

Roll No.

Total Pages : 2

CMCA/M-22

24518

WEB TECHNOLOGIES

Paper-MCA-20-21

Time Allowed : 3 Hours] [Maximum Marks : 75

Note : Attempt **five** questions in all, selecting **one** question from each Unit. Question No. **1** is compulsory. All questions carry equal marks.

Compulsory Question

1. (a) What is the difference between static and dynamic web pages? Discuss.
- (b) Differentiate between == and === operators in JavaScript using suitable examples.
- (c) PHP is a loosely typed language? Comment.
- (d) What is AJAX? What is the advantage of using it? Discuss.

UNIT-I

2. (a) What is a web browser? Discuss its characteristic features.
- (b) What are the different attributes of <form> tag?
3. (a) What are the different types of CSS selectors? Explain.
- (b) Discuss the syntax and semantics of following HTML tags : (i) <a>, (ii) <u>, (iii)
, (iv) <title>.

UNIT-II

4. (a) What do you understand by client side data validation? Write the JavaScript code to validate the employee's age. Make the necessary assumptions.
- (b) Discuss the different looping constructs available in JavaScript.
5. (a) What do you understand by Document object model? Write the function in JavaScript invoked by onclick event to change the contents of a paragraph of a web page.
- (b) What do you understand by short circuit evaluation of logical operators in JavaScript? Discuss.

UNIT-III

6. (a) How is data inserted in MySQL table using prepared statement of PHP? Illustrate.
- (b) How is an array created in PHP? Discuss the array operators in PHP.
7. (a) Differentiate between indexed array and associative array in PHP using example.
- (b) How is the HTML form data handled in PHP? Explain.

UNIT-IV

8. Write short notes on the following :
- (a) XML HttpRequest Object Properties.
- (b) Ajax Security.
9. (a) How is request sent to a server using XMLHttpRequest object? Discuss.
- (b) How is AJAX used to create more interactive web pages? Illustrate.

Roll No.

Total Pages : 3

CMCA/M-22

24519

LINUX AND SHELL PROGRAMMING

Paper-MCA-20-22

Time Allowed : 3 Hours]

[Maximum Marks : 75

Note : Attempt **five** questions in all, selecting **one** question from each Unit. Question No. 1 is compulsory. All questions carry equal marks.

Compulsory Question

1. (a) What is a shell? How many different types of shells are there? Explain. 3
- (b) What is process table? Discuss. 4
- (c) What is lilo? Discuss the booting process in Linux. 4
- (d) How can the processes be connected with pipes? Discuss about the output of the command : `ls | tee list.txt`. 4

UNIT-I

2. (a) Discuss the history of Linux and the organization of file systems of Linux. 6
- (b) Discuss various blocks that constitute the Linux/Unix file system. 9
3. (a) How can the permissions and ownerships of files and directories be viewed and changed in Linux? Discuss using the general format of commands and examples. 7

(b) Explain following commands in Linux with their format using suitable examples : 8

(i) bc (ii) script (iii) tee (iv) date.

UNIT-II

4. What are system calls and what role do they play in the system? Explain the following file-related system calls using suitable examples : (i) reading files (ii) writing to files (iii) relocating file descriptors (iv) unlinking files (v) accessing file status information (vi) changing permission of files. 15
5. Discuss various process related and process scheduling commands using suitable examples. How can we manage multiple processes? 15

UNIT-III

6. (a) Discuss the commands to create, modify and delete the user accounts and groups using examples. 9
- (b) Discuss the following networking tools : 6
- (i) ping (ii) ftp (iii) rlogin.
7. (a) How are file systems created and mounted/unmounted in Linux? Discuss. 8
- (b) How makefiles can be used to manage large 'C' projects? 7

UNIT-IV

8. (a) Explain various filters in Linux using examples. 10
- (b) Explain different file and string test operators with examples. 5

9. (a) Explain various iterative statements available in bash shell using examples. Also write a menu driven shell script to copy, rename and delete a file. 9
- (b) Discuss the following command using examples :
(i) export (ii) basename (iii) sleep (iv) shift. 6

Roll No.

Total Pages : 3

CMCA/M-22

24520

ADVANCED DATABASE SYSTEMS

Paper-MCA-20-23

Time Allowed : 3 Hours]

[Maximum Marks : 75

Note : Attempt **five** questions in all, selecting **one** question from each Unit. Question No. **1** is compulsory. All questions carry equal marks.

