

Course Name: MCA / MCAC0013 Design & Analysis of Algorithm**Course Outcome**

- CO1- Understanding of complexity representation in terms of Big Oh, Theta and Omega notations.
- CO2- Derive and solve recurrences describing the performance of divide-and-conquer algorithms (quick sort and merge sort).
- CO3- Compare and analyze different data structures (RB Tree, B Tree, Binomial Heaps, Fibonacci Heaps).
- CO4- Understand the major graph algorithms (DFS, BFS, Dijkstra's Bellman Ford) and their analyses.
- CO5- Understand the greedy paradigm and able to analyze when an algorithmic design situation calls for it. Synthesize greedy algorithms (Optimal Reliability Allocation, Minimum Spanning Trees, Fractional Knapsack) and analyze them.
- CO6- Synthesize dynamic-programming algorithms (0/1 knapsack problem, Resource allocation problem, Warshall's and Floyd's algorithms) and analyze them.
- CO7- Understand the backtracking paradigm and able to analysis when an algorithmic design situation calls for it. Synthesize backtracking algorithms (N Queen Problem, TSP Problem, sum of subsets problem, Graph Coloring) and analyze them.

Printed Pages: 3**University Roll No.****End Term Examination, Even Semester 2022-23****MCA, I Year, II Semester****MCAC0013 Design & Analysis of Algorithm****Time: 3 Hours****Maximum Marks: 50****Section - A****Attempt All Questions****4 X 5 = 20 Marks**

No.	Detail of Question	Marks	CO	BL	KL																
1	What is recurrence relation? Solve the following recurrence relation using recursion tree method. $T(n) = 3T\left(\frac{n}{4}\right) + cn^2$	4	2	A	C																
2	Construct a B-Tree of order 3 by inserting all integers from 3 to 10. Also, compare the running time of make-heap and extract-min operations in Binomial heap and Fibonacci heap.	4	3	An	C																
3	A file contains the following characters with the frequencies as shown. Use Huffman Coding for data compression and determine. a. Huffman Code for each character b. Average code length	4	5	A	P																
<table border="1"> <tr> <td>Characters</td> <td>a</td> <td>e</td> <td>i</td> <td>o</td> <td>u</td> <td>S</td> <td>t</td> </tr> <tr> <td>Frequencies</td> <td>10</td> <td>15</td> <td>12</td> <td>3</td> <td>4</td> <td>13</td> <td>1</td> </tr> </table>						Characters	a	e	i	o	u	S	t	Frequencies	10	15	12	3	4	13	1
Characters	a	e	i	o	u	S	t														
Frequencies	10	15	12	3	4	13	1														

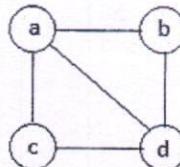
4	The running time of Prim's algorithm depends on how we implement the min-priority queue. Which type of heap data structure you will suggest to have the running time of Prim's algorithm to be $O(E + V \lg V)$ Justify your answer.	4	4	An	M
5	Find the longest possible sequence of characters common in the given strings. A: bghkdl B: sbahdml	4	6	A	P

Section – B

Attempt All Questions

3 X 5 = 15 Marks

No.	Detail of Question	Marks	CO	BL	KL
6	What are the basic features of Dynamic Programming approach? How does it differ from Backtracking?	3	6	R	F
7	Which graph searching algorithm guarantees to provide a path from start node to the given node but does not guarantee its optimality. Justify your answer with a suitable example.	3	4	U	C
8	Explain the following terms with respect to a flow network using a suitable example: a. Residual capacity b. Maximum flow c. Minimum cut	3	4	R	C
9	Explain the use of state-space tree in m-coloring problem? Also draw the state space tree for the following graph.	3	7	U	C
10	DNA is a sequence of nucleotides: adenine (A), thymine (T), guanine (G), and cytosine (C). A biologist wants to find a particular pattern of such	3	7	R	P



nucleotides, corresponding to certain disorder, in a given DNA. Suggest one algorithm for same and also explain its working.

