)

3. (a) What is the use of Master's Theorem ?   (10 marks)

   (b) Solve the following recurrence relation using Master's theorem :

   $$T(n) = 2T(n/4) + n^{0.51}.$$

                                                                             (10 marks)

Turn over

4. (a) Explain in detail about dynamic programming Algorithm design technique.   (10 marks)

   (b) What are the difference between Divide and Conquer and Dynamic Programming ?

                                                                             (10 marks)

5. (a) Explain any *one* algorithm example which uses backtracking approach.   (10 marks)

   (b) What are the difference between backtracking and branch and bound techniques ?

                                                                             (10 marks)

6. (a) Explain with an example about class NP hard problems.   (10 marks)

   (b) How do you find all solutions to the SUBSET-SUM problem ?   (10 marks)

7. (a) What are the factors performance measures of parallel algorithm ?   (10 marks)

   (b) What is parallel sorting ? Give one example of a parallel sorting algorithm.   (10 marks)

                                                         [5 × 20 = 100 marks]

D 10971

FOURTH SEMESTER M.C.A. DEGREE (REGULAR/SUPPLEMENTARY) EXAMINATION, DECEMBER 2021

M.C.A.

MCA 18 401—CRYPTOGRAPHY AND NETWORK SECURITY

(2018 Syllabus Year)

Time : Three Hours   Maximum : 100 Marks

Answer **five** *full questions.*

Each question carries 20 *marks.*

1. (a) Explain the different security services and mechanisms.   (10 marks)

   (b) Use Vigenere Cipher to encipher the message" MACHINE LEARNING" using the Keyword "DOOR".

   (10 marks)

2. (a) What will be the encrypted text corresponding to plain text "RUN A USERS APPLICATION" if columnar transposition cipher is used with the keyword "GAMES" ?

   (10 marks)

   (b) Explain in detail about Rotor Machine cipher.   (10 marks)

3. (a) State and prove Euler's Theorem.   (10 marks)

   (b) With an example explain Fermat's method of Primality testing.   (10 marks)

4. (a) With neat diagram explain the 4 main transformations in AES algorithm.   (10 marks)

   (b) Do you think DES is a failure due to Weak keys and semi weak keys ? Justify your answer.

   (10 marks)

5. (a) With neat diagram explain a single round in DES algorithm.   (10 marks)

   (b) Explain in detail about Blowfish encryption algorithm.   (10 marks)

6. (a) Explain the basic steps of SHA 160.   (10 marks)

   (b) What are the properties of Hash function? List some uses of Hash function. (10 marks)

7. (a) Explain in detail about S/MIME.   (10 marks)

   (b) What are the differences between PGP and S/MIME ?   (10 marks)

[5 × 20 = 100 marks]

D 10970

FOURTH SEMESTER M.C.A. DEGREE (SUPPLEMENTARY) EXAMINATION, DECEMBER 2021

M.C.A.

MCA 10 405C—EMBEDDED SYSTEMS

(2010 Syllabus Year)

Time : Three Hours   Maximum : 100 Marks

Answer any **five** *questions.*
All questions carry equal marks.

I.   (a)   List and define the three main design technologies. How are each of the three different design technologies helpful to designers ?

(10 marks)

(b)   Compare combinational and sequential circuit and explain them with examples. (10 marks)

II. (a)   Compose $1K \times 8$ ROMs into an $8K \times 8$ ROM.   (10 marks)

(b)   Explain different cache mapping techniques.   (10 marks)

III. (a)   What are the different implementation alternatives for digital camera ?   (10 marks)

(b)   Discuss the advantages and disadvantages of using memory-mapped I/O versus standard I/O.   (10 marks)

IV   (a)   Differentiate HCFSM and PSM with examples.   (10 marks)

(b)   What is the different synchronization methods used in concurrent process ?   (10 marks)

V   (a)   What is the different logic synthesis in automation of embedded system?   (10 marks)

(b)   What are the new challenges to the processor users and processor providers by the core?

(10 marks)

VI   (a)   Explain different types of arbitration methods.   (10 marks)

(b)   Explain three different transmission mediums and write two applications for each.

(10 marks)

VII (a)   Compose $1K \times 8$ ROMs into a $1K \times 32$ ROM.   (10 marks)

(b)   Briefly define each of the following : mask-programmed ROM, PROM, EPROM, EEPROM, flash EEPROM, RAM, SRAM, DRAM, PSRAM, and NVRAM.

