H.T.No: | 2 | 0 | A | 9 | 1 | F | 0 | 0 | 5 | 3 |

Course Code: **203MC1T02**

ADITYA ENGINEERING COLLEGE (A)
MCA – I Semester End Examinations Regular (AR20) – AUG 2021

MATHEMATICAL AND STATISTICAL FOUNDATIONS

Time: 3 hours   Max. Marks: 70

Answer ONE question from each unit
All Questions Carry Equal Marks (5 x 14 = 70M)
All parts of the questions must be answered at one place only

UNIT – I

1. a State Bayes theorem. A and B are two weak students of statistics and their chance of solving a problem in statistics correctly are $\frac{1}{6}$ and $\frac{1}{8}$ respectively. If the probability of their making a common error is $\frac{1}{525}$ and they obtain same answer, find the probability that their answer is correct.   K2   CO1   [7M]

   b Describe Acceptable and Natural assignment probabilities. For any two events A and B , Prove that   K2   CO1   [7M]
i) $P(\overline{A} \cap B) = P(B) - P(A \cap B)$ ii) $P(A \cap \overline{B}) = P(A) - P(A \cap B)$

OR

2. a Explain what is meant by random variable. Compare discrete and continuous random variables.   K2   CO1   [6M]

   b The diameter (x) of an electric cable, is assumed to be a continuous random variable with p.d.f.: f(x) = 6x(1-x), 0≤x≤1.   K3   CO1   [8M]
i) Check that the given f(x) is a p.d.f. ii) Obtain an expression for the c.d.f. of x iii) Compute $P(\frac{1}{3} \le x \le \frac{2}{3})$ and iv) determine the number of k such that $P(x < k) = P(x > k)$

UNIT – II

3. a Briefly explain how to select random samples from the population using simple random sampling with and without replacement.   K3   CO2   [6M]

   b For a frequency distribution of scores in mathematics of 50 candidates selected at random from a certain examination. Compute mean and variance using the moments.   K3   CO2   [8M]

Scores	5-10	10-15	15-20	20-25	25-30	30-35	35-40
Frequency	6	8	17	21	15	11	2

(P.T.O)

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K3 CO2 [6M]

4 a Explain briefly the criteria of good estimator. K3 CO2 [8M]
   b Define the likelihood function of a random sample of size n. Obtain the maximum likelihood estimate of the parameter α of a population having the density function: $f(x) = \dfrac{2}{\alpha^2}(\alpha - x)$, $0<x<\alpha$ for a sample of unit size is 2x.

UNIT – III

5 a Explain i) Null and Alternative hypothesis ii) One tailed and two tailed tests. K3 CO3 [6M]
   b The hourly wage of a sample of 150 workers in a plant 'A' was Rs. 2.56 with a standard deviation of Rs. 1.08. The hourly wage of a sample of 200 workers in a plant 'B' was Rs. 2.87 with a standard deviation of Rs. 1.28. Can an applicant safely assume that the hourly wages paid by plant 'B' are higher than those paid by plant 'A'. K3 CO3 [8M]

$$\frac{x_1 - x_2}{\sqrt{\dfrac{\sigma_1^2}{n_1} + \dfrac{\sigma_2^2}{n_2}}}$$

OR

6 a Discuss how to construct i) $\overline{X}$ chart ii) R chart K3 CO3 [7M]
   b A survey of 800 families with four children each revealed the following distribution: K3 CO3 [7M]

No. of Boys	0	1	2	3	4
No. of Girls	4	3	2	1	0
No. of families	32	178	290	236	64

Is this result with the hypothesis that male and female births are equally probable?

UNIT – IV

7 a Let $(A,\cdot)$ be a group i) show that $(ab)^{-1} = b^{-1}a^{-1}$ ii) Show that $(a_1, a_2, ...a_r)^{-1} = a_r^{-1} a_{r-1}^{-1} ....a_2^{-1}, a_1^{-1}$ K2 CO4 [7M]
   b If $p_1, p_2, ...p_n$ are relatively prime to q then their product is relatively prime to q. K2 CO4 [7M]

