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Total No. of Pages : 02

MCA (Sem-2)
DESIGN AND ANALYSIS OF ALGORITHMS

Subject Code : PGCA-1920

M.Code : 79616

Date of Examination : 11-05-2024

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

- INSTRUCTIONS TO CANDIDATES :**
1. SECTION-A is **COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
 2. SECTION - B & C. have **FOUR** questions each.
 3. Attempt any **FIVE** questions from SECTION B & C carrying **TEN** marks each.
 4. Select atleast **TWO** questions from SECTION - B & C.

SECTION-A

1. Write briefly :

- What is difference between an algorithm and a program?
- State principle of optimality.
- What do you mean by control abstraction?
- What are implicit and explicit constraints?
- How is randomized quicksort algorithm different from quicksort algorithm?
- What is the time complexity of conventional matrix multiplication method and Strassen's matrix multiplication method?
- Prove that if $f_1(n) = O(g_1(n))$ and $f_2(n) = O(g_2(n))$, then $f_1(n) + f_2(n) = O(\max(g_1(n), g_2(n)))$.
- Define the following terms in context of backtracking : E-node, live node, and dead node.
- What do you mean by recurrence relations? How are they solved?
- What are NP-hard and NP-complete problems?

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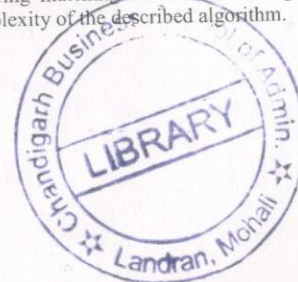
(S6)-565

SECTION-B

2. What are asymptotic notations? Describe with the help of examples various commonly used asymptotic notations.
3. What is 0/1 Knapsack, problem? Describe how 0/1 knapsack problem can be solved using branch- and-bound algorithm design strategy. Using LCB, solve the following instance of 0/1 knapsack problem: $n=5$, $p()=(10, 15, 6, 8, 4)$, $w()=(4, 6, 3, 4, 2)$ and $m=12$.
4. What do you mean by Hamiltonian circuit? Describe how Hamiltonian circuit problem can be solved using backtracking algorithm design strategy?
5. What do you mean by control abstraction? Using the control abstraction, describe in detail greedy approach of algorithm design.

SECTION-C

6. Describe quicksort algorithm for sorting a given list of elements. Perform its average and worst-case time complexity analysis. Is quicksort algorithm stable?
7. Describe in detail breadth-first search and depth-first search. What are the applications of each method?
8. Describe the problem classes - P, NP, NP-hard and NP-complete by giving an example of each class.
9. What is string matching? Describe a string-matching algorithm. Analyze the time and space complexity of the described algorithm.



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Total No. of Questions : 09

Total No. of Pages : 02

M.C.A. (Sem.-2)

WEB TECHNOLOGIES

Subject Code : PGCA1909

M.Code : 79615

Date of Examination : 08-05-2024

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C have FOUR questions each.
3. Attempt any FIVE questions from SECTION - B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1. Answer briefly :

- i) What is TCP/IP?
- ii) How to preserve white space in XHTML?
- iii) What are <div> and tags?
- iv) Define XML.
- v) What is Math object and Date object?
- vi) What is CSS and how they are used?
- vii) What is the meaning of COLSPAN and ROWSPAN?
- viii) How images are used as hyperlinks?
- ix) How to write javascript in HTML?
- x) How lists are used in HTML?

(S6)-360

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SECTION-B

2. How table is created and how COLSPAN and ROWSPAN is used?
3. Explain the several ways for positioning elements on the web pages.
4. How IP address is used in establishing connection?
5. How to set width and border of a table in HTML?

SECTION-C

6.
 - i) How FRAMESET tag is used?
 - ii) Write a Javascript to find factorial of a number.
7. What is CSS and how it is used? Explain with-its advantages.
8. How objects are created and used in Website?
9. How database connectivity is performed in Javascript?



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Total No. of Pages : 02

MCA (Sem.-2)
ADVANCED JAVA
Subject Code : PGCA/1918
M.Code : 79617
Date of Examination : 15-05-2024

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1. Answer Briefly :

- What do you mean by cookies?
- What is a session?
- What is JSP?
- What are struts?
- How is session management done in JSP?
- What is the basic principle of RMI architecture?
- What is the purpose of CORBA?
- What are the major advantages of using Hibernate framework?
- State the constructor of SimpleBeanInfo Class.
- What do you mean by JavaBeans?