(10 marks)

D 10969　　　　　　　(Pages : 2)　　　　　Name...

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Time : Three Hours　　　　　　　　　　　　　　　　　Maximum : 100 Marks

Answer any **five** *questions.*

1. (a) Define system simulation. Discuss the simulation of continuous systems with an example.

    (10 marks)

    (b) An online shopping portal supports different payment modes including credit cards, debit cards and internet banking. The system supports credit cards of all banks and debit cards of selected banks. Online banking also is supported for all banks. If a user opts debit card based payment and his/her card is not accepted by the system, the user can continue with other modes of payment. Assuming that information is available about the type of card and the name of the issuing bank, draw a flowchart of possible flow of a transaction.

    (10 marks)

II. (a) Simulate a single server queuing system for four arrivals whose inter arrival and service times (in minutes) are given by the expressions $a_n = (a_{n-1} * 5)$ (mod 11) and $a_n = (a_{n-1} * 7)$ (mod 11) respectively. Find the average waiting time of the customers and average queue length. Assume 5 as seed value both the computations and consider it as the first estimate of inter arrival time and service time.　　　(10 marks)

    (b) Simulate a single server queuing system for eight arrivals assuming one arrival at a time. Estimate average inter-arrival time, average service time, server idle time and average queue length of the system.　　　(10 marks)

III. (a) Explain with an example the inverse transformation method used for generating non-uniformly distributed random numbers.　　　(10 marks)

    (b) For a simulation experiment random numbers in the range [0,10] including both, are to be generated. Using multiplicative congruential generator with 5 as seed value and 7 as constant multiplier, generate 10 random numbers. Calculate mean and variance of the random numbers generated.　　　(10 marks)

Turn over

IV. (a) What is a simulation language ? Compare the features of various discrete-system simulation languages. (10 marks)

(b) Discuss the general features of GPSS. (10 marks)

V. (a) Explain any five operating characteristics of a queuing system with an example.

(10 marks)

(b) Explain simulation of multi-server queues with an example. (10 marks)

VI. (a) The following table summarizes the statistics of a pseudorandom sequence. Perform Chi-Square test on the data. Will the data set pass the test with 90% probability ?

Cell/Range	Number of observed occurrences	Number of expected occurrences
1	100	100
2	96	100
3	98	100
4	85	100
5	105	100
6	93	100
7	97	100
8	125	100
9	107	100
10	94	100

(10 marks)

(b) What is meant by a model ? Explain the various aspects of validating a model. (10 marks)

VII. (a) A project schedule has the following characteristics. Construct the network diagram. Also compute the earliest and latest start and finish times of all activities.

Activity	Time (Weeks)	Activity	Time (Weeks)
1–2	4	5–6	4
1–3	1	5–7	8
2–4	1	6–8	1
3–4	1	7–8	2
3–5	6	8–10	5
4–9	5	9–10	7

(10 marks)

(b) What do you mean by PERT charts ? Explain simulation of activity networks using PERT charts with an example. (10 marks)

D 10967

Name.......................................

Reg. No...............................

FOURTH SEMESTER M.C.A. DEGREE (SUPPLEMENTARY) EXAMINATION DECEMBER 2021

M.C.A.

MCA 10 405 A—DESIGNS AND ANALYSIS OF ALGORITHMS

(2010 Syllabus Year)

Time : Three Hours   Maximum : 100 Marks

Answer any **five** *questions.*

All questions carry equal marks.

1. (a) What are the problems in Deterministic Algorithm ?

    What are the advantages of Randomized Algorithm ?

    (6 marks)

    (b) Perform merge sort operations for the given integer set {20, 47, 15, 8, 9, 4, 40, 30, 12, 17}.

    (c) Define Space and Time Complexity.   (7 marks)

    Sort the functions $F1 (n) = n^{\sqrt{n}}$, $F2 (n) = 2^n$ and $F3 (n) = 2^{n/2} \cdot n^{10}$ in increasing order of big-O complexity.