Section - C

Attempt All Questions

5 X 3 = 15 Marks

No	Detail of Question	Marks	CO	BL	KL																									
11	<p>Dijkstra's algorithm is widely used in the routing protocols required by the routers to update their forwarding table. The graph given below represents the distance between the routers. Use Dijkstra's Algorithm to find the shortest path from source router S and update the forwarding table.</p> <pre> graph LR S((S)) -- 1 --> a((a)) S -- 5 --> b((b)) a -- 2 --> c((c)) a -- 2 --> b b -- 2 --> d((d)) c -- 3 --> d </pre>	5	4	A	P																									
12	<p>Explain matrix chain multiplication as dynamic programming problem. Also find the optimal parenthesis for the following sequence of matrices.</p> $A_1: 6 \times 4; A_2: 4 \times 5; A_3: 5 \times 3;$ $A_4: 3 \times 7; A_5: 7 \times 2$	5	6	U	P																									
13	<p>You have to deliver some goods at different places in Mathura. You need to start your journey from GLA University (U), visit Goverdhan square (G), Banke Bihari Temple (B), Mathura Jn. (M) and return back to university. Consider the distances among the locations as per the matrix given below and find the optimal sequence to travel these locations.</p> <table border="1"> <thead> <tr> <th>Locations</th><th>U</th><th>G</th><th>B</th><th>M</th></tr> </thead> <tbody> <tr> <td>U</td><td>0</td><td>18</td><td>13</td><td>24</td></tr> <tr> <td>G</td><td>19</td><td>0</td><td>15</td><td>9</td></tr> <tr> <td>B</td><td>15</td><td>20</td><td>0</td><td>10</td></tr> <tr> <td>M</td><td>26</td><td>8</td><td>9</td><td>0</td></tr> </tbody> </table>	Locations	U	G	B	M	U	0	18	13	24	G	19	0	15	9	B	15	20	0	10	M	26	8	9	0	5	7	An	C
Locations	U	G	B	M																										
U	0	18	13	24																										
G	19	0	15	9																										
B	15	20	0	10																										
M	26	8	9	0																										

Course Name: Database Management System

Course Outcome

- CO1- Understand the concept of database management systems and Relational database.
 CO2- Identify the various data model used in database design.
 CO3- Design conceptual models of a database using ER modeling for real life applications and construct queries in Relational Algebra.
 CO4- Create and populate a RDBMS for a real life application, with constraints and keys, using SQL.
 CO5- Select the information from a database by formulating complex queries in SQL.
 CO6- Analyze the existing design of a database schema and apply concepts of normalization to design an optimal database.

Printed Pages: 4

University Roll No.

End Term Examination, Even Semester 2022-23

Program: MCA, Year: I, Semester: II

DATABASE MANAGEMENT SYSTEM (MCAC0009)

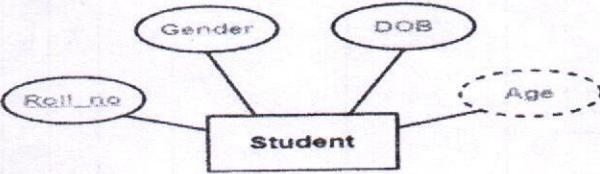
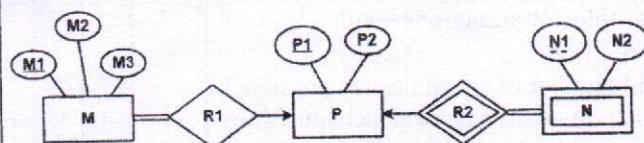
Time: 3 Hours

Maximum Marks: 50

Section - A

Attempt All Questions

4 X 5 = 20 Marks

No.	Detail of Question	Marks	CO	BL	KL
1	<p>What are the various types of attributes of an entity and how we can represent them diagrammatically? What are the types of the attributes in the following ER diagram?</p> 	4	1	R	F
2	<p>How many tables will be formed by entity relationship diagram given below and what are they? Identify strong and weak entity sets in the given ER diagram. What is the primary key of weak entity set of the given ER diagram?</p> 	4	3	U	F
3	<p>Why would you choose a database system instead of simply storing data in operating system files? When would it make sense not to use a database system?</p>	4	1	R	F

	<p>Consider the following relation schema:</p> <p>employee (person-name, street, city)</p> <p>works (person-name, company-name, salary)</p> <p>company (company-name, city)</p> <p>manages (person-name, manager-name)</p> <p>Write the relational algebra for the following queries:</p> <ol style="list-style-type: none"> Find the names of all employees who work for ABC bank. Find the names and cities of residence of all employees who work for ABC bank. Find the names, street address, and cities of residence of all employees who work for ABC bank and earn more than \$10,000 per annum. Find the names of all employees in this database who live in the same city as the company for which they work. 																			
4		4	3	A C																
5	<p>Check whether the given schedule S is conflict serializable and recoverable or not-</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>T1</th> <th>T2</th> <th>T3</th> <th>T4</th> </tr> </thead> <tbody> <tr> <td></td> <td>R(X)</td> <td></td> <td></td> </tr> <tr> <td>W(X) Commit</td> <td></td> <td>W(X) Commit</td> <td></td> </tr> <tr> <td></td> <td>W(Y) R(Z) Commit</td> <td></td> <td>R(X) R(Y) Commit</td> </tr> </tbody> </table>	T1	T2	T3	T4		R(X)			W(X) Commit		W(X) Commit			W(Y) R(Z) Commit		R(X) R(Y) Commit	4	6	U C
T1	T2	T3	T4																	
	R(X)																			
W(X) Commit		W(X) Commit																		
	W(Y) R(Z) Commit		R(X) R(Y) Commit																	

