B.L.D.E.A's V.P.Dr.P.G.HALAKATTI COLLEGE OF ENGINERING AND TECHNOLOGY VIJYAPUR 586103

INDEX FILE QUESTION PAPERS JAN/FEB 2023

M.C.A.

20 1st Sem M.CA

CBCS SCHEME

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20MCA11

First Semester MCA Degree Examination, Jan./Feb. 2023
Data Structures with Algorithms

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. What are data structures? Explain the classification of data structures with a neat diagram. **(10 Marks)**

b. Define stack. Write a C program to implement the primitive operators of stack. **(10 Marks)**

OR

2 a. Write an algorithm to evaluate a postfix expression. Trace the algorithm for the following expression showing the contents of stack : 53 + 62 / * 35 * + **(10 Marks)**

b. Convert the expression to prefix and postfix expression (A + B $ C) / D + E **(04 Marks)**

c. Discuss about the applications of stack. **(06 Marks)**

Module-2

3 a. What is recursion? Write a program for finding the factorial of a number using recursion. **(10 Marks)**

b. What is a Queue? Write a function to demonstrate insert and delete operation in a linear queue. **(10 Marks)**

OR

4 a. Define circular queue. Explain its advantages over ordinary queue. **(07 Marks)**

b. Write a note on applications of queue. **(06 Marks)**

c. Discuss the operations on priority queue. **(07 Marks)**

Module-3

5 a. Define linked list. Explain in detail about inserting and deleting nodes from a liked list. **(10 Marks)**

b. Write notes on getnode( ) and freenode( ). **(06 Marks)**

c. Discuss the limitations of array implementation. **(04 Marks)**

OR

6 a. Explain linked implementation of stacks with push and pop operation using singly linked list. **(12 Marks)**

b. Write a note on header nodes and its applications. **(08 Marks)**

Module-4

7 a. Explain the various steps involved in algorithm design and analysis process with a neat diagram. **(10 Marks)**

b. Explain important fundamental problem types of different category. **(10 Marks)**

OR

8 a. Define algorithm. Explain different asymptotic notations. **(10 Marks)**

b. Write the general plan of analyzing the efficiency of non-recursive algorithm. Explain with an example writing the algorithm. **(10 Marks)**

Module-5

9 a. Explain Bruteforce algorithm for pattern matching with an example. **(10 Marks)**

b. Write a program to perform binary search and explain with example. **(10 Marks)**

OR

10 a. Illustrate the Prims algorithm pseudo code. Apply the algorithm for the given graph to construct minimum spanning tree.

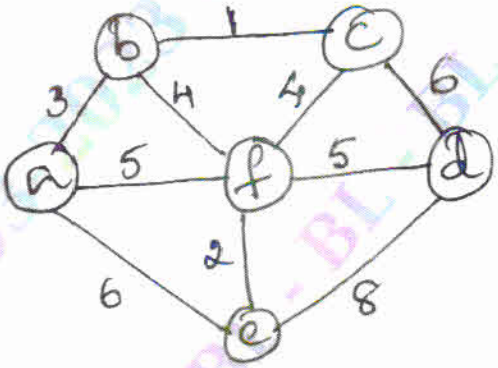

Fig.Q10(a) **(10 Marks)**

b. Apply Dijkstra's algorithm to find single source shortest path assuming vertex a as a source.

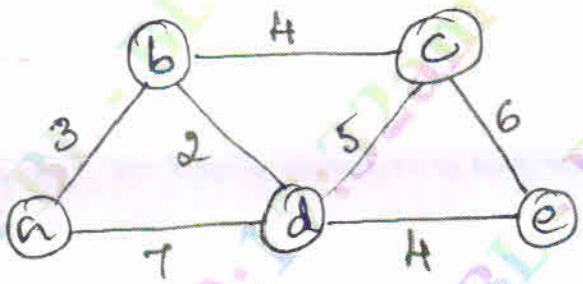

Fig.Q10(a) **(10 Marks)**

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20MCA12

First Semester MCA Degree Examination, Jan./Feb. 2023
Operating System with UNIX

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. What is Operating System? Explain with a neat diagram the components of computer system. **(08 Marks)**

b. Write short notes on:
i) Distributed system
ii) Clustered system
iii) Real time system
iv) Virtual machine. **(12 Marks)**

OR

2 a. What is process, process state and Process Control Block (PCB)? Describe the contents of PCB. **(10 Marks)**

b. Consider the following set of processes with given length of CPU burst. Draw Gantt chart for SJF (Preemtive) and SJF (Non-Preemptive). Find the average waiting time, for each scheduling algorithm. **(10 Marks)**

Processes	P_1	P_2	P_3	P_4	P_5
Burst time	6	2	8	3	4
Arrival time	2	5	1	0	4

Module-2

3 a. With a neat diagram, explain resource allocation graph and wait for graph. **(10 Marks)**

b. Explain the deadlock detection algorithms for several instances of a resource. **(10 Marks)**

OR

4 a. What is deadlock? Explain the necessary conditions for its occurrence. **(10 Marks)**

b. Explain swapping with a neat diagram. **(10 Marks)**

Module-3

5 a. With a neat diagram, explain the architecture of UNIX OS. **(10 Marks)**

b. Explain who, uname, date, cal, echo commands with example. **(10 Marks)**

OR

6 a. Explain pwd, mkdir, rmdir, cd commands with examples. **(10 Marks)**

b. Create a script file called file properties that reads a filename entered and output its properties. Explain positional parameters. **(10 Marks)**

Module-4

7 a. Explain the various options of P5 command with example. **(10 Marks)**

b. Explain internal and external commands with suitable example. **(10 Marks)**

OR

8 a. Explain different forms of 'if' statement used in shell with example. **(10 Marks)**

b. Differentiate while and until loops. Give suitable examples. **(10 Marks)**

Module-5

9 a. Write an awk script to compute gross salary of an employee according to rule given below.
If basic salary < 10000 then
hra = 15% of basic and da = 45% of basic.
If basic salary > 10,000 then
hra = 20% of basic and da = 50% of basic. **(10 Marks)**

b. Demonstrate logical and relational operators in awk with suitable examples. **(10 Marks)**

OR

10 a. Write a awk script to delete duplicate lines from a text file. The order of the original lines must remain unchanged. **(10 Marks)**

b. With an example explain if and for control structures in awk. **(10 Marks)**

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20MCA13

First Semester MCA Degree Examination, Jan./Feb. 2023
Computer Networks

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Draw the OSI network architecture. Explain each layer in detail. **(10 Marks)**
b. Differentiate between connection oriented and connectionless service. **(10 Marks)**

OR

2 a. Explain the uses of Computer Networks. **(10 Marks)**
b. Discuss about support for common services in network requirement. **(10 Marks)**

Module-2

3 a. With neat diagram explain layering and protocol in network architecture. **(10 Marks)**
b. How encapsulation is used in network? **(10 Marks)**

OR

4 a. Explain Internet architecture with neat diagram. **(10 Marks)**
b. Discuss the following encoding techniques:
i) NRZ ii) NRZI iii) Manchester iv) 4B/5B. **(10 Marks)**

Module-3

5 a. Explain virtual circuit switching with an example network. **(10 Marks)**
b. Discuss the following :
i) ATM cell format ii) Source Routing. **(10 Marks)**

OR

6 a. Discuss about Spanning Tree algorithm with necessary diagrams. **(10 Marks)**
b. Explain the following :
i) IPV4 Packet Header format ii) Internetworking **(10 Marks)**

Module-4

7 a. Explain the following queuing disciplines with a neat diagram:
i) FIFO Queuing ii) Fair Queuing **(10 Marks)**
b. Explain three way hand shake with the help of a neat diagram. **(10 Marks)**

OR

8 a. How congestion is controlled in TCP? Explain. **(10 Marks)**
b. Discuss congestion avoidance mechanisms in TCP. **(10 Marks)**