1 | M-79617

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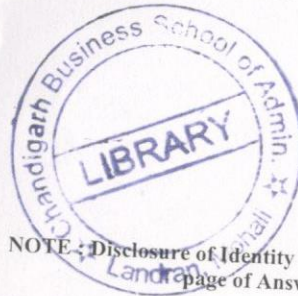
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SECTION-B

2. **Answer the following :**
 - a. Define the `init()` method of a Servlet. Explain in detail.
 - b. How cookies are used to track a session? Write a program in support of your answer.
3. **Answer the following :**
 - a. Why is JSP preferred over Servlets? Explain.
 - b. What is the use of `page` and `include` directive tags?
4. Explain the various components of struts framework.
5. What is MVC architecture in struts framework? Explain the basic architecture of model, view, controller in struts.

SECTION-C

6. Write a program to show remote interface using remote method invocation.
7. What are the main components of CORBA architecture? Explain in detail.
8. Explain Hibernate architecture in detail.
9. **Answer the following :**
 - a. List and explain any 2 classes available in Javabeans package.
 - b. What is the difference between Stateful and Stateless session beans?



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Total No. of Questions : 09

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MCA (Sem-2)

INFORMATION SECURITY AND CYBER LAW

Subject Code : PGCA1932

M.Code : 79619

Date of Examination : 22-05-2024

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C have FOUR questions each.
3. Attempt any FIVE questions from SECTION - B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1. Write short notes on :
 - a. What is a firewall in information security?
 - b. What is an intrusion detection system in information security?
 - c. What is penetration testing in information security?
 - d. What is cyber law?
 - e. What is a cyber crime?
 - f. What is cyber stalking?
 - g. What is identity theft?
 - h. What is hacking?
 - i. What is phishing?
 - j. What is malware?

SECTION-B

2. What are some common threats to database security, such as unauthorized access, SQL injection attacks, and data leakage, and how can they be prevented or mitigated? What are some best practices for securing databases, such as access control, encryption, and data masking, and how can they be implemented in different types of database systems?
3. What are some common threats to each aspect of the CIA triad, and how can they be prevented or mitigated? How can organizations balance the need for security with the need for accessibility and usability of their data?
4. What is Role-Based Access Control (RBAC) in information security, and how does it help organizations manage access to their resources based on job functions and responsibilities? How is RBAC different from other access control models, such as Discretionary Access Control (DAC) and Mandatory Access Control (MAC)?
5. What are Denial-Of-Service (DoS) attacks and rootkits in information security, and how do they work to disrupt or compromise the availability, integrity, and confidentiality of data and systems? What are some common types of DoS attacks, such as flooding, amplification, and distributed DoS (DDoS), and how can they be prevented or mitigated?

SECTION-C

6. What is the role of IDS in detecting potential security breaches, and what are the different types of IDS used to monitor network traffic and system activity? What are some best practices for implementing a firewall and IDS in an organization, and how can they be used together to improve overall security posture?
7. What are cryptographic algorithms, and how are they used in information security to protect data confidentiality, integrity, and authenticity? What are the different types of cryptographic algorithms, and what are their strengths and weaknesses?
8. How can security policies be effectively communicated and enforced throughout an organization, and what are some best practices for maintaining and updating security policies over time? What are some examples of cyber laws and regulations, and how do they impact information security practices in different industries and jurisdictions?
9. What are some commonly used internet security protocols and standards, such as SSL/TLS, IPsec, and DNSSEC, and how do they help to secure communication and data exchange over the internet? How do these protocols and standards work to provide confidentiality, integrity, and authenticity of information, and what are some best practices for implementing them in an organization?

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May-June-2024

Roll No.

Total No. of Questions : 09

Total No. of Pages : 02

MCA (Sem.-2)

LINUX ADMINISTRATION

Subject Code : PGCA-1956

M.Code : 79618

Date of Examination : 24-05-2024

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C. have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying EIGHT marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

I. Write short notes on :

- i. GUI (Graphical User Interface)
- ii. Kernel
- iii. Booting Process in Linux
- iv. File Permissions in Linux
- v. Steps and Linux Command to Unpacking the Package
- vi. Web Server
- vii. HTTP Protocol
- viii. SMTP Protocol
- ix. POP3 Protocol
- x. Samba SWAT.