Section – B

Attempt All Questions

3 X 5 = 15 Marks

No.	Detail of Question	Marks	CO	BL	KL
6	<p>Consider there are three transactions with 2, 3, 4 operations respectively, find-</p> <ol style="list-style-type: none"> How many total number of schedules are possible? How many total number of serial schedules are possible? How many total number of non-serial schedules are possible? 	3	4	R	F

7	<p>Check whether the given schedule S is view serializable or not. If yes, then give the serial schedule.</p> <p>S : R₁(A) , W₂(A) , R₃(A) , W₁(A) , W₃(A)</p>	3	6	U	C
8	<p>Consider the following relation schema:</p> <p>College (Cname, State, enrollment)</p> <p>Student (Sid, Sname, GPA, Sizehs, Dob)</p> <p>Apply (Sid, Cname, Major, Decision)</p> <p>Write the Sql queries for the following :</p> <p>a) Find detail of applications who applied to California State.</p> <p>b) Find Sids, name, GPA of students and name of college with GPA > 3.7 applying to Stanford.</p> <p>c) Find details of students who have not applied to any of college.</p>	3	5	A	C
9	<p>Consider the following transaction involving two bank accounts x and y.</p> <p>read (x); x: = x - 50; write (x); read (y); y: = y + 50; write (y)</p> <p>Which ACID property is maintained so that the sum of the accounts x and y should remain constant.</p> <p>Discuss ACID properties with example.</p>	3	4	A	P
10	Discuss the Wait-Die & Wound-Wait deadlock prevention approaches with example.	3	6	A	P

Section – C

Attempt All Questions

5 X 3 = 15 Marks

No.	Detail of Question	Marks	CO	BL	KL
11	<p>Consider the following log sequence of two transactions on a bank account, with initial balance 12000, that transfer 2000 to a mortgage payment and then apply a 5% interest.</p> <p>1. T1 start</p> <p>2. T1 B old=12000 new=10000</p> <p>3. T1 M old=0 new=2000</p> <p>4. T1 commit</p>	5	4	U	C

	5. T2 start 6. T2 B old=10000 new=10500 7. T2 commit Suppose the database system crashes just before log record 7 is written. When the system is restarted, what actions the system will take and why?			
12	Discuss the preventive measures which ensures the recovery from hold and wait and circular wait type of deadlock conditions? Consider the following two phase locking protocol. Suppose a transaction T accesses (for read or write operations), a certain set of objects {O1,...,Ok}. This is done in the following manner: Step 1. T acquires exclusive locks to O1, . . . , Ok in increasing order of their addresses. Step 2. The required operations are performed. Step 3. All locks are released. What type of guarantee free operation it will provide?	5	6	U P
13	Consider the transactions T1, T2, and T3 and the schedules S1 and S2 given below. Draw the serializability (Precedence) graph for S1 & S2 and state that whether each schedule is serializable or not. If a schedule is serializable, write down the equivalent serial schedule(s). T1: r1(X); r1(Z); w1(X); T2: r2(Z); r2(Y); w2(Z); w2(Y); T3: r3(X); r3(Y); w3(Y) S1: r1(X); r2(Z); r1(Z); r3(X); r3(Y); w1(X); w3(Y); r2(Y); w2(Z); w2(Y); S2: r1(X); r2(Z); r3(X); r1(Z); r2(Y); r3(Y); w1(X); w2(Z); w3(Y); w2(Y);	5	6	U C

Course Name: English for Professional Purposes II (BELH0004)

Course Outcomes:

CO1-The topics dealing with communication aspects will train the students hands on, by enabling them understand/identify and appreciate the barriers to communication, ways to overcome, process, type of communication etc.

CO2-The students will be able to understand the needs and requirements of the target audience based on their exposure and knowledge of the subject and will be able to communicate accordingly with certain level of accuracy.

CO3-The writing skills of the students will be enhanced to such an extent that they could easily prepare and manage materials and strategies of formal correspondence themselves.

CO4-The students will be equipped with interpersonal skills through listening and speaking activities. The exercises will help in getting rid of stage-fear, nervousness and hesitation during deliveries of official nature.

CO5-The students will be able to identify and rectify grammatical errors in written communication.

Printed Pages: 7

University Roll No.

End Term Examination, Even Semester 2022-23

MCA, First Year, II Semester

English for Professional Purposes II: BELH0004

Time: 3 Hours

Maximum Marks: 50

Section – A

Attempt All Questions

4 X 5 = 20 Marks

No.	Details of Questions	Marks	CO	BL	KL
1	Write an essay on <i>any one</i> of the following topics (300 words): A. What will life be like in 2050? B. A week without internet and technology C. A day in the life of an Engineer	4	3	A	P
2	(i) Write the following phonetically transcribed words in English Alphabet: A. /ə'bʌv/ B. /'dɪkʃənri/ C. /ðeə(r)/ D. /'eɪdʒənt/ (ii) Count the number of syllables in the following words: A. position B. interview C. section D. internet	2+2	4	An	P

Read the advertisement given below and, considering yourself as ABC, answer questions (3-5)



॥ विद्या योगेन रक्ष्यते ॥

भारतीय शिक्षा बोर्ड Bhartiya Shiksha Board (BSB)

Haridwar - Uttarakhand, Bharat (India) 249405
Equivalent to Central/State School Board of India: AIU/EV/IN(1)/2022/BSB
Website: www.bsb.org.in | Email: secretary@bsb.org.in | Phone: +91-9868122

Notification

Following IT personnels are required in the office of
Bhartiya Shiksha Board (BSB), Haridwar.