OR

8 a Write a division algorithm and find the quotient remainder when i) 777 is divisible by 21 ii) 1234567 is divisible by 1001 K2 CO4 [7M]
   b Express the gcd of each pair of integers as a linear combination of these integers i) 33, 44 ii) 101, 203 K2 CO4 [7M]
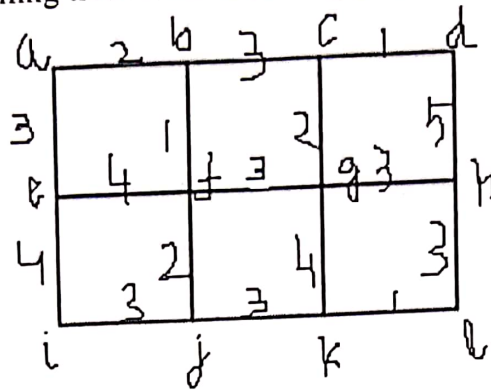
UNIT – V

9 a Describe different kinds of Graph models. K3 CO5 [6M]

   b Write Prim's algorithm to find a minimum spanning tree and hence find K3 CO5 [8M]
      the minimum spanning tree of the following graph.

OR

10 a Construct a precedence graph for the following program: K3 CO5 [7M]

$S_1 : x := 0$, $S_2 : x := x+1$, $S_3 : y := 2$, $S_4 : z := y$, $S_5 : x := x+2$

$S_6 : y := x+z$, $S_7 : z := 4$

   b. Find the adjacency matrix for the following graphs i) K_n ii) $K_{m,n}$ K3 CO5 [7M]

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ADITYA ENGINEERING COLLEGE (A)
MCA – 1 Semester End Examinations Regular (AR20) – AUG 2021

BUSINES COMMUNICATION

Time: 3 hours   Max. Marks: 70

Answer ONE question from each unit
All Questions Carry Equal Marks (5 x 14 = 70M)
All parts of the questions must be answered at one place only

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UNIT – I

1 a What are the essentials of good communication?   K1 CO1 [7M]
   b Explain the channels of communication?   K2 CO1 [7M]

OR

2 a What is formal and informal communication?   K1 CO2 [7M]
   b What role does communication play in business?   K1 CO2 [7M]

UNIT – II

3 a What are the factors affecting presentations?   K1 CO5 [7M]
   b How can presentations be made effective?   K2 CO5 [7M]

OR

4 a Explain role of emotion in interpersonal communication   K2 CO2 [7M]
   b Briefly explain effective interpersonal communication   K2 CO2 [7M]

UNIT – III

5 a What are the characteristics of non –verbal communication?   K1 CO1 [7M]
   b Explain the difference between formal & informal communications?   K1 CO3 [7M]

OR

6 a What do you mean by etiquette? How they are important in business?   K1 CO3 [7M]
   b Give suitable examples for some business etiquettes, which are essentials K2 CO3 [7M]
      in business dealings?

UNIT – IV

7 a Discuss the different forms of internal correspondence?   K2 CO4 [7M]
   b What role does a resume plays for a job applicant?   K1 CO4 [7M]

OR

8 a Discuss the important considerations in preparing a resume?   K2 CO4 [7M]
   b What do you mean by a report? Discuss various types and structures of K1 CO4 [7M]
      reports?

UNIT – V

9 a What is an interview? What aspects interviewers assess when they   K1 CO5 [7M]
      interview candidates?
   b What are the characteristics of a prerequisites of effective presentation?   K1 CO5 [7M]

OR

10 a Elaborate some of presentation skills and how they contribute to effective   K2 CO5 [7M]
       presentations?
    b Briefly explain techniques involved in interviews?   K2 CO5 [7M]

ADITYA ENGINEERING COLLEGE (A)
MCA – I Semester End Examinations Regular (AR20) – AUG 2021

COMPUTER ORGANIZATION & OPERATING SYSTEMS

Time: 3 hours   Max. Marks: 70

Answer ONE question from each unit
All Questions Carry Equal Marks (5 x 14 = 70M)
All parts of the questions must be answered at one place only

UNIT – I
1	a	Explain How to measure the performance of a computer?	K2	CO1	[7M]
	b	What are operational steps needed to execute any machine instruction?	K1	CO1	[7M]

OR

2	a	Explain about stacks and Queues Basic Input/output Operations	K2	CO1	[7M]
	b	List out the different addressing modes and discuss with examples.	K2	CO1	[7M]