Compulsory Question

1. (a) Define entity, entity type and entity set. What is the extension of entity type?
- (b) What is database schema, subschema and database instances?
- (c) What are views? How views are created?
- (d) Write note on domain key normal form.
- (e) What is query tree? Write a note on equivalence of query tree.
- (f) Define ACID properties of Transaction management.
- (g) Write a detailed note on GIS.
- (h) What is object structure in object-oriented database? 15

UNIT-I

2. (a) Discuss the role of mapping in three tier architectures of DBMS as proposed by ANSI-SPARC. 8

24520/K/1361/400

P. T. O.

- (b) What are database users ? Explain different component modules of database system. 7
3. (a) Outline the different symbolic representations that are used in designing an ER diagram. 8
- (b) What is EER model? Write note on generalization and specialization. 7

UNIT-II

4. (a) Differentiate between SQL and PL/SQL. Explain delete, drop and alter SQL statements with their purpose, syntax and example. 8
- (b) What do you mean by cursor? Write a PL/SQL block to implement implicit cursor. 7
5. What is normalization? Why we need normalization? Draw and explain the similarities and dissimilarities between third normal form and BCNF. Which of the normal form is stronger among them? 15

UNIT-III

6. Explain the two-phase locking protocols with the help of an example. What are the benefits of rigorous two-phase locking? 15
7. (a) Explain read-only, write-only and read-before-write protocols in serializability. 8
- (b) Explain immediate database modification log based recovery method. Also explain role of check point in log base. 7

UNIT-IV

8. (a) Differentiate between parallel and distributed databases. Discuss shared nothing architecture of parallel databases with its advantages and disadvantages. 8
- (b) Differentiate between temporal, non-temporal and bi-temporal databases. Discuss the challenges of implementing a Temporal database. 7
9. (a) Write the feature of Web databases. Differentiate between data centric and document centric XML documents? 8
- (b) What do you mean by multimedia database? What is its content? How you will design multimedia databases? 7

Roll No.

Total Pages : 2

CMCA/M-22

24521

PRINCIPLES OF PROGRAMMING LANGUAGES

Paper-MCA-20-24

Option-(i)

Time Allowed : 3 Hours]

[Maximum Marks : 75

Note : Attempt **five** questions in all, selecting **one** question from each Unit. Question No. **1** is compulsory. All questions carry equal marks.

Compulsory Question

1. (a) What do you understand by imperative language paradigm?
(b) Discuss ambiguous grammar using suitable examples.
(c) Differentiate between name and structural equivalence.
(d) What is an applet? Discuss.

UNIT-I

2. (a) What are the quality attributes of a good programming language? Discuss.
(b) What is the difference between parsing and scanning?
3. (a) Write a note on the effect of different environments on the features of programming languages?
(b) Differentiate between compile time and run time binding.

UNIT-II

4. (a) What is explicit type declaration? Discuss its merits and demerits over implicit type declaration.
- (b) Differentiate between deterministic and non-deterministic finite state automata.
5. (a) What is the difference between narrowing and widening type conversion? Illustrate.
- (b) What is regular grammar? Give the regular grammar for all strings over $\{0, 1\}$ containing the string 010.

UNIT-III

6. (a) What is an abstract class? What is the need of declaring a class abstract.
- (b) What do you understand by associativity of operators? Illustrate.
7. (a) What do you understand by software reuse? How is it implemented in object oriented languages?
- (b) What do you understand by implicit sequence control? Explain.

UNIT-IV

8. (a) What is the difference between call by value and call by result? Explain.
- (b) Write a brief note on xml.
9. (a) Illustrate the difference between static and dynamic scoping.
- (b) Write a note on scheduled subprogram.

Roll No.

Total Pages : 2

CMCA/M-22

24526

SECURITY IN COMPUTING

Paper–MCA-20-25

Option–(iii)

Time Allowed : 3 Hours]

[Maximum Marks : 75

Note : Attempt **five** questions in all, selecting **one** question from each Unit. Question No. 1 is compulsory.