May-June-2024

SECTION-B

2. Differentiate between Linux and Windows operating systems. Using Suitable examples.
3. Define Linux root user role and discuss its differences from Windows admin accounts.
4. Explain Linux file permissions' role in security also describes types and manipulation.
5. Explain Linux package and user management processes. Include software installation and user/group administration.

SECTION-C

6. Describe the process of installing and configuring a DNS server, including setting up BIND database files and configuring DNS clients.
7. Discuss the various types of DNS records and their significance in DNS resolution. How do they contribute to domain management?
8. Explain the steps involved in understanding the HTTP protocol. How does it facilitate communication between clients and servers?
9. Detail the installation process of Apache HTTP Server and discuss the steps for starting up and shutting down Apache.



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Roll No.

Total No. of Pages : 02

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MCA (Sem.-3)
E-COMMERCE AND DIGITAL MARKETING

Subject Code : PGCA-1921

M.Code : 90807

Date of Examination : 19-12-2024

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C. have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select atleast TWO questions each from SECTION - B & C.

SECTION-A

1. Write short notes on:

- a) What is ISP?
- b) Discuss Hypertext Publishing.
- c) What is meant by token Based systems?
- d) Define EDI.
- e) What are customer EDI systems?
- f) Write concept of Blogging.
- g) What are Forums?
- h) Discuss content marketing strategy.
- i) Write the function of Mobile Marketing.
- j) Write about Web Analysis.

SECTION-B

2. Discuss the framework of E-commerce.
3. Define following :
 - a. Value Exchange System
 - b. Designing Electronic Payment System.
4. Discuss the legal and security issues in Electronic data Exchange Procedure?
5. Explain the role of Smart cards and credit cards in Electronic Payment System.

SECTION-C

6. Discuss the advantages of Online Marketing. What is the importance of Social Media Marketing?
7. What is need for Search Engine Optimization? Explain its analysis on Search Engine
8. What is the use of keyword research and analysis? Explain keyword research tools
9. Explain the impact of various strategies to improve the web product to improve the marketing

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Total No. of Questions : 09

Total No. of Pages : 02

MCA (Sem.-3)

E-COMMERCE AND DIGITAL MARKETING

Subject Code : PGCA-1921

M.Code : 90807

Date of Examination : 19-12-2024

Time : 3 Hrs.

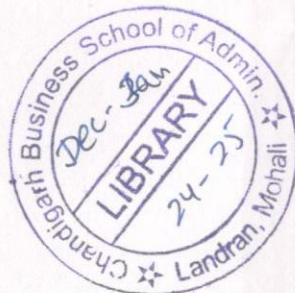
Max. Marks : 70

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 - a) What is ISP?
 - b) Discuss Hypertext Publishing.
 - c) What is meant by token Based systems?
 - d) Define EDI.
 - e) What are customer EDI systems?
 - f) Write concept of Blogging.
 - g) What are Forums?
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Total No. of Questions : 09

Total No. of Pages : 02

MCA (Sem.-3)

SOFTWARE PROJECT MANAGEMENT

Subject Code : PGCA1930

M.Code : 90801

Date of Examination : 12-12-2024

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select atleast TWO questions from each SECTION - B & C.

SECTION-A

1. Write short notes on :
 - a) Define project management process?
 - b) Write use of COCOMO2 model.
 - c) What is meant by cost benefit evaluation?
 - d) Define Capers jones rule?
 - e) What is scheduling activity?
 - f) What is Software People Management?
 - g) Discuss hazard analysis.
 - h) Discuss monte carlo simulation model.
 - i) What is organizational structure?
 - j) Write a short note on Software Reliability.

SECTION-B

2. What is cost-benefit analysis? Discuss the cost-benefit evaluation techniques.
3. **Define following :**
 - a) Requirement analysis
 - b) Hazard analysis
4. Illustrate the PERT method for identifying the critical path of project.
5. Write in brief the Types of Risk Management and managing its use in software project management.

SECTION-C

6. Write in detail the monitoring and control of software project management cycle. Discuss various collection data techniques.
7. Discuss Contract Management. What are the types of Contracts and its stages?
8. Explain different approaches for Quality Management. Give the overview of any one case study of Quality Management.
9. What is the criteria for selecting the team structure?

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Total No. of Questions : 09

Total No. of Pages : 02

MCA (Sem.-3)

THEORY OF COMPUTATION

Subject Code : PGCA1927

M.Code : 90800

Date of Examination: 5-12-2024

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select atleast TWO questions from each SECTION - B & C.