    (2 + 2 + 3 = 7 marks)

II. (a) Write differences between Divide and Conquer method and Dynamic Programming technique.

    6 marks)

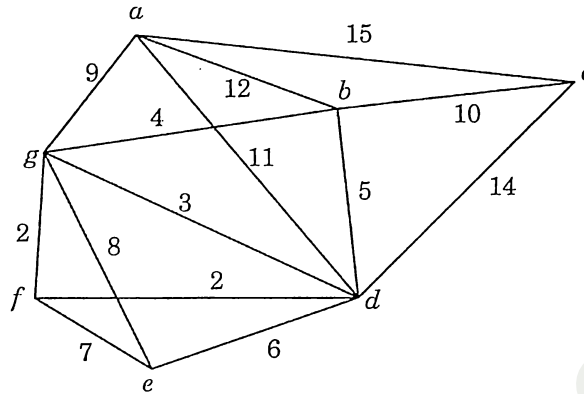   (b) State Matrix Chain Multiplication Problem.   (7 Marks)

    (c) Write recurrence relation for Stassen's Matrix multiplication algorithm and derive the complexity. Compare the complexity with normal matrix multiplication.

    (7 Marks)

Turn over

III. (a) Illustrate Kruskal's algorithm and find the minimum spanning tree of the graph given below :

(10 marks)

(b) Generate Huffman code for *"Eerie eyes seen near lake"*   (10 marks)

IV. (a) Define PRAM model. What are the constraints enforced on PRAM model to enforce simultaneous access of same memory ? Briefly explain each.

(10 marks)

(b) Now the manufacturers give focus on parallel algorithms. Why ?   (4 marks)

(c) State Brents theorem and its application.   (6 marks)

V. (a) Prove that TSP is NP-complete assuming that Hamiltonian problem is NP-complete.

(10 marks)

(b) Define P, NP, NP complete and NP hard problems with examples.   (10 marks)

VI. (a) Compare Dynamic Programming and Divide and Conquer approach.   (10 marks)

(b) Define Optimal Binary search tree. Explain the procedure to build Optimal Binary search tree. Give a function to build optimal binary search tree.

(10 marks)

VII. (a) What is an Euler tour ? What are the conditions to have an Euler tour on a graph ?

Explain the model and Analyze the complexity of Euler's tour.

(10 marks)

(b) Write a note on Parallel prefix computation.

Give an algorithm for parallel prefix computation.

(10 marks)

[5 × 20 = 100 marks]

D 10966

FOURTH SEMESTER M.C.A. DEGREE (SUPPLEMENTARY) EXAMINATION DECEMBER 2021

M.C.A.

MCA 10 404 C—ADVANCED DATA BASE MANAGEMENT SYSTEM

(2010 Syllabus Year)

Time : Three Hours   Maximum : 100 Marks

Answer any **five** *questions.*

All questions carry equal marks.

I. (a) Write on OQL and ODL.

   (b) Explain different steps for mapping an EER Schema to an ODB Schema.

II. (a) Explain major components of CORBA architecture.

   (b) With a neat block diagram explain client server distributed architecture.

III. (a) What is fragmentation ? What are different types of data fragmentation.

   (b) Define concurrency control in Distributed database. Briefly explain distributed synchronization technique.

IV. (a) Define the term data replication. Explain different replication strategies.

   (b) Explain basic inference mechanism for logic program.

V. (a) Explain different steps in Data Mining.

   (b) What is a Data warehouse ? Differentiate database and data warehouse.

VI (a) Explain main functionalities of Geographic Information System.

   (b) Write a note on deductive databases

VII. (a) What are two basic memory structures on the Oracle instance ? Explain in detail.

   (b) Explain the features of Microsoft access.

(5 × 20 = 100 marks)

D 10965   (Pages : 2)   Name...

Reg. No....................................

FOURTH SEMESTER M.C.A. DEGREE (SUPPLEMENTARY) EXAMINATION DECEMBER 2021

M.C.A.

MCA 10 404 B—IMAGE PROCESSING

(2010 Syllabus Year)

Time : Three Hours   Maximum : 100 Marks

Answer any **five** *questions.*
All questions carry equal marks.

1. a) Explain concept of sampling and quantization for digitizing image. Discuss its effect on quality of the image.

   b) What is digital image processing ? Write a note on objectives of digital image processing.

   (10 + 10 = 20 marks)

2. a) Explain Discrete Fourier Transform and its inverse. Also, state and prove its translation property.

   b) Explain the basic principle of Hotelling transform.