Compulsory Question

1. (a) List various non-malicious program errors.
- (b) What is integrity model of security?
- (c) What is repudiation? How can it be prevented in real life?
- (d) What is access control? How it is different from availability?
- (e) Define the term patent and copyright. 5×3=15

UNIT–I

2. (a) Distinguish among vulnerability, threat and control. 8
- (b) Describe any two substitution Ciphers with examples. 7
3. (a) What is a virus? What is the significant difference between a worm and a virus? 8

- (b) Discuss different security functional requirements. 7

UNIT-II

4. (a) Discuss various message confidentiality threats. 8
(b) Describe strength and limitation of IDS. 7
5. (a) List the different factors that make the data sensitive. 3
(b) Write a short note on the following :
(i) Sensitive data (ii) Inference (iii) Reliability. 12

UNIT-III

6. (a) What are the three parts of Kerberos? Explain. 10
(b) Explain the Record protocol of SSL. 5
7. (a) Discuss following terms :
Linux Vulnerability and Linux System Hardening. 10
(b) Describe the architecture of Window Security. 5

UNIT-IV

8. Discuss different legal and ethical issues in computer security. 15
9. Explain the different approaches to identify and mitigate risks to an organization's IT infrastructure. 15

Roll No.

Total Pages : 3

MCA/M-22

24641

BIG DATA AND PATTERN RECOGNITION

Paper-MCA-20-41

Time Allowed : 3 Hours]

[Maximum Marks :.75

Note : Attempt **five** questions in all, selecting **one** question from each Unit. Question No. 1 is compulsory. All questions carry equal marks.

Compulsory Question

1. Write short notes on the following: 15
 - (a) Differentiate between Structured, Unstructured and Semi-structured data.
 - (b) Who is responsible for growth of Big data and why ?
 - (c) How to adopt Big Data governance ?
 - (d) List the benefits of Zookeeper.
 - (e) Differentiate between Quantitative and Qualitative analysis.
 - (f) Write about Data domain for pattern recognition.
 - (g) Give a brief note on Graph database.
 - (h) Write the benefits of NoSQL over DBMS.

UNIT-I

2. (a) What are the characteristics of Big Data ? Discuss the motivating factors for Big Data adoption. 8

24641/K/2448/210

P. T. O.

- (b) Outline a neat sketch and elaborate the different stages of Big Data analytics Life Cycle. 7
3. (a) What do you mean by Big Data Business intelligence ? Illustrate a Big Data success story. 8
- (b) Explore the four phases of Business Process Management discipline. 7

UNIT-II

4. (a) Discuss “Map Phase”, “Reducer Phase” and “Combiner Phase” in MapReduce. 8
- (b) What are the advantages of Hadoop ? How does HDFS ensure data Integrity in a Hadoop Cluster ? 7
5. (a) What is Data governance in Big Data ? How does Big Data governance work ? 8
- (b) Elaborate the reasons of Big Data Project failure. Discuss the Legalities involved in Big Data Project failure. 7

UNIT-III

6. Enlist the Fundamental problems in Pattern recognition. How features are extracted and reduced in Pattern recognition ? 15
7. Discuss the important approaches of Pattern recognition. Explain the strategies for identifying patterns using nearest neighbour classifiers. Illustrate with an example. 15

UNIT-IV

8. Explain the misconceptions of NoSQL. Discuss key-value storage types and column-oriented storage type with examples and its advantage. 15
9. What is meant by Schema less models ? How data management is done for big data using NoSQL ? Write a detailed note on CAP theorem. 15

Roll No.

Total Pages : 3

MCA/M-22

24642

COMPUTER GRAPHICS AND ANIMATION

Paper-MCA-20-42

Time Allowed : 3 Hours]

[Maximum Marks : 75

Note : Attempt **five** questions in all, selecting **one** question from each Unit. Question No. **1** is compulsory. All questions carry equal marks.

Compulsory Question

1. Answer any **five** of the following questions in brief :
 - (a) Consider a raster system with a resolution of 1020×512 . What will be the size of the frame buffer needed for this system if 256 color intensities are used for the display ?
 - (b) What is a Frame buffer ? How is a Frame buffer loaded ?
 - (c) List the characteristics of a good line drawing algorithm.
 - (d) Write the equations for generating an algorithm using Polynomial method.
 - (e) Obtain the composite matrix for translation and scaling.
 - (f) Write the equations for interpolating light intensities using Gouraud Shading.

UNIT-I

2. (a) What is the end product of a graphics application ? How is it obtained ? What are the components of an Interactive graphics system ?
- (b) Describe any three pointing devices along with their features and working.
3. Answer the following questions in brief :
 - (a) Define and distinguish between resolution and aspect ratio. If you have monitor with a resolution of 640×480 pixels then what will be the aspect ratio ?
 - (b) Describe any two important Coordinate systems used in Graphics.
 - (c) What is the role of Shadow mask in Colour CRT ?