SECTION-A

- I. Write short notes on:**
- a) Mealy machines
 - b) Yield of a tree
 - c) Left context
 - d) Transition Diagram
 - e) NDFA
 - f) Type-3 grammar
 - g) Right Derivative
 - h) Theory of Computation
 - i) LBA
 - j) Normal Forms.

SECTION-B

2. Construct a finite automata equivalent to the regular expression:

$$(0+1)^*(00+11)(0+1)^*$$

3. Prove that $P + PQ^*Q = a^*bQ^*$ where $P = b + aa^*b$ and Q is any regular expression.
4. Find a grammar in GNF equivalent to the grammar

$$S \rightarrow XB \mid AA \quad A \rightarrow a \mid SB \quad B \rightarrow b \quad X \rightarrow a$$

5. What is a Derivation Tree and Grammar? Explain the concept of ambiguous grammar with help of example.

SECTION-C

6. Explain the variants of Turing Machines.
7. Design PDA for $\{wcw^T \mid w = \{a,b\}^*\}$.
8. Write a note on halting problems and tractable and intractable problems.
9. Design Turing Machine of $\{0^n 1^n 2^n \mid n \geq 1\}$.

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Total No. of Questions : 09

MCA (Sem.-3)

Subject Code : PGCA1926
M. Code : 90799

M.Code : 90799

Max. Marks : 70

Time : 3 Hrs.

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is **COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. SECTION - B & C. have **FOUR** questions each.
3. Attempt any **FIVE** questions from SECTION-B & C carrying **TEN** marks each.
4. Select atleast **TWO** questions from SECTION-B & C.

1. Write short notes on :

- Write a brief note on backward chaining.
- List the differences between propositional logic and first order predicate logic.
- Write down the steps of A* search.
- What is pragmatic analysis in natural language processing?
- Differentiate between hard computing and soft computing.
- What is associative memory?
- Define minmax composition in fuzzy sets with the help of example.
- What is the significance of fitness function in genetic algorithm?
- Discuss some examples of activation functions used in neural networks.
- What are the various levels of artificial intelligence?

- Define artificial intelligence. Discuss the history of artificial intelligence. Explain how 8-queens can be formulated and solved as an artificial intelligence problem?
- Discuss the salient features of propositional logic. Consider the following facts and construct a step-by-step proof by resolution of the statement "John likes peanuts".

- a. John likes all kinds of food.
 - b. Apple and vegetable are foods.
 - c. Anything anyone eats and is not killed by is food.
 - d. Anil eats peanuts and is still alive.
 - e. Harry eats everything that Anil eats.
4. List the features of hill climbing algorithm. Write a brief note on simulated annealing.
5. What are the components of natural language processing? Explain the steps in the process of natural language processing.

6. What are the requirements of soft computing? Discuss the major application areas of soft computing.
7. Write a detailed note on the architecture of backpropagation neural network. Explain the process of backpropagation learning.
8. Write short notes on :

- a. Fuzzy decision making
- b. Fuzzy classification.

9. Write down the steps of genetic algorithm. Discuss the operators in genetic algorithm.

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Total No. of Questions : 09

Total No. of Pages : 02

MCA (Sem.-3)

ADVANCED COMPUTER NETWORKING

Subject Code : PGCA1925

M.Code : 90798

Date of Examination : 29-11-2024

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C. have FOUR questions each.
3. Attempt any FIVE questions from SECTION - B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

- 1. Write short notes on the following :**
- What are the goals of Computer Networks?
 - What is ALOHA?
 - Find the netid and hostid in 132.57.8.6 the IP address
 - What are the transmission impairments?
 - Write down four differences between UDP and TCP.
 - What is a cellular network?
 - What is the difference between hard handoff and soft handoff?
 - Give four examples of wireless communication systems.
 - List the features of Adhoc networks.
 - What is frequency reuse factor?

SECTION-B

2.
 - a) Write down the applications of Computer Networks.
 - b) What are the design issues of transport layer? Also write down the type of addresses used by the transport layer and their size.
3. What is selective repeat ARQ sliding window protocol? How it is used to manage flow control? Explain with the help of diagrams.
4. Write a detailed note on wireless transmission media.
5. Define Routing. Explain the working of Distance Vector Routing algorithm.