Module-5

9 a. Explain symmetric-key and public-key ciphers with a neat diagram. **(10 Marks)**
b. Write short notes on :
i) DNS ii) SNMP **(10 Marks)**

OR

10 a. Explain simple mail transfer protocol with the help of a neat diagram. **(10 Marks)**
b. Elaborate the functions of firewall. **(10 Marks)**

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20MCA14

First Semester MCA Degree Examination, Jan./Feb. 2023
Mathematical Foundation for Computer Application

Time: 3 hrs. Max. Marks: 100

Note : 1. *Answer any FIVE full questions, choosing ONE full question from each module.*
2. *Use of Statistical Tables is permitted.*

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-1

1 a. Define Subset , Null set and Power set with an example for each. **(06 Marks)**

b. Find the number of positive integers less than or equal to 2076 and divisible by 3 or 4. **(06 Marks)**

c. Find the Eigen values and Eigen vectors of $\begin{pmatrix} 3 & 2 \\ -1 & 0 \end{pmatrix}$. **(08 Marks)**

OR

2 a. State and prove Associative laws of Set theory. **(06 Marks)**

b. A survey of 500 viewers of a sports channel produced the following information : 285 watch baseball , 195 watch shuttle , 115 watch kabbadi , 45 watch baseball and kabbadi , 70 watch baseball and shuttle , 50 watch shuttle and kabbadi and 50 do not watch any of 3 kinds of games. i) How many viewers watch all 3 kinds of games? **(06 Marks)**

c. State Pigeonhole Principle. P.T if 5 colors are used to paint 26 doors , atleast 6 doors will have the same color. **(08 Marks)**

Module-2

3 a. Define Biconditional with an example. Let p, q, r to propositions having truth values 0, 0, 1 respectively. Find the truth value of the compound proposition $p \wedge (r \rightarrow q)$. **(06 Marks)**

b. Define Tautology. With an example using truth table , prove that $[(p \rightarrow q) \wedge (q \rightarrow r)] \rightarrow (p \rightarrow r)$ is a tautology. **(08 Marks)**

c. Test the validity of the statement "If Socrates is a man, Socrates is mortal. Socrates is a man". Therefore Socrates is mortal. **(06 Marks)**

OR

4 a. Prove that $\forall x, p(x) \vee q(x) \Rightarrow \forall x , p(x) \vee \exists x, q(x)$. **(04 Marks)**

b. Define Universal Quantifier and Existential Quantifier with an example. **(06 Marks)**

c. Give i) Direct proof ii) Proof by contradiction of the statement, "If n is an even integer , then n + 7 is an odd integer". **(10 Marks)**

Module-3

5 a. Define Cartesian product of sets with an example. If A is a set with m elements and B is a set with n elements , find the number of relations from A to B. **(10 Marks)**

b. Define Equivalence relation.
Let A = {1, 2, ...7} and S = {(a, b) / a – b is divisible by 3}, verify that S is an equivalence relation. **(10 Marks)**

OR

6 a. For any 3 non empty sets A, B, C prove that i) $A \times (B \cap C) = (A \times B) \cap (A \times C)$.
ii) $A \times (B - C) = (A \times B) = (A \times C)$. **(10 Marks)**

b. Define Partial Order relation R on A. Show that the inclusion relation $\subseteq$ is a partial order in the power set of a set S. Determine whether the relation represented by the following zero one matrix is a partial order

$$M_R = \begin{pmatrix} 1 & 0 & 1 \\ 1 & 1 & 0 \\ 1 & 0 & 1 \end{pmatrix}.$$ **(10 Marks)**

Module-4

7 a. The probability density function P(x) of a variable X is given by the following table :

X	0	1	2	3	4	5	6
P(x)	K	3K	5K	7K	9K	11K	13K

For what value of K, does this represent a valid probability distribution?
Find $P(x < 4)$ $P(x \geq 5)$ $P(3 < x \leq 6)$. Determine the minimum value of K so that $P(x \leq 2) \geq 0.3$. **(10 Marks)**

b. The probability that a pen manufactured by a company will be defective is 0.1. If 12 such pens are selected, find the probability that i) exactly 2 will be defective
ii) at least 2 will be defective iii) none will be defective. **(10 Marks)**

OR

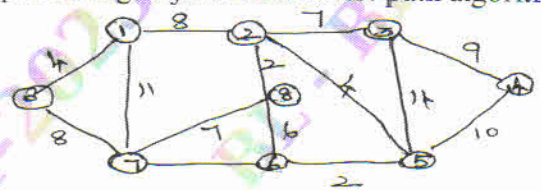
8 a. In a certain town, the duration of a shower is exponentially distributed with mean equal to 5 minutes. What is the probability that a shower will last for
i) less than 10 minutes ii) 10 minutes or more? **(10 Marks)**

b. The weekly wages of workers in a company are normally distributed with mean of Rs 700 and standard deviation of Rs 50. Find the probability that the weekly wage of a randomly chosen worker is i) between Rs 650 and Rs 750 ii) more than Rs 750. **(10 Marks)**

Module-5

9 a. Define Euler path, Hamilton path and Planar graph with an example for each. **(06 Marks)**

b. Determine the shortest path using Dijkstra's shortest path algorithm. **(14 Marks)**



OR

10 a. Define Graph Coloring and Euler graph. **(04 Marks)**

b. Define Isomorphism in graphs. **(04 Marks)**

c. Check whether the following graphs are isomorphic?

Give reasons for the same. **(12 Marks)**

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2nd Sem. M.CA.

CBCS SCHEME

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20MCA22

Second Semester MCA Degree Examination, Jan./Feb. 2023
Object Oriented Programming with Java

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. What is Typecasting? Explain different types of typecasting in java with suitable example. **(05 Marks)**

b. Explain the following with example:
i) % = ii) >> iii) Find the type of the roots of the quadratic equation for the discriminent value using ternary operator iv) Bitwise complement operator (~). **(09 Marks)**

c. Explain the scope and lifetime of variables in java. **(06 Marks)**

OR

2 a. How arrays are initialized and defined in java explain with example? Write a java program to find the maximum and minimum element among array = {7, -8, 36, 105, 15, 18, -1} using for each loop. **(10 Marks)**

b. Explain the following: i) charAt( ) ii) getBytes( ) iii) compareTo( ) iv) regionMatches( ) v) lastIndexof( ) **(10 Marks)**

Module-2

3 a. Explain about static variable, static method and static block with suitable example. **(06 Marks)**

b. What is varargs? Specify the restrictions on varargs. Explain varargs with an example. **(06 Marks)**

c. Create a class called distance where distance is expressed in terms of mts and cms. Write constructors to initialize the distance object. Overload a method add such that
distance add (distance int) // Add int value and object
distance add (distance distance) // Add two objects
Test the same on creating the objects. **(08 Marks)**

OR

4 a. What is inheritance? What is the advantages of inheritance, write a java program to explain the execution of the constructor when an object of permanent Employee is created for the following hierarchy. **(10 Marks)**

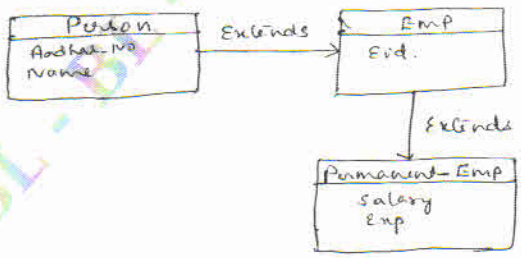

Fig.Q.4(a)

b. What is method overriding? Explain how overriding methods supports polymorphism create a class called Vehicle and a class Car which extends vehicle. Illustrate overriding using the relationship between the classes. **(10 Marks)**