The Post and the salary be commensurate to their expertise and qualification.

Solution Architect - 1

Qualification: B.E./B.Tech./M.S./M.Tech-CS/IT or MCA

Experience: 10+ Years(PG), 12+ Years (UG)

Project Role Description: To build frameworks and architect strategic solution end to end while leading software development team and mentoring the technology front. Must be a quick self-learner, adaptable and capable enough work on emerging technology platforms.

Technological Experience: Open Source- JAVA-J2EE, PHP, PostgreSQL, MySQL, MongoDB/NoSQL DB.

7+ years of hands-on stack development experience, 3+ years of p architectural/technology leadership experience with a strong track record of successful project delivery. Required and experiences certified architect on a one cloud platform (Azure, AWS, GCP) is mandatory certified architect on a one technology platform like Java, .Net, Front-ends etc.

Tech Leads - 1

Qualification: B.E./B.Tech./M.S./M.Tech-CS/IT or MCA

Experience: 8-10 Years (UG Level), 7-9 Years (PG Level)

Technological Experience: Open Source- JAVA-J2EE, PHP, PostgreSQL, MySQL, MongoDB/NoSQL DB.

R. P. Singh IPS (Retd)

Secretary, Bhartiya Shiksha Board, Haridwar.

In response to the above advertisement, write a cover letter to the Secretary, Bhartiya Siksha Board, Haridwar, for either of the posts mentioned.

4 Considering yourself as ABC, prepare a tailored resume to be attached with your cover letter.

5 On the basis of your resume prepared for the answer of Question no. 4 of Section A of this question paper, answer the following interview

4 2 An P

4 2 An P

2+2 4 U P

	questions: A. Introduce yourself. B. Why should you be hired?				
--	---	--	--	--	--

Section – B

Attempt All Questions

$3 \times 5 = 15$ Marks

No.	Details of Questions	Marks	CO	BL	KL
6	<p>Spot the errors, if any:</p> <p>(i) Hardly had (A)/ she gone (B)/ than an inspector knocked at the door. (C) No error (D)</p> <p>(ii) I heard the (A)/ unfortunate news (B)/ that his father died (C)/ from lung cancer. (D)</p> <p>(iii) After opening the door (A) / the teacher entered into (B)/ the class room next to the balcony. (C) No Error (D)</p>	3	5	U	C
7	<p>Spot the errors, if any:</p> <p>(i) Either the chief minister (A)/ or his cabinet colleagues (B)/ has submitted his resignation. (C)/ No error (D)</p> <p>(ii) They will be delighted (A)/ if you will (B)/ welcome them. (C) No error (D)</p> <p>(iii) The social worker had championed (A) the cause for (B) the weak and oppressed for the last two decades. (C) No error (D)</p>	3	5	U	C
8	<p>Spot the errors, if any:</p> <p>(i) In some tribal areas (A)/ people worship snakes (B)/ and are not scared from them. (C) No error (D)</p> <p>(ii) If we had read the book (A)/ we would (B) / have understand the film. (C) No error (D)</p> <p>(iii) Most of the Himachal Pradesh is (A) / hilly where (B) / a number of rivers flows. (C) / No error (C)</p>	3	5	U	C

	<p>Fill in the blanks with appropriate choices:</p> <p>(i) It's hard to make enough money to provide such a large family. A. with B. to C. for D. about</p> <p>(ii) I was so tired that I decided going to the party after all. A. to B. on C. against D. for</p> <p>(iii) I love my job, but I long my family when I have to spend so much time on the road. A. on B. to C. at D. for</p>			
9	<p>Fill in the blanks with appropriate choices:</p> <p>(i) Rajat's brother has been chosen as a to the convention. A. whizzkid B. novice C. amateur D. delegate</p> <p>(ii) Gas lamps became when electric lighting was invented. A. antiquarian B. obsolete C. decommissioned D. unanimous</p> <p>(iii) The committee decided to investigate the fraud charges against the company, which has always been about its internal operations. A. bankable B. flamboyant C. reticent D. incorrigible</p>	3	5	U C
10	<p>Fill in the blanks with appropriate choices:</p> <p>(i) Rajat's brother has been chosen as a to the convention. A. whizzkid B. novice C. amateur D. delegate</p> <p>(ii) Gas lamps became when electric lighting was invented. A. antiquarian B. obsolete C. decommissioned D. unanimous</p> <p>(iii) The committee decided to investigate the fraud charges against the company, which has always been about its internal operations. A. bankable B. flamboyant C. reticent D. incorrigible</p>	3	5	R P