SECTION-C

6. What is IEEE 802.11 network? List the components of IEEE 802.11 architecture and explain the main fields included in IEEE 802.11 frame format.
7. What is an Adhoc network? List the routing protocols used in Ad-hoc networks. Also explain the working of Ad-hoc on demand distance vector routing algorithm.
8. Explain the coverage and capacity improvement techniques for cellular systems.
9. a) Describe evolution for 2.5G TDMA Standards.
b) List five issues in seamless mobility in reference to wireless networks.

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SOFTWARE PROJECT MANAGEMENT

Subject Code : PGCA1930

M.Code : 90801

Date of Examination : 20-06-2024

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1. Write short notes on :

- (i) What do you mean by Software Quality Assurance?
 - (ii) What do you mean by risk quantification?
 - (iii) What are milestones?
 - (iv) What is the significance of cost-benefit analysis?
 - (v) What is critical path? What is its importance?
 - (vi) Mention the important activities in the Software Project Management.
 - (vii) Define risk identification and its ranking.
 - (viii) What is risk management?
 - (ix) What are the advantages of COCOMO?
 - (x) What is Phase?
- 



SECTION-B

2. What is Project Planning? What are the major activities in Project Planning? Explain in detail.
3. Explain drawing of Gantt Chart with an example. Also, state the difference between CPM and PERT.
4. Define project. How software project differs from other projects?
5. Discuss the various risks in a project is susceptible to. How the Risk Management plans are derived and implemented?

SECTION-C

6. What are the Project Execution processes? Explain them in detail.
7. What are the steps in Project Closure? Explain in detail.
8. Explain Oldham-Hackman Job characteristic model.
9. Explain with an example how the earned value chart depicts scheduled progress, actual cost and actual progress (earned value) to allow the determination of spending, schedule and time variances?



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MCA (Sem.-3)
ADVANCED COMPUTER NETWORKING

Subject Code : PGCA1925

M.Code : 90798

Date of Examination : 12-06-2024

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C. have FOUR questions each.
3. Attempt any FIVE questions from SECTION -B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

- I. Write short notes on :
 - a) Define Multiplexing.
 - b) Discuss hamming code.
 - c) Write about sliding window protocol.
 - d) What is principle of congestion control?
 - e) Write about FTP.
 - f) Define WLAN.
 - g) What is the use of IEEE 802.11?
 - h) Compare Adhoc vs cellular networks.
 - i) Discuss TDMA.
 - j) What is Frequency reuse?

SECTION-B

2. Discuss in detail the OSI model used in Computer Networks?
3. **Define following :**
 - a) Transmission media
 - b) Error detection and correction codes.
4. Write the various routing algorithms used in networking.
5. Explain the addressing and flow control on transport layer.

SECTION-C

6. Discuss in detail the Wireless and Mobile Networking Technologies.
7. a) **Write a note on** features of Adhoc Network.
b) Give the introduction of MAC Protocols.
8. Discuss the evolution of 2G cellular networks. How it is used for wireless communication?
9. How would the coverage and capacity improvement be done in cellular systems?



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Total No. of Pages : 02

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MCA (Sem.-3)
E-COMMERCE AND DIGITAL MARKETING

Subject Code : PGCA-1921

M.Code : 90807

Date of Examination : 08-06-2024

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is **COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. SECTION - B & C have **FOUR** questions each.
3. Attempt any **FIVE** questions from SECTION-B & C carrying **TEN** marks each.
4. Select atleast **TWO** questions from SECTION - B & C.

SECTION-A

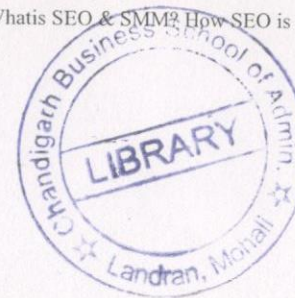
1. Write briefly:
 - i. Value exchange system
 - ii. SEO
 - iii. Google rankings
 - iv. P-O-E-M Framework
 - v. E-commerce
 - vi. Influencer marketing
 - vii. Display media
 - viii. Paid search
 - ix. Hypertext publishing
 - x. LinkedIn marketing.

SECTION-B

2. Write in detail how WWW is used as architecture and hypertext publishing?
3. **Define following :**
 - i. Electronic Fund Transfer.
 - ii. Risk in Electronic Payment System.
4. Write the various Electronic Data Interchange methods explaining their uses.
5. Explain the Legal security and privacy issues in E-Commerce.

SECTION-C

6. How can digital marketing strategy be planned to address the marketing challenges?
7. What is the digital marketing landscape? What are the skills required in digital Marketing?
8. Discuss the various content creation tools & apps. What are the challenges of content marketing?
9. What is SEO & SMM? How is SEO helping businesses to grow?