UNIT-II

4. (a) Describe a Line drawing algorithm that is based on total integer arithmetic. Rasterize a line between the endpoints (5, 6) and (12, 9) using this algorithm.
- (b) How is a circle drawn using Polar coordinates ?
5. (a) How are Bezier curves drawn ? Why are they called Parametric curves ?
- (b) What are the advantages of Scan line fill algorithm over basic seed fill algorithms ? Describe the working of scan line filling algorithm using suitable examples.

UNIT-III

6. Magnify a triangle with vertices A(5, 5), B(11, 5) and C(8, 11) to twice its size keeping vertex A fixed. Also scale the same triangle to a times keeping its center fixed.
7. (a) Describe the 2-D viewing transformations that maps a window in world coordinates onto a normalized view port. Find the position of a point (7, 8) defined in window with diagonal vertices at (3, 3) and (11, 11) transformed onto a normalized view port.
(b) Describe how lines are clipped using Mid-Point Subdivision line clipping algorithm.

UNIT-IV

8. Describe how solid objects can be modeled using Boundary representations and Spatial-Partitioning representations. Also describe the role of Fractals in 3-D modeling.
9. Distinguish between the following :
 - (a) Orthographic and Oblique Parallel Projection.
 - (b) Area Subdivision and BSP-Tree methods for hidden surface elimination.

Roll No.

Total Pages : 2

MCA/M-22

24643

MOBILE APPLICATION DEVELOPMENT

Paper-MCA-20-43

Time Allowed : 3 Hours]

[Maximum Marks : 75

Note : Attempt five questions in all, selecting **one** question from each Unit. Question No. 1 is compulsory. All questions carry equal marks.

Compulsory Question

1. Write short notes on the following : 5×3=15
- (a) List any three features of Android.
 - (b) What is API key for Google maps ?
 - (c) What is meant by Location based Services ?
 - (d) Describe Intents.
 - (e) Describe DVM.

UNIT-I

2. (a) Differentiate Grid layout and Table layout. 8
- (b) Describe Android and File structure. 7
3. Explain Android application life cycle and various components of Android. 15

UNIT-II

4. (a) Design an Android application to send a message. Write Java code too. 8

(b) Describe explicit Intent by giving a suitable example. 7

5. Explain the following with various properties :

(a) Radio and Checkboxes.

(b) Dialog and Pickers. 15

UNIT-III

6. (a) Which component of Android is responsible for Sensors ? How many categories of sensors does Android have ? 10

(b) Illustrate the state and relevant methods of MediaPlayer. 5

7. (a) Explain the concept of fragment with an example that contains three fragments in an activity. 10

(b) Describe Client Server application. 5

UNIT-IV

8. How many types of gradients are there in Android and how to make gradient background in Android. 15

9. (a) Differentiate MySQL and SQLite database. Can MySQL be used for Android applications ? 10

(b) What is the use of Content provider ? 5

Roll No.

Total Pages : 2 .

MCA/M-22

24645

MACHINE LEARNING

Paper-MCA-20-44(ii)

Time Allowed : 3 Hours]

[Maximum Marks : 75

Note : Attempt **five** questions in all, selecting **one** question from each Unit. Question No. 1 is compulsory. All questions carry equal marks.

Compulsory Question

1. (a) What are the limitations of SVM?
- (b) Compare classification with regression with an example.
- (c) What do you understand by clustering? Illustrate.
- (d) What is the difference between parameters and hyper parameters?

UNIT-I

2. (a) What is the difference between supervised and unsupervised learning? Discuss.
- (b) What do you understand by decision tree? Discuss the use of decision tree in supervised learning.
3. (a) What do you understand by machine learning? What are its applications? Discuss.
- (b) What is hyper parameter optimization? Discuss any approach for it.

UNIT-II

4. (a) What is simple linear regression? Discuss the steps for machine learning using linear regression.
(b) Explain Bayesian belief network and conditional independence with examples.
5. (a) What is CART in machine learning? How does CART process the splitting of the Dataset? Discuss.
(b) Discuss : (i) Prior Probability (ii) Conditional Probability (iii) Posterior probability.

UNIT-III

6. (a) Compare K means clustering with Hierarchical Clustering Techniques.
(b) What is sigmoid function? Explain the logistic regression technique for machine learning.
7. Discuss in detail Expectation Maximization (EM) algorithm for learning.