Module-3

5 a. What is an interface? With an example explain how multiple inheritance is implemented in java. **(05 Marks)**

b. Design an interface called polygon with a method called area. Implement this interface to create different classes like square, rectangle and print the area of square and rectangle. **(08 Marks)**

c. What is a package? Write a simple program to create a package and import package to make use of the class declared in the package. **(07 Marks)**

OR

6 a. Define exception and explain the general structure of exception handling mechanism. Write a simple program to generate arithmetic exception and print the description of exception through the program. **(10 Marks)**

b. How to create user defined exception in java explain with an example? **(06 Marks)**

c. Differentiate between throw and throws. **(04 Marks)**

Module-4

7 a. Define a thread. Explain the two methods of creating threads. Write a java program to create multiple threads by implementing runnable interface. **(10 Marks)**

b. Write a java program to demonstrate producer consumer problem using synchronized threads. **(10 Marks)**

OR

8 a. What is enumeration? Explain values( ) and valueOf( ) methods. **(10 Marks)**

b. What is autoboxing and autounboxing in arithmetic expressions? Explain with an example. **(10 Marks)**

Module-5

9 a. Explain about URL connection class. Give suitable example for the same. **(10 Marks)**

b. What is TCP/IP client socket? Explain the two constructs used to create client socket. **(10 Marks)**

OR

10 a. Explain linked list collection class in java with any 4 methods associated with it and write the java program to demonstrate adding a user defined class into linked list collection class. **(12 Marks)**

b. Explain Map interface with an example. **(08 Marks)**

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CBCS SCHEME

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20MCA23

Second Semester MCA Degree Examination, Jan./Feb. 2023
Web Technologies

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Explain HTTP protocol in detail. **(10 Marks)**

b. Define Web Server. Explain its operation and characteristics. **(10 Marks)**

OR

2 a. Explain the following with example :
(i) Heading tag.
(ii) Hypertext link.
(iii) Image tag.
(iv) Select tag.
(v) Figure tag. **(10 Marks)**

b. Explain the structure of HTML5 web page. **(04 Marks)**

c. Explain different types of list with example. **(06 Marks)**

Module-2

3 a. What is CSS? Describe the different levels of style sheet and their precedence. **(10 Marks)**

b. Explain variety of selector form with example. **(10 Marks)**

OR

4 a. Explain any 5 array methods used in Javascript. **(10 Marks)**

b. Explain JavaScript methods alert ( ), prompt ( ) and confirm ( ) with an example. **(10 Marks)**

Module-3

5 a. What is Bootstrap? Develop a Bootstrap program to implement contextual classes to provide "meaning through colors". **(10 Marks)**

b. What is responsive web design? Develop a Bootstrap program to add zebra-stripes to a table. **(10 Marks)**

OR

6 a. Explain Bootstrap containers. Develop a Bootstrap program to add spinners to a button. **(10 Marks)**

b. Explain form validation in Bootstrap. Develop a Bootstrap program to create a stacked form with 2 input fields, one checkbox and a submit button. **(10 Marks)**

Module-4

7 a. Write a sample jQuery program and explain its structure. **(10 Marks)**

b. Develop programs to implement the following jQuery effects :
(i) hide ( ) and show ( )
(ii) fadeIn and fadeOut ( ) **(10 Marks)**

OR

8 a. What is an event? List the common events found in jQuery. Develop a jQuery program to implement mouseenter ( ) jQuery effect. **(10 Marks)**

b. What is jQuery HTML? What are the methods used for DOM manipulation? Develop a jQuery program to get attribute values. **(10 Marks)**

Module-5

9 a. What is AngularJS? Explain the following AngularJS directives : ng-app, ng-model, ng-bind. **(04 Marks)**

b. Write an AngularJS program to use expressions. **(06 Marks)**

c. What is AngularJS data binding? Write a AngularJS program to add a controller. **(10 Marks)**

OR

10 a. What are AngularJS filters? Write a AngularJS program to show how you can add filters to expressions. **(10 Marks)**

b. What is a AngularJS service? Explain any 4 of them. Write a AngularJS program to show how you can use $location service. **(10 Marks)**

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CBCS SCHEME

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20MCA24

Second Semester MCA Degree Examination, Jan./Feb. 2023
Software Engineering

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Describe the professional and ethical responsibilities of a Software Engineer. **(10 Marks)**

b. Differentiate between small systems development and large system development with respect to scaling agile methods. **(10 Marks)**

OR

2 a. List and explain the attributes of good software. **(10 Marks)**

b. Describe in detail about extreme programming release cycle with a neat diagram. **(10 Marks)**

Module-2

3 a. Describe the requirements Elicitation and analysis process with a neat diagram. **(10 Marks)**

b. Explain in detail about different types of non-functional requirements. **(10 Marks)**

OR

4 a. Explain requirements change management with a neat diagram. **(10 Marks)**

b. Discuss in detail about the CBSE process with a neat block diagram. **(10 Marks)**

Module-3

5 a. What is object orientation? Explain briefly about the stages involved in object oriented methodology. **(10 Marks)**

b. What do you mean by abstraction? Discuss different types of modeling techniques used for object-oriented modeling and design. **(10 Marks)**

OR

6 a. Define links and association. Explain UML notations for links and associations with an example. **(10 Marks)**

b. Discuss the terms aggregation and composition with an example. **(10 Marks)**

Module-4

7 a. Define state diagram. Also draw the state diagram for telephone line with activities. **(10 Marks)**

b. What do you mean by states and events? Discuss different kinds of events. **(10 Marks)**

OR

8 a. What do you mean by swim lane? Explain briefly an activity diagram with swim lanes for servicing an airplane. **(10 Marks)**

b. Discuss sequence models. Draw the sequence diagram for a session with an online stock broken. **(10 Marks)**

Module-5

9 a. Describe in detail about project scheduling and staffing with an example. (10 Marks)

b. Explain the steps involved in risk management process in detail. (10 Marks)

OR

10 a. Illustrate the relationship between function – oriented design and detailed design with a neat diagram. (10 Marks)

b. Define coupling and cohesion. Describe in detail about the types of coupling with suitable examples. (10 Marks)

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CBCS SCHEME

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20MCA262

Second Semester MCA Degree Examination, Jan./Feb. 2023
Artificial Intelligence

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. Define AI. Explain task domains of AI. **(08 Marks)**

b. What is production system? Explain requirements for good control strategies. **(08 Marks)**

c. State the importance of AI Technique. **(04 Marks)**

OR

2 a. What is heuristic? Explain various problem characteristics while selecting a heuristic search. **(10 Marks)**

b. Discuss Hill climbing search method. Also discuss its limitations and ways to overcome these limitations. **(10 Marks)**

Module-2

3 a. Explain four properties for representation of knowledge in a good system. **(08 Marks)**

b. Discuss in brief Inheritable knowledge with example. **(08 Marks)**

c. List the issues in knowledge representation. **(04 Marks)**

OR

4 a. Explain steps to convert wff into clause form. **(08 Marks)**

b. Discuss principle of resolution and give an algorithm for it. **(08 Marks)**

c. Convert the following sentences into predicate logic:
i) John likes all kinds of food.
ii) Anything anyone eat and it is not killed is food.
iii) Bill eats peanuts and is still alive.
iv) Swe eats everything bill eats. **(04 Marks)**

Module-3

5 a. Explain frame based system with example. **(08 Marks)**

b. Write a short note on:
i) Dempster shafer theory.
ii) Fuzzy Logic. **(08 Marks)**

c. List the advantages and disadvantages of production based systems. **(04 Marks)**

OR

6 a. Define Inference. Explain various inference strategies. **(10 Marks)**

b. Define the following:
i) Probability
ii) Conditional probability
iii) Certain factor
iv) Baye's theorem
v) Bayesian network. **(10 Marks)**

Module-4

7	a.	Define planning. Explain various components of planning.	(08 Marks)
	b.	Define STRIP mechanism. Explain all list used in STRIP operations.	(08 Marks)
	c.	Explain two important features of planning.	(04 Marks)