   (10 + 10 = 20 marks)

3. a) What is meant by image enhancement by point processing ? Discuss any two methods in it ?

   b) What do you mean by Image restoration ? Is original Image can be restored ? Justify your answer.

   (10 + 10 = 20 marks)

4. a) Explain Lossy compression and compare Lossless and Lossy compression.

   b) Consider the 9 × 6, 8 - bit image. Perform LZW encoding.

10	15	20	100	200	255
10	15	20	100	200	255
10	15	20	100	200	255
10	15	20	100	200	255
10	15	20	100	200	255
10	15	20	100	200	255
10	15	20	100	200	255
10	15	20	100	200	255
10	15	20	100	200	255

   (10 + 10 = 20 marks)

Turn over

5. a) Explain Fourier Slice theorem.

   b) Explain Parallel beam and Fan beam projections.

   (10 + 10 = 20 marks)

6. a) Write about Smoothing Spatial filters.

   b) Explain Slant transform.

   (10 + 10 = 20 marks)

7. a) Explain least mean square filtering.

   b) State distributivity and scaling property of DFT.

   (10 + 10 = 20 marks)

FOURTH SEMESTER M.C.A. DEGREE (SUPPLEMENTARY) EXAMINATION DECEMBER 2021

MCA

MCA 10 404 A—ARTIFICIAL INTELLIGENCE

(2010 Syllabus Year)

Time : Three Hours   Maximum : 100 Marks

Answer any **five** *questions.*
All questions carry equal marks.

1. (A) Explain any *two* uninformed search strategy of State space graphs.   (10 marks)

   (B) Explain the heuristic method called A* algorithm for problem solving.   (10 marks)

2. (A) Explain with example how Constraint Satisfaction Problem is done using graphs.

                                                                                          (10 marks)

   (B) Illustrate with example how Alpha Beta pruning is done in games.   (10 marks)

3. (A) What is Resolution? Explain Resolution Algorithm in prepositional logic.

   (B) Briefly explain Well-Formed Formula (wff). How can we convert an arbitrary wff to conjunction of clauses ?

4. (A) Explain how representation of knowledge is done using semantic networks.   (8 marks)

   How the following example is represented using semantic networks.

      Tom is a cat.

      Tom caught a bird.

      Tom is owned by John.

      Tom is ginger in color.

      Cats like cream.

      The cat sat on the mat.

      A cat is a mammal.

      A bird is an animal.

      All mammals are animals.

      Mammals have fur

4. (B) Explain the statement Resolution is refutation complete. What do you mean by the term unification ? Explain briefly with example.

                                                                                          (12 marks)

5. (A) Develop a Back propagation Learning Algorithm   (15 marks

   (B) Explain the difference between internal representation issues and External representation issues.

                                                                                    (5 marks)

6. (A) Consider the problem of finding the shortest route through several cities, such that each city is visited only once and in the end return to the starting city (the Travelling Salesman problem). Suppose that in order to solve this problem we use a genetic algorithm, in which genes represent links between pairs of cities. For example, a link between London and Paris is represented by a single gene 'LP\ Let also assume that the direction in which we travel is not important, so that LP = P L

   (a) How many genes will be used in a chromosome of each individual if the number of cities is 10 ?

   (b) How many genes will be in the alphabet of the algorithm ?

                                                                                    (8 marks)

   (B) Explain Forward chaining and Backward chaining in Expert systems.   (12 marks)

7. (A) Explain various list processing functions of LISP.   (16 marks)

   (B) Explainthe term Mapping in LISP with example.   (4 marks)

                                                                 [5 × 20 = 100 marks]

D 10963

FOURTH SEMESTER M.C.A. DEGREE (SUPPLEMENTARY) EXAMINATION DECEMBER 2021

M.C.A.

MCA 10 403—WEB PROGRAMMING

(2010 Syllabus Year)

Time : Three Hours   Maximum : 100 Marks

Answer any **five** *questions.*
All questions carry equal marks.

1. a) Write a HTML program for creating a register form.

    b) What is CSS ? Explain about embedded style sheet with an example.

    (10 + 10 = 20 marks)

2. a) What is Javasciprt ? Explain the memory concept in Javascript.

    b) Explain with an example about arrays in Javascript

    (10 + 10 = 20 marks)

3. a) What is dynamic HTML ? Explain about object model and collections with example.

    b) Explain in detail about math and string object used in Javascript.