UNIT-IV

8. (a) What is the significance of dimensionality reduction? What are the properties of principal components in PCA? Discuss.
(b) What is Support Vector Machine (SVM)? What are its applications? Discuss.
9. (a) Write a note on the techniques for detecting the outliers in data.
(b) What do you understand by content based filtering in recommender system? Explain.

Roll No.

Total Pages : 3

MCA/M-22

24648

INFORMATION SYSTEMS

Paper-MCA-20-45

Option-(ii)

Time Allowed : 3 Hours] [Maximum Marks : 75

Note : Attempt **five** questions in all, selecting **one** question from each Unit. Question No. **1** is compulsory. All questions carry equal marks.

Compulsory Question

1. (a) Discuss major trends in information systems. 4
- (b) Define and describe software mashups and apps. 4
- (c) Why identity theft is such a big problem today? Discuss. 3
- (d) Describe how virtual reality systems support knowledge work? 4

UNIT-I

2. (a) What is Information system? Discuss the Operations and Management classification of information systems. 10
- (b) How can business applications of information systems support a firm's business processes, managerial decision making and strategies for competitive advantage? Explain using examples. 5

24648/K/2053/200

P. T. O.

3. (a) Discuss the following information system resources : 10
- (i) People
 - (ii) Hardware
 - (iii) Software
 - (iv) Data
 - (v) Network.
- (b) Discuss the basic activities of information systems. 5

UNIT-II

4. (a) Describe the evolving Mobile platform, Grid computing and Cloud computing. 8
- (b) Explain, how businesses can benefit from autonomic computing, virtualization and green computing? 7
5. (a) Define and describe an entity-relationship diagram and explain its role in database design. 7
- (b) Discuss data mining describe how it differs from OLAP and the types of information it provides. 8

UNIT-III

6. (a) Identify and describe the security problems posed by cloud computing and the mobile digital platform. 6
- (b) Discuss the general controls and application controls and describe each type of these controls. 9
7. (a) What are enterprise systems? How do enterprise systems help businesses achieve operational excellence? 8
- (b) Describe the challenges of global supply chains and how Internet technology can help companies manage them better. 7

UNIT-IV

8. Define and describe fuzzy logic, genetic algorithms, neural networks and intelligent agents. Explain how each works and the kinds of problems for which each is suited? 15
9. (a) Discuss Executive support system. 8
- (b) Distinguish between unstructured, semi-structured and structured decision. 7

Roll No.

Total Pages : 3

MCA/M-22

24649

BLOCKCHAIN TECHNOLOGY

Paper-MCA-20-45

Option-(iii)

Time Allowed : 3 Hours]

[Maximum Marks : 75

Note : Attempt **five** questions in all, selecting **one** question from each Unit. Question No. **1** is compulsory. All questions carry equal marks.

Compulsory Question

1. Answer the following questions in brief : 5×3=15
- (a) What is smart contract? What are properties of smart contracts?
 - (b) Explain different components of a Block.
 - (c) What are multichain and bigchain? Explain.
 - (d) What is decentralization? Why is it important?
 - (e) What are innovations in bitcoin? Explain in brief.

UNIT-I

2. (a) What is Blockchain? Discuss the historical evolution of the Blockchain technology. 7
- (b) What is DAO? How is it different from DAC? Also, explain characteristic of Maidsafe and Lisk decentralization platforms. 8

24649/K/2273/50

P. T. O.

3. (a) What are different types of Blockchain? Explain each with their merits and demerits. 8
- (b) What is bitcoin? Discuss routes of bitcoin. 7

UNIT-II

4. (a) Compare and contrast Blockchains and shared databases. 7
- (b) What are different types of Blockchain architectures? Explain each in brief. 8
5. (a) What is Cryptocurrency? What are different types of cryptocurrency? Discuss applications of cryptocurrency. 8
- (b) What are private and public keys in bitcoin? Explain relationships between them. Also explain how bitcoin address is generated. 7

UNIT-III

6. (a) What is proof-of-work? Discuss different alternative to proof-of-work. 8
- (b) What are wallets? Discuss different types of wallets. 7
7. Write short notes on the following :
- (a) Bitcoin Network. 5
- (b) Hashing. 5
- (c) Bitcoin Clients. 5

UNIT-IV

8. (a) What is Hyperledger? Explain architecture of Hyperledger with suitable diagram. 8
- (b) What is IOTA technology? Explain its working. 7
9. (a) How can you design a distributed application? Explain. 7
- (b) Discuss different applications of Blockchain. 8