OR

8	a.	In brief explain general learning system.	(10 Marks)
	b.	Write a note on : i) Machine learning ii) Adaptive learning.	(10 Marks)

Module-5

9	a.	Define Expert system and discus the architecture of expert system.	(10 Marks)
	b.	Explain expert system calls and its components.	(10 Marks)

OR

10	a.	Explain benefits and limitations of expert systems.	(10 Marks)
	b.	Write a note on: i) MYCIN ii) DART.	(10 Marks)

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18-20 III Sem MCA

CBCS SCHEME

USN | | | | | | | | | | |

20MCA31

Third Semester MCA Degree Examination, Jan./Feb. 2023
Data Analytics using Python

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Define keywords, statements, expressions, variables, precedence and associativity with examples and syntax. **(10 Marks)**

b. Explain with syntax and example different types of Python data types and type( ) function. **(10 Marks)**

OR

2 a. Discuss different forms of if control statements with necessary examples. **(10 Marks)**

b. What is a function? Mention its types. Write a python program to add two numbers using function, read input from the user. **(10 Marks)**

Module-2

3 a. Define string. Explain with necessary coding five basic string operations. Explain string slicing and joining. **(10 Marks)**

b. Explain List creation, indexing and built in functions used on lists with syntax and examples. **(10 Marks)**

OR

4 a. Differentiate between sets, tuples and dictionaries. Write a python program to demonstrate encapsulation and overloading. **(10 Marks)**

b. What is inheritance? Explain different types of inheritance with necessary example. **(10 Marks)**

Module-3

5 a. Define creating an array from Python lists. Explain numpy array attributes. **(06 Marks)**

b. Discuss with example numpy array concatenation and splitting. **(08 Marks)**

c. Explain specialized universal functions:
(i) Trignometric (ii) Exponents and logarithms with necessary coding. **(06 Marks)**

OR

6 a. Mention Pandas data structures. Create a dataframe with three dimensional list state, year, POP (dictionary). Write necessary coding for retrieving row values and modifying column values. **(06 Marks)**

b. Explain with example the concept of reindexing and ffill method. **(06 Marks)**

c. How do we handle missing data in Python using Pandas? Explain with coding. **(08 Marks)**

Module-4

7 a. Explain reading and writing data in text format in Python with examples. **(10 Marks)**

b. Explain the following methods with respect to database interaction:
i) Create ii) insert iii) connect iv) execute v) fetch all. **(10 Marks)**

OR

8 a. Explain with example the following merge methods:
i) inner ii) left iii) right
Create two dataframes with the following :

df1:

data1	key
0	b
1	b
2	a
3	c
4	a
5	b

df2:

data2	key
0	a
1	b
2	a
3	b
4	d

(10 Marks)

b. Explain Data transforming using a function or mapping. Create a dataframe with the following columns:

Food	Ounce
Bacon	4.0
Pulled pork	3.0
Bacon	12.0
Honeyham	5.0

Add a column indicating the type of animal that each food come from. **(10 Marks)**

Module-5

9 a. Write a Python program to plot sinusoid and cosine waves using Matplotlib and label them with necessary title and labels. **(10 Marks)**

b. Explain with necessary coding creating a basic error bars and continuous errors. **(10 Marks)**

OR

10 a. Write a Python program to plot the histogram as follows (customized histogram). [Refer Fig.Q10(a)].

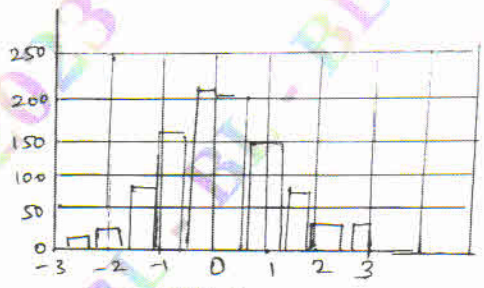

Fig.Q10(a) **(10 Marks)**

b. What is Seaborn plot? Explain pair plots for 'iris' dataset and kernel density estimation using kdeplot and displot. **(10 Marks)**

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CBCS SCHEME

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20MCA32

Third Semester MCA Degree Examination, Jan./Feb. 2023
Internet of Things

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. Define IOT and discuss the genesis of IOT with evolutionary phases of internet. **(04 Marks)**
b. Describe IOT world Forum standardized architecture. **(06 Marks)**
c. Explain the IOT impacts in real world. **(04 Marks)**
d. Explain with neat diagram, the one M2M IOT standardized architecture. **(06 Marks)**

OR

2 a. Explain IOT data management and compute stack. **(08 Marks)**
b. Explain core IOT functional stack. **(08 Marks)**
c. Write the different challenges of IOT. **(04 Marks)**

Module-2

3 a. Explain briefly the Wireless Sensor Networks (WSN). **(06 Marks)**
b. Explain different communication criteria of IOT. **(06 Marks)**
c. What is Zigber? Explain 802.15.4 physical layer, MAC layer, and security. **(08 Marks)**

OR

4 a. Define sensors and actuators. Explain how they interact with the physical world. **(06 Marks)**
b. What is SANET? Explain some advantages and disadvantages that a wireless based solution offers. **(06 Marks)**
c. List and explain different types of sensors. **(08 Marks)**

Module-3

5 a. What are the key advantages of Internet Protocol? Explain each of them. **(05 Marks)**
b. Discuss the need for optimization. **(05 Marks)**
c. Describe application protocol for IOT. **(10 Marks)**

OR

6 a. Explain 6TiSCH in detail. **(10 Marks)**
b. Discuss various IOT application transport methods. **(10 Marks)**

Module-4

7 a. List the common challenges in OT security. Explain any 4 of them. **(10 Marks)**
b. Explain any 2 Bigdata analytics tools and technology. **(10 Marks)**

OR

8 a. Discuss the following:
   i) Supervised learning
   ii) Unsupervised learning
   iii) Neural network. **(06 Marks)**

b. Explain OCTAVE and FAIR formal risk analysis. **(06 Marks)**

c. Explain edge streaming analytics in detail. **(08 Marks)**

Module-5

9 a. What is Arduino? What are the advantages of Arduino? **(05 Marks)**

b. Explain the following with respect to the fundamentals of arduino programming:
   i) Structure
   ii) Function
   iii) Variables and data types
   iv) Flow control statements. **(10 Marks)**

c. Explain IOT strategy for smart cities. **(05 Marks)**

OR

10 a. With a neat diagram, explain Raspberry Pi board and its connections. **(10 Marks)**

b. Explain smart city IOT architecture. **(10 Marks)**

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20MCA33

Third Semester MCA Degree Examination, Jan./Feb. 2023
Advances in Java

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-1

1 a. Define Servlet. Explain life cycle of a Servlet with a neat diagram. **(10 Marks)**

b. Define Cookies. Write a JAVA Servlet program using Cookies to remember user preferences. **(10 Marks)**

OR

2 a. Explain 4 different ways in which a session can be tracked with suitable examples. **(10 Marks)**

b. Briefly explain any 5 HTTP status codes during server responses. **(05 Marks)**

c. Explain HTTP Request headers in brief. **(05 Marks)**

Module-2

3 a. Explain different kinds of main tags used in JSP with example for each. **(10 Marks)**

b. Explain different ways in which you can invoke JAVA code from JSP. **(10 Marks)**

OR

4 a. Explain the need, benefits and advantages of JSP over competing technologies. **(10 Marks)**

b. Write a JSP program that adds two numbers entered through HTML form and display the result **(10 Marks)**

Module-3

5 a. List all the attributes of Page directives tags in JSP and explain any five with an example for each. **(10 Marks)**

b. Write a JSP program to get student information through HTML form. Create a JAVA Bean class, populate Bean and display the same information through another JSP. **(10 Marks)**