    (10 + 10 = 20 marks)

4. a) Explain in detail about Document Object Model.

    b) Write notes on MYSQL.

    (10 + 10 = 20 marks)

5. a) Differentiate between CGI and PHP.

    b) Explain the steps involved in JSP environment setup.

    (10 + 10 = 20 marks)

6. a) Write a programmer defined function Square to calculate the squares of the integers from 1 to 10 in Javascript.

    b) Write the script for Random Image Generator Using Arrays.

    (10 + 10 = 20 marks)

7. a) Write a Javascript to sort the elements of an array using the method 'sort'.

    b) Explain about Multidimenstional array in Javascript.

    (10 + 10 = 20 marks)

D 10962

Name..

Reg. No....................................

FOURTH SEMESTER M.C.A. DEGREE (SUPPLEMENTARY) EXAMINATION DECEMBER 2021

M.C.A.

MCA 10 402—SOFTWARE ARCHITECTURE AND PROJECT MANAGEMENT

(2010 Syllabus Year)

Time : Three Hours

Maximum : 100 Marks

Answer any **five** *full questions.*
All questions carry equal marks.

1. a) With neat diagram explain in detail about IS2000.

   b) What are product factors ? Explain in detail.

   (10 + 10 = 20 marks)

2. a) Explain in detail the design activities for the Execution architecture view.

   b) Describe Product Archetype Pattern.

   (10 + 10 = 20 marks)

3. a) Explain in detail about Access Control Patterns.

   b) Discuss about the Patterns for Distribution.

   (10 + 10 = 20 marks)

4. a) Discuss the patterns used by Adaptable systems.

   b) Explain in detail about Application Interface-Level EAI.

   (10 + 10 = 20 marks)

5. a) Write notes on Database- Oriented Middleware and EAI.

   b) How mapping to relational databases done ?

   (10 + 10 = 20 marks)

6. a) What is Distributed pattern ? Explain about Remote Façade.

   b) What is Object-Relational Metadata Mapping Patterns ? Explain in detail about Repository.

   (10 + 10 = 20 marks)

7. a) What are Domain Logic patterns ? Explain in detail about transaction script.

   b) What is Data source Architectural patterns ? Explain in detail about Table data Gateway.

   (10 + 10 = 20 marks)

   [5 × 20 = 100 marks]

D 10961   (Pages : 2)   Name..

Reg. No................................

FOURTH SEMESTER M.C.A. DEGREE (SUPPLEMENTARY) EXAMINATION DECEMBER 2021

MCA

MCA 10 401—CRYPTOGRAPHY AND NETWORK SECURITY

(2010 Syllabus Year)

Time : Three Hours   Maximum : 100 Marks

Answer any **five** *full questions.*

All questions carry equal marks.

1. (a) Explain reduced residue systems with examples.

   (b) Define Euler's phi function. Describe the properties of Euler's phi function.

   (10 + 10 = 20 marks)

2. (a) Explain the process of encryption and decryption in DES.

   (b) What is steganography ?

   (10 + 10 = 20 marks)

3. (a) How are keys generated in RSA cryptosystem ? In a RSA cryptosystem a particular A uses two prime numbers $p = 13$ and $q = 17$ to generate her public and private keys. If the public key of A is 35. Then what is the private key of A ?

   (b) Explain in detail the various pseudorandom number generators.

   (10 + 10 = 20 marks)

4. (a) What are transposition ciphers ? Explain with examples the different types of transposition ciphers..

   (b) Which are the main attacks that occurs on hash functions.

   (10 + 10= 20 marks)

5. (a) Explain in detail the protocol stacks of SSL.

   (b) What are firewalls ? Explain the different types of firewalls.

   (10 + 10 = 20 marks)

Turn over

6. (a) Explain the concept of linear congruence in detail. Find all solutions to the linear congruence. $210x = 40 \pmod{212}$.

   (b) Explain with neat diagram the symmetric cipher model.

   (10 + 10 = 20 marks)

7. (a) Explain in detail about elliptic curve cryptography.

   (b) What are the message authentication requirements and the functions used for message authentication.

   (10 + 10= 20 marks)

   [5 × 20 = 100 marks]