Section - C

Attempt All Questions

5 X 3 = 15 Marks

N o.		Marks	CO	BL	KL
	<p>The sentences given in each question, when properly sequenced, form a coherent paragraph. Choose the most logical order of sentences to construct a coherent paragraph.</p> <p>(i)</p> <p>A. When they gathered together, the Buddha was completely silent & some speculated that perhaps the Buddha was tired or ill.</p> <p>B. It is said that Gautam Buddha gathered his disciples one day for a Dharma talk.</p> <p>C. One of the Buddha's disciples, Mahakasyapa, silently gazed at the flower & broke into a broad smile.</p> <p>D. The origin of Zen Buddhism is ascribed to the</p>				
11	<p>(i)</p> <p>A. When they gathered together, the Buddha was completely silent & some speculated that perhaps the Buddha was tired or ill.</p> <p>B. It is said that Gautam Buddha gathered his disciples one day for a Dharma talk.</p> <p>C. One of the Buddha's disciples, Mahakasyapa, silently gazed at the flower & broke into a broad smile.</p> <p>D. The origin of Zen Buddhism is ascribed to the</p>	5	5	U	C

Flower Sermon, the earliest source which comes from the 14th century.

E. The Buddha silently held up & twirled a flower and twinkled his eyes, several of his disciples tried to interpret what this meant though none of them was correct.

- A. EBDAC
- B. DBAEC
- C. BCDEA
- D. CADBE

(ii)

A. The US market will continue to be the dominant one in the foreseeable future. The rupee could become even stronger.

B. A greater recourse to hedging as well as striving for multi-currency revenue streams automatically suggests itself.

C. Already one company, TCS, by resorting to these methods extensively has turned in an above - average performance during the first quarter.

D. Most IT companies have been grappling with more mundane problems such as a high level of attrition amidst rising wage costs and inability to secure the right type and number of American visas.

E. The BPO industry and many medium-sized software exporters are reportedly operating on thin margins.

- A. BCADE
- B. ABCDE
- C. DCBAE
- D. EDABC

(iii)

A. Last March, I was invited to present a paper on the topic of whether the mistakes of the 20th century would be repeated in the 21st century as well.

B. The economic crisis hadn't become grave then.

C. But today the world is in the midst of the biggest economic crisis since 1929.

D. The key difference between then and now is that the old power structures have finally disappeared.

E. Now even the US is pleading for financial help

	<p>from China.</p> <p>A. BCADE B. ABCDE C. CDEAB D. DEABC</p> <p>(iv)</p> <p>A. Thus, despite India's huge population, we have not done well in Olympic Games. B. During the British period also, cricket remained popular in India. C. Cricket has been an extremely popular game in India for quite some time now. D. It is time our government and corporate fraternity pay due attention to other games/sports and we redeem our national pride in Olympic Games. E. However, due to this reason, other games/sports did not receive the required attention they deserve.</p> <p>A. EACDB B. BDACE C. CBEAD D. DCEAB</p> <p>(v)</p> <p>A. People started fearing a famine. B. Monsoon turned out to be unusually abundant and the danger was averted. C. The monsoon failed and water tanks became almost empty. D. So, no grain could be sown by the farmers in their fields. E. Farmers looked anxiously for the next monsoon.</p> <p>A. CADBE B. CDAEB C. AEDCB D. DABCE</p>			
12	<p>Which sentence is the most preferable in respect to grammar/ meaning and is suitable for formal writing:</p> <p>(i)</p> <p>A. If you need advice, you can just call our help line. B. If you need advice, you have just call our help line. C. If you need advice, you would just call our help line. D. If you need advice, you do just call our help line.</p> <p>(ii)</p> <p>A. If it didn't rain for a long time, the earth gets very dry.</p>	5	5	U C

- B. If it doesn't rain for a long time, the earth gets very dry.
 C. If it will not rain for a long time, the earth gets very dry.
 D. If it hadn't rained for a long time, the earth would get very dry.

(iii)

- A. I don't understand this. If I was you, I'd asked the teacher for help.
 B. I don't understand this. If I were you, I'd ask the teacher for help.
 C. I don't understand this. If I were you, I had ask the teacher for help.
 D. I don't understand this. If I had been you, I'll ask the teacher for help.

(iv)

- A. They wouldn't have hired you if you hadn't had some experience abroad.
 A. They wouldn't have hired you if you hadn't had some experience abroad.
 A. They shouldn't have hired you if you hadn't had some experience abroad.
 A. They wouldn't have hired you if you hadn't some experience abroad.

(v)

- A. You could have helped me if you are staying later.
 B. You could have help me if you'd stayed later.
 C. You could helped me if you'd stayed later.
 D. You could have helped me if you'd stayed later.