OR

6 a. Define JAVA Bean and state its advantages. Explain the features of JAVA Bean. **(08 Marks)**

b. Write a note on JAR files. **(06 Marks)**

c. Write a JSP program to include an applet along with necessary applet code. **(06 Marks)**

Module-4

7 a. With an example, explain the essential steps of JDBC program. **(10 Marks)**

b. Explain in brief basic and advanced JDBC data types. **(10 Marks)**

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20MCA33

Third Semester MCA Degree Examination, Jan./Feb. 2023
Advances in Java

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Define Servlet. Explain life cycle of a Servlet with a neat diagram. **(10 Marks)**

b. Define Cookies. Write a JAVA Servlet program using Cookies to remember user preferences. **(10 Marks)**

OR

2 a. Explain 4 different ways in which a session can be tracked with suitable examples. **(10 Marks)**

b. Briefly explain any 5 HTTP status codes during server responses. **(05 Marks)**

c. Explain HTTP Request headers in brief. **(05 Marks)**

Module-2

3 a. Explain different kinds of main tags used in JSP with example for each. **(10 Marks)**

b. Explain different ways in which you can invoke JAVA code from JSP. **(10 Marks)**

OR

4 a. Explain the need, benefits and advantages of JSP over competing technologies. **(10 Marks)**

b. Write a JSP program that adds two numbers entered through HTML form and display the result **(10 Marks)**

Module-3

5 a. List all the attributes of Page directives tags in JSP and explain any five with an example for each. **(10 Marks)**

b. Write a JSP program to get student information through HTML form. Create a JAVA Bean class, populate Bean and display the same information through another JSP. **(10 Marks)**

OR

6 a. Define JAVA Bean and state its advantages. Explain the features of JAVA Bean. **(08 Marks)**

b. Write a note on JAR files. **(06 Marks)**

c. Write a JSP program to include an applet along with necessary applet code. **(06 Marks)**

Module-4

7 a. With an example, explain the essential steps of JDBC program. **(10 Marks)**

b. Explain in brief basic and advanced JDBC data types. **(10 Marks)**

OR

8 a. What are annotations? Discuss built-in annotations with an example. **(10 Marks)**

b. Explain the types of statements objects in JDBC with an example. **(10 Marks)**

Module-5

9 a. Explain the following terms of container services in EJB:

(i) Transactions

(ii) Security.

(iii) Naming and Object stores **(10 Marks)**

b. What is stateless session bean? Explain the life cycle of stateless session bean with a neat diagram. **(10 Marks)**

OR

10 a. What is message driven bean? Explain the life cycle of message driven bean. **(10 Marks)**

b. Write short notes on :

(i) Stateful session bean.

(ii) Singleton session bean. **(10 Marks)**

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20MCA342

Third Semester MCA Degree Examination, Jan./Feb. 2023
Cloud Computing

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. What are the uses of creating data centre? Explain practical examples of cloud computing. **(10 Marks)**

b. With a neat diagram, explain cloud computing reference model. **(10 Marks)**

OR

2 a. Define cloud computing. Explain the characteristics and benefits of clod computing. **(10 Marks)**

b. Explain how the two technologies grid computing and Web 2.0 has contributed for cloud computing. **(10 Marks)**

Module-2

3 a. Explain different hardware architectures for parallel processing. **(10 Marks)**

b. Define component and connector. Explain data-centered architectural style. **(10 Marks)**

OR

4 a. Explain client-server architectural style. **(10 Marks)**

b. What is a service? Explain the characteristics that identify service. **(10 Marks)**

Module-3

5 a. Explain the advantages of visualization in detail. **(10 Marks)**

b. What is Hypervisor? With a neat diagram, explain the types of hypervisor. **(10 Marks)**

OR

6 a. Explain different types of hardware virtualization. **(10 Marks)**

b. With a neat diagram, explain Xen-Paravirtualization. **(10 Marks)**

Module-4

7 a. With a neat diagram, explain Infrastructure as a service reference implementation. **(10 Marks)**

b. What is the need for private cloud? Discuss the advantages of using private cloud. **(10 Marks)**

OR

8 a. Explain the sectors where community clouds are used. **(10 Marks)**

b. Explain the challenges in cloud computing. **(10 Marks)**

Module-5

9 a. What is open stack? Discuss the important components of open stack. **(10 Marks)**

b. Explain briefly the storage services of Amazon Web services. **(10 Marks)**

OR

10 a. Explain any two scientific applications where cloud computing can be used. **(10 Marks)**

b. Explain in detail business and consumers application of cloud computing. **(10 Marks)**

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20MCA354

Third Semester MCA Degree Examination, Jan./Feb. 2023
Software Project Management

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. What is Project? Explain the characteristics of the project and how software projects are different from other types of projects. **(10 Marks)**

b. What are the activities covered by Software Project Management? Explain. **(10 Marks)**

OR

2 a. With neat diagram, explain Project Control Cycle. **(10 Marks)**

b. Explain some ways of categorizing Software projects. **(10 Marks)**

Module-2

3 a. Explain different methods of evaluating Individual projects. **(10 Marks)**

b. Discuss the different cost – benefit of Evaluation techniques. **(10 Marks)**

OR

4 a. What is Financial Accounting? Explain the principles and standard. **(10 Marks)**

b. Explain the various Project Risk Evaluation with example. **(10 Marks)**

Module-3

5 a. Explain the objectives of Activity Planning. **(10 Marks)**

b. List and explain the three approaches used for identifying activities or tasks that make up a project. **(10 Marks)**

OR

6 a. List out the Activity on Arrow rules and Conventions with example. **(10 Marks)**

b. Explain a framework for dealing with a Risk. **(10 Marks)**

Module-4

7 a. Explain the different Visualizing methods for a Project Progress. **(10 Marks)**

b. Write and explain flow chart of Project Control Cycle. **(10 Marks)**

OR

8 a. Explain in detail the Review process model with neat diagram. **(10 Marks)**

b. Explain how the project can take back to target. **(10 Marks)**

Module-5

9 a. Explain Oldman Hackman Job characteristics model. **(08 Marks)**

b. Write a note on :

i) Team Formation model.

ii) Individual characteristics to need of balanced team. **(12 Marks)**

OR

10 a. Explain the Maslow's hierarchy of needs. **(05 Marks)**

b. Write a note on Leadership. **(05 Marks)**

c. Explain in detail decision making in Software Project Management. **(10 Marks)**

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3 III Sem M.CA

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18MCA32

Third Semester MCA Degree Examination, Jan./Feb. 2023
Programming Using Python

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. How a Python program is run on a computer? Discuss with a neat diagram. **(06 Marks)**

b. Write the output for the following:

(i) 56||4
(ii) 3 < 4 and 4 < 5
(iii) 2 > 4
(iv) 2 = = 3
(v) 2**3
(vi) – 2 * 4 + 3 * +2 **(06 Marks)**

c. Trace the function call in the following code by using memory model.

```
>>> def f(x) :
        x = 2*x
        return (x)
>>> x = 1
>>> x = f(x+1) + f(x+2)
```
(08 Marks)

OR

2 a. With an example, explain the following built-in functions:
(i) abs( ) (ii) pow ( ) (iii) int ( ) (iv) round ( ) (v) help ( ) **(10 Marks)**

b. With different examples, explain how print ( ) function can be used to print messages. **(10 Marks)**

Module-2

3 a. How Boolean operators and relational operators can be used in python? Explain with examples for both. **(10 Marks)**

b. With the help of syntax and proper examples, explain the different forms of "if" statements available in python. **(10 Marks)**

OR

4 a. Define a module. Explain the different ways of importing modules. **(10 Marks)**

b. Explain the below string methods with an example for each :

(i) capitalize ( )
(ii) find (s)
(iii) islower ( )
(iv) rstrip ( )
(v) upper ( ) **(10 Marks)**