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Total No. of Questions : 09

Total No. of Pages : 02

MCA (Sem.-3)

THEORY OF COMPUTATION

Subject Code : PGCA 1927

M.Code : 90800

Date of Examination : 18-06-2024

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C. have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1. Write short notes on :
- a) DFA
 - b) Moore
 - c) Ambiguity
 - d) Type-2 grammar
 - e) CNF
 - f) Left context
 - g) Language
 - h) Unit Productions
 - i) PDA
 - j) Transition Diagram.

SECTION-B

2. Construct a Moore machine equivalent to the Mealy machine M defined as follows:

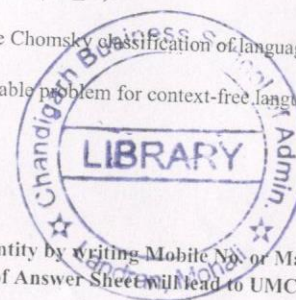
Present State	Next State			
	a = 0		a = 1	
	state	output	state	output
$\rightarrow q_1$	q_1	1	q_2	0
q_2	q_4	1	q_4	1
q_3	q_2	1	q_3	1
q_4	q_3	0	q_1	1

3. Write a note on how to minimize finite automata.
4. Define regular sets and write its closure properties.
5. Find a grammar in GNF equivalent to the grammar

$$E \rightarrow E + T \mid \quad T \rightarrow T * F \mid F \quad F \rightarrow (E) \mid a.$$

SECTION-C

6. Describe TM and its representations in detail.
7. Design PDA for $\{a^m b^m \mid m \geq 1\}$.
8. Explain in detail the Chomsky classification of languages.
9. Write a note unsolvable problem for context-free languages and classifying complexity.



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[illegible]

Total No. of Questions : 09

Total No. of Pages : 03

MCA (Sem.-4)

MACHINE LEARNING AND DATA ANALYTICS USING PYTHON

Subject Code : PGCA-1976

M.Code : 91855

Date of Examination : 07-05-2024

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1. Answer Briefly :

- When to apply linear regression?
- Write the loss function for multiple linear regression.
- How to do multiclass classification using logistic regression?
- Name a method used in choosing the value of K in KNN.
- What are the criteria for choosing a root in a decision tree?
- Why do we use the dot (.) operator in python?
- What are various datatypes in Python?
- When do we need NumPy?
- Write two advantages of using PCA.
- What is supervised learning? Explain with an example.

SECTION-B

2. a) Explain the working of Decision Trees.
b) What are the advantages of random forests over decision trees?
3. a) Explain PCA in detail using eigen values and eigen vectors.
b) *Logistic regression does work of classification. Discuss.*
4. a) What are neural networks? When do we use them?
b) What are the various hyperparameters needed for neural networks?
5. Consider the following training set that classifies the output variable play tennis as Yes or No depending upon weather conditions such as Outlook, Temperature, Humidity, and Windy Status.

S. No.	Outlook	Temperature	Humidity	Windy	Play Tennis
1	Sunny	Hot	High	Weak	No
2	Sunny	Hot	High	Strong	No
3	Overcast	Hot	High	Weak	Yes
4	Rainy	Mild	High	Weak	Yes
5	Rainy	Cool	Normal	Weak	Yes
6	Rainy	Cool	Normal	Strong	No
7	Overcast	Cool	Normal	Strong	Yes
8	Sunny	Mild	High	Weak	No
9	Sunny	Cool	Normal	Weak	Yes
10	Rainy	Mild	Normal	Weak	Yes
11	Sunny	Mild	Normal	Strong	Yes
12	Overcast	Mild	High	Strong	Yes
13	Overcast	Hot	Normal	Weak	Yes
14	Rainy	Mild	High	Strong	No

Using Naive Bayes Classifier, classify whether, on a Sunny, Cool, Normal Humidity, and Weak Windy day, we can play tennis or not.

SECTION-C

6. Write Python code for printing the first N Fibonacci series values.
7.
 - a) What are the various functionalities of Pandas library for handling CSV files and manipulating them? Discuss in detail.
 - b) What is the difference between a series and a list? Explain using examples.
8.
 - a) Explain the usage of the Matplotlib library using examples.
 - b) Write the matplotlib command for generating histograms and pie charts.
9.
 - a) What are the various techniques for handling missing data?
 - b) Discuss how to do data input and output in Pandas.

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