Read the Cloze passage and fill the blanks with the most appropriate option:

"To avoid the various foolish opinions to which mankind is prone, no superhuman brain is required. A few simple rules will keep you, not from all errors, but from silly errors.

If the matter is one that can be settled by

.....(i)....., make the observation yourself.
 Aristotle could have avoided the mistake of thinking

5	5	U	C
---	---	---	---

that women have(ii)..... teeth than men, by the simple device of asking Mrs. Aristotle to keep her mouth open while he(iii)..... Thinking that you know, when in fact you do not, is a bad mistake to which we are all(iv)..... I believe myself that hedgehogs eat black beetles, because I have been told that they do; but if I(v)..... writing a book on the habits of hedgehogs, I should not commit myself until I had seen one enjoying this diet. Aristotle, however, was less cautious. Ancient and Medieval writers knew all about unicorns and salamanders; not one of them thought it necessary to avoid dogmatic statements about them because they had never seen any of them."

- (i) A. discussion B. observation C. talking D. requesting
- (ii) A. fewer B. stronger C. more D. softer
- (iii) A. was counting B. noted C. counted D. had counted
- (iv) A. willing B. prone C. capable D. open
- (v) A. have been B. started C. am D. were

Course Outcome

- CO1: Understand the concept of OSI and TCP/IP reference model.
- CO2: Understand the basics of data transmission at physical layer.
- CO3: Understand the channel allocation using ALOHA, CSMA and CSMA/CD.
- CO4: Apply error detection and correction technique to eliminate transmission error.
- CO5: Analyze the fixed and variable length address (IPv4) subnetting for the given scenarios.
- CO6: Understand the design issues of the transport layer.
- CO7: Understand the mechanism of protocols at application layer such as FTP, HTTP, Telnet, DNS.
- CO8: Understand IPv6 addressing and differentiate it from IPv4.

Printed Pages: 4

University Roll No.

End Term Examination, Even Semester 2022-23

MCA, 1st Year, II Semester

MCAC0011 Computer Networks

Time: 3 Hours

Maximum Marks: 50

Section – A

Attempt All Questions

4 X 5 = 20 Marks

No.	Detail of Question	Marks	CO	BL	KL
1	Can you explain why the vulnerable time in ALOHA depends on T_{fr} but in CSMA depends on T_p ?	4	3	R	F
2	Comment on the size of the sender and receiver window of Go Back N ARQ. Is it necessary to keep window size less than 2^m to accept frame correctly where m is the size of the sequence number field of header in bits.	4	4	A	C
3	You have a class ‘C’ network that needs 28 subnets while maximizing the number of valid host addresses available on each subnet. How many bits need to borrow from the host field to provide the correct combination, what will be the subnet mask and how many maximum valid hosts we will have in each subnet?	4	5	An	P
4	An IP datagram of size 1000 bytes arrives at a router. The router has to forward this packet on a link whose MTU (maximum transmission unit) is 100 bytes. Assume that the size of the IP header is 20 bytes. how many fragmentations will be generated and also write MF (more fragment), offset and total length value for all.	4	8	A	P

	<p>PC1 IP: 192.168.1.2</p> <p>PC2 IP: 192.168.1.3</p>				
5	<p>Refer the above diagram. Scenario Two PC's are connected to a switch. The IP addresses of the PC's are as displayed in the diagram. PC (192.168.1.2) is connected to port 2 on the switch and PC (192.168.1.3) is connected to port 3 on the switch.</p> <p>(a) Does the switch need an IP address for PC1 to communicate with PC2. (b) What should be the value of default gateway on the TCP/IP adapter settings on the respective PC's for communication between them to be successful</p>	4	5	U	F

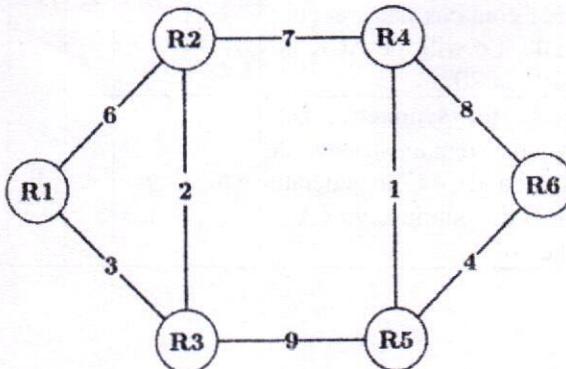
Section – B

Attempt All Questions

3 X 5 = 15 Marks

No.	Detail of Question	Marks	CO	BL	KL
6	What is the difference between the delivery of a frame in the data link layer and the delivery of a packet in the network layer?	3	4	U	F
7	Your company has been using the network of 193.56.7.0 /24. You want to put each of the 6 floors in your building on a different subnet. What is the range of the last available subnet after doing Subnetting?	3	5	An	P
8	One employee came to you and he was saying that the internet was not working on his system, but other employees could work on the internet. You went to his system and check its IP configuration and you saw 172.29.97.127/26 was configured there. What will be your first step to solve this problem? Also mention the reason.	3	5	C	E

Consider a network with 6 routers R1 to R6 connected with links having weights as shown in the following diagram



9

3

20

4

1

Suppose the weights of all unused links are changed to 2 and the distance vector algorithm is used again until all routing tables stabilize. How many links will now remain unused and why?