Module-3

5 a. Discuss the usage of the below mentioned functions with an example for each:
   (i) len ( )
   (ii) max ( )
   (iii) min ( )
   (iv) sum ( )
   (v) sorted ( ) **(10 Marks)**

   b. With proper examples, explain the working of for and while loop in python. **(10 Marks)**

OR

6 a. How break and continue statements are used in Python? Explain with an example for each. **(10 Marks)**

   b. Explain any 5 methods of list with an example. **(10 Marks)**

Module-4

7 a. Which are the different techniques for reading a file in python? Explain. **(12 Marks)**

   b. With an example, explain any 4 set methods. **(08 Marks)**

OR

8 a. Compare the storage collection types tuples and dictionary. **(10 Marks)**

   b. What is inverting a dictionary? Explain with example. **(10 Marks)**

Module-5

9 a. What are the different phases that are involved in object orient programming? Explain. **(10 Marks)**

   b. Discuss the procedure of creating a method in a class with example. **(10 Marks)**

OR

10 a. Explain the model view controller design with the help of tkinter program. **(10 Marks)**

   b. Explain any 05 Graphical User Interface Widgets with respect to tkinter. **(10 Marks)**

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18MCA33

Third Semester MCA Degree Examination, Jan./Feb. 2023
Design and Analysis of Algorithms

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Explain the steps involved in design and analysis of an algorithm. **(10 Marks)**

b. Write the mathematical steps involved in solving recursive and non-recursive algorithms. **(10 Marks)**

OR

2 a. Explain various asymptotic notations of an algorithm with graphical representation for the same. **(12 Marks)**

b. Write a recursive algorithm for tower of Hanoi problem and find its efficiency. **(08 Marks)**

Module-2

3 a. Write an algorithm for bubble sort with its efficiency, also trace the following numbers using bubble sort :
89, 45, 68, 90, 29, 34, 17 **(10 Marks)**

b. Describe sequential search and string matching algorithms using Brute force technique. **(10 Marks)**

OR

4 a. Write an algorithm for merge sort also calculate its efficiency with time complexity. **(10 Marks)**

b. Explain Binary search algorithm and apply the same to find K = 70 on the sequence of numbers as follows :
3, 14, 27, 31, 39, 42, 55, 70, 74, 81, 85, 93, 98 **(10 Marks)**

Module-3

5 a. Write an algorithm for insertion sort also find time complexity for best, average and worst cases. **(10 Marks)**

b. Design an algorithm to find minimum cost spanning tree using Prim's algorithm. **(10 Marks)**

OR

6 a. Demonstrate Dijikstras algorithm and find its efficiency. **(10 Marks)**

b. Construct the Huffman code for the following data :

Character	A	B	C	D	-(underscore)
Probability	0.4	0.1	0.2	0.15	0.15

Encode the text ABCABC_AD
Decode the string whose encoding is 11111001010101 **(10 Marks)**

Module-4

7 a. Explain Floyd's algorithm and also find the shortest path for the following graph using the same.

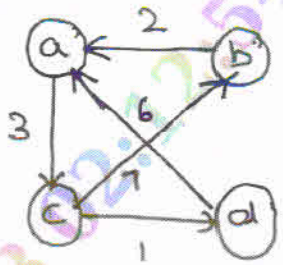

Fig. Q7 (a) **(12 Marks)**

b. Apply Kruskal's Algorithm and find the minimum cost spanning tree for the following graph :

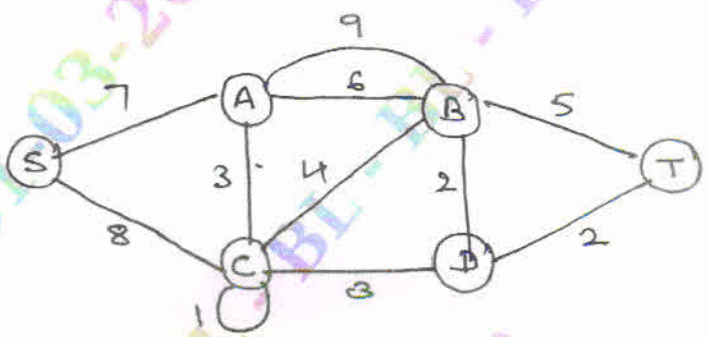

Fig. Q7 (b) **(08 Marks)**

OR

8 a. Explain Warshell's algorithm and implement it for the following graph :

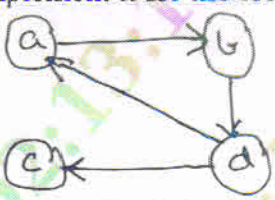

Fig. Q8 (a) **(10 Marks)**

b. Illustrate Binomial coefficient algorithm and evaluate 5_{C_2} using the same. **(10 Marks)**

Module-5

9 a. Illustrate travelling salesman problem with an example. **(12 Marks)**

b. Explain P, NP and NP complete problems with examples. **(08 Marks)**

OR

10 a. Discuss N-Queens and sum of subset problems using bracktracking method. **(12 Marks)**

b. Solve the following knapsack problem :
Capacity W = 10, weights {4, 7, 5, 3} and values {40, 42, 25, 12} **(08 Marks)**

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18MCA34

Third Semester MCA Degree Examination, Jan./Feb. 2023
System Software

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-1

1 a. Explain the SIC machine architecture with respect to memory, registers, data formats, instruction format and addressing modes. **(10 Marks)**

b. Write the sequence of instructions to illustrate the arithmetic operation for SIC and SIC/XE machine architecture. **(10 Marks)**

OR

2 a. Explain the basic functions and directives of an assembler. **(10 Marks)**

b. Write an algorithm for Pass-2 assembler. **(10 Marks)**

Module-2

3 a. Explain the concept of program relocation with the help of a neat diagram. **(10 Marks)**

b. Explain Literals and symbol-defining statements with an example each. **(10 Marks)**

OR

4 a. Describe the concept of multi-pass assembler. **(10 Marks)**

b. Explain the following :
(i) Program blocks.
(ii) MASM Assembler **(10 Marks)**

Module-3

5 a. Briefly explain the bootstrap loader with an algorithm. **(10 Marks)**

b. Write an algorithm for Pass 1 and Pass 2 of linking loader. **(10 Marks)**

OR

6 a. Explain the Linkage editor and Dynamic linking loader design options with neat diagram. **(10 Marks)**

b. Write a short note on :
(i) Automatic Library Search.
(ii) MS-DOS Linker **(10 Marks)**

Module-4

7 a. Write an algorithm for one-pass macroprocessor. **(10 Marks)**

b. Explain diagram data structures used by macroprocessor with neat diagram. **(10 Marks)**

OR

8 a. Explain the following machine-independent macroprocessor features :
(i) Conditional macro expansion.
(ii) Generation of unique labels. **(10 Marks)**

b. Write a note on following :
(i) General purpose macroprocessor.
(ii) MASM macroprocessor **(10 Marks)**

Module-5

9 a. Explain the following :
   (i) Grammer
   (ii) Lexical Analysis
   (iii) Syntactic Analysis
   (iv) Code generation **(10 Marks)**

   b. Explain recursive descent parsing. Write recursive descent parse for 'READ' statement. **(10 Marks)**

OR

10 a. Explain the following compiler design options :
   (i) Division into passes
   (ii) P-code compiler **(10 Marks)**

   b. Write a note on :
   (i) SunOS compiler
   (ii) Compiler-Compilers **(10 Marks)**

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18MCA351

Third Semester MCA Degree Examination, Jan./Feb. 2023
Software Testing

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. What is software quality? Explain software quality with quality attributes. **(10 Marks)**

b. Explain errors, faults and failures in the process of programming and testing with a neat diagram. **(10 Marks)**

OR

2 a. Discuss different types of testing metrics. **(10 Marks)**

b. Explain different steps of testing and debugging. **(10 Marks)**

Module-2

3 a. Explain typical testing life cycle with an illustration. **(10 Marks)**

b. Describe SATM screen with problem statement. **(10 Marks)**

OR

4 a. State and explain data flow diagram for triangle problem. **(10 Marks)**

b. Explain program behaviour and tested behavior with Venn diagram. **(10 Marks)**