14

2

1

1

1

Section – C

Attempt All Questions

5 X 3 = 15 Marks

No.	Detail of Question	Marks	CO	BL	KL										
11	<p>Classless Inter-domain Routing (CIDR) receives a packet with address 131.23.151.76. The router's routing table has the following entries: Prefix Output Interface Identifier</p> <table> <thead> <tr> <th>Prefix Output Interface</th> <th>Identifier</th> </tr> </thead> <tbody> <tr> <td>131.16.0.0/12</td> <td>3</td> </tr> <tr> <td>131.28.0.0/14</td> <td>5</td> </tr> <tr> <td>131.19.0.0/16</td> <td>2</td> </tr> <tr> <td>131.22.0.0/15</td> <td>1</td> </tr> </tbody> </table> <p>The identifier of the output interface on which this packet will be forwarded.</p>	Prefix Output Interface	Identifier	131.16.0.0/12	3	131.28.0.0/14	5	131.19.0.0/16	2	131.22.0.0/15	1	5	5	A	P
Prefix Output Interface	Identifier														
131.16.0.0/12	3														
131.28.0.0/14	5														
131.19.0.0/16	2														
131.22.0.0/15	1														

12	TCP is a connection oriented protocol, Show the connection establishment process in TCP. In the connection termination phase, suppose the FIN segment from the client-side contains data ranging from sequence no 100 to 200, So will the ACK no from the server start from 201 or 202?	5	6	A	P
13	Identify the possible threats for symmetric key cryptography. 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 find the private key of A.	5	7	A	P

Course Name: OBJECT ORIENTED PROGRAMMING**Course Outcome**

- CO1: Understand differences between procedures oriented and object-oriented approach.
 CO2- Understand the relevance of Object-Oriented Programming techniques
 CO3- Understand how to write, compile and execute a Java Program.
 CO4- Understand the use of polymorphism and Inheritance.
 CO5- Understand how to define user exceptions and its uses.
 CO6- Understand what is a thread and Multithreading model.
 CO7- Understand how to develop a GUI application.

Printed Pages:3

University Roll No.

EVEN

End Term Examination, ~~2021~~ Semester 2022-23Program (MCA), Year: 1st, Semester: II

MCAC1007 OBJECT ORIENTED PROGRAMMING

Time: 3 Hours

Maximum Marks: 50

Section - A*Attempt All Questions*

4 X 5 = 20 Marks

No.	Detail of Question	Marks	CO	BL	KL
1	A set of 5 words are given. Write a program to reverse each word and arrange the resulting words in alphabetical order.	4	CO1	A	P
2	Write a program in Java which enters five numbers in an array using command line arguments and print sum and average of the numbers.	4	CO3	A	P
3	Write a program in Java to create a class 'Box' which contains three data members for holding width, height and length of box and two methods 'area' and 'volume' to calculate and return the area and volume of box. Create another class named 'BoxDemo' which uses Box class.	4	CO2	U	D
4	Define an interface using JAVA that contains a method to calculate the perimeter of an object. Define two classes circle and Rectangle with suitable fields and methods. Implement the interface "perimeter" in these classes. Write the appropriate main () method to create object of each class and test all the methods.	4	CO4	E	DI
5	Are we allowed to use only try blocks without a catch and finally blocks? Explain with pseudo code example.	4	CO5	A	D

Section - B

3 X 5 = 15 Marks

Attempt All Questions

No.	Detail of Question	Marks	CO	BL	KL
6	Assume you're developing a software application. You notice that sometimes the file is missing or has an incorrect format, which causes your application to crash or produce incorrect results. How would you use exceptions to handle this situation and ensure that your application gracefully handles errors? Could you explain the difference between throw and throws in Java with a suitable example?	3	CO5	A	D
7	Explain the following terms with respect to exception handling. (a) Try, (b) catch , (c) throw (d) finally	3	CO5	U	S
8	You're working on a web server that handles a large number of requests at any given time. To improve the server's performance, you decide to implement a multithreaded architecture program for Calculator application which perform addition, subtraction, multiplication and division operation on integers.	3	CO3	E	DI
9	Assume you're developing a graphical user interface (GUI) application in Java that needs to work on different screen sizes and resolutions. You want to ensure that the components in your application are positioned correctly and don't overlap or get cut off, regardless of the screen size or resolution. How would you use Layout Managers to achieve this and what are the different types of Layout Managers available in Java? Additionally, could you provide a suitable example of using a Layout Manager in Java to position components in a GUI application?	3	CO6	A	S
10	Developing a web page that requires an applet to accept two integer numbers from the user and display the sum and difference of these numbers. You want to ensure that the applet is easy to use and provides accurate results. How would you design and implement this applet using Java?	3	CO7	U	D