Module-3

5 a. Explain Boundary value analysis with example. **(10 Marks)**

b. Write briefly about equivalence class test for next date function. **(10 Marks)**

OR

6 a. What is equivalence class test, what are the different forms of equivalence class testing? **(10 Marks)**

b. Explain decision table for triangle problem. **(10 Marks)**

Module-4

7 a. Explain DD path for triangle problem. **(10 Marks)**

b. Illustrate waterfall and spinoff system with example. **(10 Marks)**

OR

8 a. Briefly explain slice based testing and metric based testing. **(10 Marks)**

b. Write the guidelines for data flow testing. **(10 Marks)**

Module-5

9 a. Explain mutation analysis and faults based adequacy criteria. **(10 Marks)**

b. Illustrate analysis and test plan. **(10 Marks)**

OR

10 a. Briefly explain in brief scaffolding with proper steps. **(10 Marks)**

b. Explain test oracles with a neat diagram and steps. **(10 Marks)**

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20 IV Sem. MCA

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20MCA41

Fourth Semester MCA Degree Examination, Jan./Feb. 2023
Advances in Web Technologies

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. How to create functions in PHP? Explain pass by value program. **(10 Marks)**

b. Explain string handling functions in PHP with suitable examples. **(10 Marks)**

OR

2 a. Explain file handling functions in PHP with examples. **(10 Marks)**

b. What are Arrays in PHP? Explain creation of arrays and predefined functions dealing with arrays. **(10 Marks)**

Module-2

3 a. Explain the following string methods in Ruby capitalize, append, chomp, swap case and concatenation. **(10 Marks)**

b. Illustrate built-in methods of arrays and lists in Ruby with simple example. **(10 Marks)**

OR

4 a. Write a Ruby code to add two integers. **(07 Marks)**

b. Explain the directory structure of rails application with a neat diagram. **(08 Marks)**

c. Explain form handling in Rails with an example. **(05 Marks)**

Module-3

5 a. Differentiate between classical web application and AJAX enables web application with a neat diagram and also list out limitations of traditional web application. **(10 Marks)**

b. What is AJAX? List out AJAX principles and also technologies behind AJAX. **(10 Marks)**

OR

6 a. Explain steps for creating AJAX applications.
[Note: create Javascript, create XMLHttpRequest objet, use GET for passing data to server, fetch data from the server and display it to client]. **(10 Marks)**

b. List out built-in properties, methods of XMLHttpRequest object and also explain status codes for the status property of XMLHttpRequest object. **(10 Marks)**

Module-4

7 a. Write a AJAX program for handling multiple XMLHttpRequest objects (2 objects) in the same page. [Use any one method GET/POST]. **(10 Marks)**

b. What are AJAX patterns? Explain predictive fetch and multi-stage download in detail. **(10 Marks)**

OR

8 a. Illustrate handling of multiple XMLHttpRequest object by using Arrays. **(10 Marks)**

b. Explain the following :
(i) Periodic Refresh and Fallback Patterns (ii) Submission Throttling **(10 Marks)**

Module-5

9 a. What is Bootstrap? Explain basic file structure and global styles of Bootstrap. **(10 Marks)**

b. Explain the following :

i) Default Grid System ii) Fluid Grid System. **(10 Marks)**

OR

10 a. Write a short note on :

i) Emphasis class
ii) Lists
iii) Code
iv) Tables
v) Buttons **(10 Marks)**

b. Explain forms and optional form layouts in Bootstrap with an example. **(10 Marks)**

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20MCA42

Fourth Semester MCA Degree Examination, Jan./Feb. 2023
Programming Using C#

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Explain the components of .NET Framework with the help of architecture diagram. **(10 Marks)**

b. List and explain the different datatypes in C#. **(10 Marks)**

OR

2 a. What are differences between value types and reference types, and write a program to explain boxing and unboxing. **(10 Marks)**

b. What is Jagged array? Write a program in C# to read jagged array and display the sum of all the elements present in jagged array of 3 inner arrays. **(10 Marks)**

Module-2

3 a. How can you create partial classes and partial methods in C#? Explain with an example program. **(10 Marks)**

b. Explain Indexers with suitable example program and give the differences between properties and indexers. **(10 Marks)**

OR

4 a. What is encapsulation? What are the two ways of achieving the encapsulation in C#? Explain each one with an example program. **(10 Marks)**

b. Explain each one with an example :
i) Sealed classes and sealed methods
ii) Abstract classes and abstract methods **(10 Marks)**

Module-3

5 a. Explain the four steps involved in creating and using delegates in the program. **(10 Marks)**

b. Write a C# program using try, catch and finally blocks to explain any predictive exceptions. **(10 Marks)**

OR

6 a. Describe the architecture of ADO.NET with neat diagram. **(10 Marks)**

b. What is Connection object? Explain the procedure of being connected to database and running the following queries with relevant example:
i) Insert record to a table
ii) Select records from a table and place in grid. **(10 Marks)**

Module-4

7 a. List out any two properties and events for checkbox, combo box, Radio button, Text box and Group box. **(10 Marks)**

b. Explain the following :
i) MDI windows forms ii) Event-Driven GUI. **(10 Marks)**

OR

8 a. Explain WPF architecture with a neat diagram. **(10 Marks)**

b. Write a short note on :

i) XAML elements

ii) Markup Extension classes in XAML. **(10 Marks)**

Module-5

9 a. Explain in detail multi-tier application architecture with a neat diagram. **(10 Marks)**

b. Explain different types of validation controls with suitable example supported by ASP.NET. **(10 Marks)**

OR

10 a. What is Cookie? Explain how session tracking is achieved by using cookies. **(10 Marks)**

b. Explain the controls from AJAX control tool kit. **(10 Marks)**

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18 V Sem M.C.A

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18MCA51

Fifth Semester MCA Degree Examination, Jan./Feb. 2023
Programming Using C# .NET

Time: 3 hrs. Max. Marks: 100

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

1 a. Explain the CLR activities for executing the program. **(10 Marks)**

b. Write a C# program to implement command line arguments. **(10 Marks)**

OR

2 a. Explain the concept of boxing and unboxing operations. Write a C# program to implement boxing and unboxing. **(10 Marks)**

b. Discuss the architecture of .Net framework with a neat diagram. **(10 Marks)**

Module-2

3 a. Define Property. Explain the Read-only and static property accessors in C# with help of a program. **(10 Marks)**

b. Discuss briefly the access modifiers in C# and classify the data types in C#. **(10 Marks)**

OR

4 a. Discuss the concept of constructors and destructors with C# program as example. **(10 Marks)**

b. Define Array. Briefly discuss how they are categorized with example. Write a C# program to implement Jagged Array. **(10 Marks)**

Module-3

5 a. Write a C# program to implement and explain the concept of multicasting a delegate. **(10 Marks)**

b. Write a C# program to implement try, catch, finally and also explain checked and unchecked statements with example. **(10 Marks)**

OR

6 a. Describe Event. Write a C# console application to demonstrate the concept of multi event handler for a single event. **(10 Marks)**

b. Explain Data Adapter for creating dataset with an example program. **(10 Marks)**

Module-4

7 a. Explain the components of ADO.NET entity framework with a neat diagram. **(10 Marks)**

b. Describe the steps involved in creating MDI form with output. **(10 Marks)**

OR

8 a. Describe Markup extension classes in XAML. **(10 Marks)**

b. Write a C# program to implement check box and Radio button. **(10 Marks)**

Module-5

9 a. Define AJAX in ASP.NET? Explain the need and features of AJAX technology. **(10 Marks)**

b. Discuss and design a tree view control using ASP.NET. Explain with an example program. **(10 Marks)**

OR

10 a. Design a web form in ASP.NET using link label control, month calendar control and date time piclar with example program. **(10 Marks)**

b. Explain validation controls using ASP.NET with example. **(10 Marks)**

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18MCA52

Fifth Semester MCA Degree Examination, Jan./Feb. 2023
Mobile Applications

Time: 3 hrs. Max. Marks: 100

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

1 a. Explain the following mobile application development platform:
i) Android ii) iOS iii) Blackberry OS iv) Windows phone 7. (10 Marks)
b. What are the Myths associated with mobile application development. (06 Marks)
c. Discuss the importance of mobile applications. (04 Marks)

OR

2 a. Briefly explain Gestalt principal in detail. (10 Marks)
b. What are the key issues involved in using screen real estate effectively? Explain. (10 Marks)

Module-2

3 a. With a neat diagram, explain the architecture of Android. (10 Marks)
b. Create a simple android application (Helloworld.java) with all steps. (10 Marks)

OR

4 a. Define Activity. Explain the lifecycle of an activity. (08 Marks)
b. Briefly discuss the anatomy of an android application. (08 Marks)
c. Bring out the significance of R. Java file. (04 Marks)

Module-3

5 a. Define view. Explain different types of views and view groups. (10 Marks)
b. Create an Android application that uses GPS location information. (10 Marks)

OR

6 a. How to deploy the APK file in android app development? Explain. (10 Marks)
b. What are the different methods for getting location data? Explain. (10 Marks)

Module-4

7 a. Explain the procedure for sending an SMS through android application. (10 Marks)
b. Briefly discuss the networking concept using HTTP protocol in android. (10 Marks)

OR

8 a. Define a service. How do you create your own service? Explain with a code snippet. (10 Marks)
b. Explain the concept of binding activities to services. (10 Marks)

Module-5

9 a. What is program level? Discuss the various programs levels applicable for an iOS developer. (10 Marks)
b. Discuss anatomy of iOS app. (10 Marks)

OR

10 Write a short note on: (20 Marks)
a. Pivot v/s panorama.
b. Accelerometer in windows phone 7.
c. iOS story board.
d. Notifications of windows phone 7 App.

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18MCA53

Fifth Semester MCA Degree Examination, Jan./Feb. 2023
Machine Learning

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Define Machine Learning. Mention some of the applications of machine learning. **(10 Marks)**

b. What are the key properties and complaints of Finds algorithm? **(10 Marks)**

OR

2 a. Write LIST-THEN-ELIMINATE algorithm. **(10 Marks)**

b. Write a note on:
(i) Version space (ii) Inductive bias **(10 Marks)**

Module-2

3 a. What is decision tree and decision tree learning? **(04 Marks)**

b. Explain decision free with example. **(08 Marks)**

c. What are the appropriate problems of decision tree learning? **(08 Marks)**

OR

4 a. Explain the concepts of Entropy and Information gain. **(10 Marks)**

b. Describe the ID3 algorithm for decision tree learning with an example. **(10 Marks)**

Module-3

5 a. Define artificial neural network. Explain appropriate problem for neural network learning with its characteristics. **(10 Marks)**

b. Explain the concept of perceptron with a neat diagram. **(10 Marks)**

OR

6 a. Briefly explain back propagation algorithm. **(10 Marks)**

b. Write a note on gradient Descent and Delta rule. **(10 Marks)**

Module-4

7 a. Define Bayesian theorem. What is the relevance and features of Bayesian theorem. **(10 Marks)**

b. Explain maximum Likelihood Hypothesis and least square error hypothesis. **(10 Marks)**

OR

8 a. Explain Brute force Bayes concept learning. **(10 Marks)**

b. Explain Naive Bayes classifier with an example. **(10 Marks)**

Module-5

9 a. Define the following term :
i) Sample error ii) Random variable iii) Variance iv) Standard deviation. **(10 Marks)**

b. Explain Binomial distribution with an example. **(10 Marks)**

OR

10 a. What are instance based learning? Explain key features and advantages of these methods. **(10 Marks)**

b. Describe K-nearest Neighbour learning algorithm for continuous values target function. **(10 Marks)**

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18MCA542

Fifth Semester MCA Degree Examination, Jan./Feb. 2023
Internet of Things (IoT)

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. With neat diagram, explain system components of an M2M solution. **(10 Marks)**
b. Define IoT. Explain emerging IoT applications. **(10 Marks)**

OR

2 a. What is Global Value Chain? Explain the inputs and outputs of an M2M value chain. **(10 Marks)**
b. Explain Game changers with example. **(10 Marks)**

Module-2

3 a. Explain the IoT – architecture outline. **(10 Marks)**
b. With a neat diagram, explain information-driven value chain for IoT. **(10 Marks)**

OR

4 a. Explain global and M2M value chains. **(10 Marks)**
b. Explain the functions layers and capabilities of an IoT solution. **(10 Marks)**

Module-3

5 a. Explain various service and deployment models of a cloud. **(10 Marks)**
b. With a neat diagram, explain how IoT has been integrated with enterprise systems. **(10 Marks)**

OR

6 a. Describe Local and Wide Area Networking with example. **(10 Marks)**
b. Discuss the key characteristics of Cloud Computing. **(10 Marks)**

Module-4

7 a. Explain IoT Domain model with example. **(10 Marks)**
b. In short explain ITU-IoT reference model with a diagram. **(10 Marks)**

OR

8 a. Briefly explain the ETSI M2M high level architecture. **(10 Marks)**
b. Explain Information model and function model with example. **(10 Marks)**

Module-5

9 a. Explain SoA-based device integration. **(10 Marks)**
b. Explain the evolution of commercial building automation. **(10 Marks)**

OR

10 a. Explain various levels of SOCRADES integration architecture. **(10 Marks)**
b. Explain Data representation and visualization with example. **(10 Marks)**

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18MCA553

Fifth Semester MCA Degree Examination, Jan./Feb. 2023
Software Architecture

Time: 3 hrs. Max. Marks: 100

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

1	a.	Define software architecture. Discuss why software architecture is important.	(06 Marks)
	b.	Explain the influence of architecture with respect to system stake holder.	(08 Marks)
	c.	What is architecture business cycle? Explain with diagram.	(06 Marks)

OR

2	a.	Discuss about architectural patterns, reference models and reference architectures.	(06 Marks)
	b.	Explain the role of architecture at the earliest set of design decisions.	(08 Marks)
	c.	Discuss the impotence of an architecture in building the architecture.	(06 Marks)

Module-2

3	a.	Explain the parts of quality attribute scenario with neat diagram.	(10 Marks)
	b.	Discuss the general scenario with respect to availability.	(10 Marks)

OR

4	a.	Discuss the tactics with respect to availability.	(10 Marks)
	b.	Discuss the tactics with respect to security.	(10 Marks)

Module-3

5	a.	How availability can be analyzed in modeling the architecture.	(10 Marks)
	b.	Discuss about experiments and Back – of – the – Envelope analysis.	(10 Marks)

OR

6	a.	How ASRS are gathered by interviewing stake holders?	(10 Marks)
	b.	Explain the role of business goals in architecturally significant requirements.	(10 Marks)

Module-4

7	a.	Briefly discuss the steps involved in attribute driven design method.	(10 Marks)
	b.	Define view. Explain the role of module view in software architecture.	(10 Marks)

OR

8	a.	Discuss the sections of documentation beyond views.	(10 Marks)
	b.	How an architecture is documented in agile development project? Explain.	(10 Marks)

Module-5

9	a.	Define architectural pattern. Also discuss the relationship between patterns.	(10 Marks)
	b.	Discuss the guidelines in implanting the Broker architectural pattern.	(10 Marks)

OR

10	a.	What is layered architectural pattern? Explain.	(10 Marks)
	b.	Explain MVC architecture with neat diagram.	(10 Marks)

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