Section -- C

5 X 3 = 15 Marks

Attempt All Questions

No.	Detail of Question	Marks	CO	BL	KL
			E	Dt	
11	List Applet initialization and termination methods. Write a Java Applet, that sets the background color and foreground color and outputs a string message "MCA-Java-Applet".	5	CO7		
12	Construct a program for given scenario: Given a number N. Count the number of digits in N which evenly divides N. Note: - Evenly divides means whether N is divisible by a digit i.e. leaves a remainder 0 when divided. Case 1: Input: N = 12, Output: 2, Explanation: 1, 2 both divide 12 evenly Case 2: Input: N = 23, Output: 0, Explanation: 2 and 3, none of them divide 23 evenly	5	CO4	A	S
13	There is an application, which have to perform two time-consuming tasks simultaneously, you want to ensure that both tasks run concurrently and don't block each other. Discuss the different way to implement the thread in java.	5	CO5	A	P

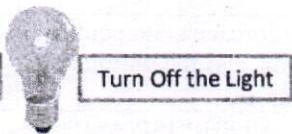
Course Name: Web Technology**Course Outcome**

- CO1. Implement static and dynamic client-based web pages' constructs using HTML, DHTML, JavaScript
 CO2. Demonstrate the concept of AJAX
 CO3. Implement XML-based programming constructs
 CO4. Implement various server-based programming constructs of ASP, JSP, and PHP
 CO5. Create web applications using PHP and AJAX.

Printed Pages: 02**University Roll No.****End Term Examination, Even Semester 2022-23****MCA, Ist Year, IInd Semester****MCAC1014 – Web Technology****Time: 3 Hours****Maximum Marks: 50**

1. All parts of a question should be answered in one place.
2. Answer should be brief and concise and supplemented with neat sketches.
3. Any missing or wrong data may be assumed suitably, giving proper justification.
4. Figures on the right-hand side margin indicate full marks.

Section – A**Attempt All Questions****4 X 5 = 20 Marks**

No.	Detail of Question	Marks	CO	BL	KL
1	Explain 1-tier, 2-tier and multi-tier architectures used in Client Server Network. Also, give advantages of one over the other.	4	1	R	C
2	Differentiate between XML DTD and XML Schema. Write the Schema for the following. <?xml version="1.0"?> <note> <to>Tove</to> <from>Jani</from> <heading>Reminder</heading> <body>Don't forget me this weekend!</body> </note>	4	3	U	F
3	Write a program to display the following. The output must be accordingly (the button must work)	4	1	A	P
					
4	Explain how a JSP file is processed. Support your answer with a neat diagram. Why is it faster than any other scripting language?	4	4	U	C
5	Explain the different types of arrays defined in PHP giving examples of each.	4	4	U	C

	Or				
	Explain all the components used in the architecture of CORBA along with a neat diagram.				

Section – B

Attempt All Questions

3 X 5 = 15 Marks

No.	Detail of Question	Marks	CO	BL	KL												
6	State the working of AJAX. Explain the prototype of the open() method used in AJAX.	3	2	A	C												
7	Write an XML code and XSLT code to display the output as in the table: <table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <th>Name</th> <th>Age</th> <th>Marks</th> </tr> <tr> <td>Ankur</td> <td>29</td> <td>98</td> </tr> <tr> <td>Piyush</td> <td>28</td> <td>88</td> </tr> <tr> <td>Siddharth</td> <td>28</td> <td>80</td> </tr> </table>	Name	Age	Marks	Ankur	29	98	Piyush	28	88	Siddharth	28	80	3	3	U	P
Name	Age	Marks															
Ankur	29	98															
Piyush	28	88															
Siddharth	28	80															
8	List the advantages of Servlets in comparison to CGI.	3	4	R	C												
9	Demonstrate the role of EJB with its Architecture along its label diagram.	3	4	U	C												
10	Illustrate with example function Call by Value and function Call by Reference in PHP.	3	4	U	P												

Section – C

Attempt All Questions

5 X 3 = 15 Marks

No.	Detail of Question	Marks	CO	BL	KL
11	Develop a PHP/JSP/ASP application that prompts the user to enter his/her name and gender through a form and displays the user's name with a proper salutation. For example, if a user enters the name "ABC" and gender as "male", the message should be displayed as "Welcome Mr. ABC." However, if the gender is "female", the message should be "Welcome, Ms. ABC".	5	5	A	P
12	Differentiate between for and foreach statements in PHP with examples and also discuss the various in-build object in JSP with examples.	5	4	U	P
13	Develop a web application using PHP/JSP/ASP and MySQL that asks the user to input a username, password, and gender through a form and store it in a table named login in MySQL. The page shall display the message "Your data submitted successfully" after the data is stored in the database.	5	4	A	PC