UNIT – II
3	a	Explain about the organization of a micro programmed control unit.	K2	CO2	[7M]
	b	What are the steps involved in execution of a complete instruction? Write the control sequence for execution of the instruction MOV instruct.	K1	CO2	[7M]

OR

4	a	Difference between RAM and ROM.	K4	CO2	[7M]
	b	What are the differences between single bus organization and multiple bus organization?	K4	CO2	[7M]

UNIT – III
5	a	Explain about operating system Services.	K2	CO3	[7M]
	b	Explain about real-time operating system.	K2	CO3	[7M]

OR

6	a	Define PCB. Explain about PCB with neat diagram	K1	CO3	[7M]
	b	What is Thread? Explain about threading issues.	K1	CO3	[7M]

UNIT – IV
7	a	Write short notes on Critical-Section.	K1	CO4	[7M]
	b	Define Semaphores. Explain about different types of Semaphores.	K1	CO4	[7M]

OR

8	a	Define Deadlock. Write about Deadlock characteristics.	K1	CO4	[7M]
	b	Explain about Deadlock prevention.	K2	CO4	[7M]

UNIT – V
9	a	Explain about file access methods.	K2	CO5	[7M]
	b	What is memory allocation? Explain about Contiguous Memory Allocation.	K1	CO5	[7M]

OR

10	a	What is file mounting? Explain about File-mounting with example.	K1	CO5	[7M]
	b	Define Seek Time. Explain about FCFS disk Scheduling Algorithm.	K1	CO5	[7M]

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ADITYA ENGINEERING COLLEGE (A)
MCA – I Semester End Examinations Regular (AR20) – AUG 2021

DATA STRUCTURES

Time: 3 hours   Max. Marks: 70

Answer ONE question from each unit
All Questions Carry Equal Marks (5 x 14 = 70M)
All parts of the questions must be answered at one place only

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UNIT – I

1 a Explain arithmetic, logical and bitwise operators with examples.   K2 CO1 [6M]
   b Write a C program to illustrate switch and if-else statements.   K2 CO1 [8M]

OR

2 a What is the need of do-while and while loops? Discuss about their usage. K2 CO1 [6M]
      Distinguish between them.
   b Write a program to demonstrate passing an array argument to a function. K2 CO1 [8M]
      Consider the problem of finding largest of N numbers defined in an
      array.

UNIT – II

3 a Explain function prototype and explain different methods to call the   K3 CO2 [7M]
      functions.
   b Define a structure. Describe how to declare and initialize structure and its K3 CO2 [7M]
      members with an example.

OR

4 a What is a user defined function? When these functions are useful? How a   K3 CO2 [6M]
      function is declared and what are the rules followed to call a function.
   b Explain about the fopen, fclose, feof, fprintf, and fscanf, functions.   K3 CO2 [8M]

UNIT – III

5 a List various operations of linked list and explain how to insert a node K3 CO3 [8M]
      anywhere in the single linked list.
   b Write an algorithm to delete an element anywhere from doubly linked   K3 CO3 [6M]
      list.

OR

6 a Explain the advantages and disadvantages of the recursive algorithms   K3 CO3 [6M]
      compared to non-recursive algorithms.
   b What is the difference between Circular linked list and doubly linked list. K3 CO3 [8M]
      Mention the applications of each type of list.

UNIT – IV

7 a Convert given Infix expression: (a + b * c ^ d) * (e + f / g) to Postfix K3 CO4 [7M]
      expression using Stack and show the details of Stack at each step of
      conversion. (Note: ^ indicates exponent operator)
   b Discuss various collision resolution techniques with suitable examples.   K3 CO4 [7M]

(P.T.O)

<div style="text-align:center">OR</div>

8   a   Explain the basic operations of stack with pseudo code.   K3   CO4   [8M]

    b   Discuss about implementation of queues using linked list.   K3   CO4   [6M]

UNIT – V

9   a   Describe insertion sort algorithm and trace the steps of insertion sort for   K4   CO5   [6M]
sorting the list 12, 19, 33, 26, 29, 35, 22, 37. Find the total number of
comparisons made.

    b   Write in-order, pre-order and post-order traversal of a binary tree.   K4   CO5   [8M]

<div style="text-align:center">OR</div>

10   a   Create binary search tree for the following elements 23, 12, 45, 36, 5, 15,   K4   CO5   [7M]
39, 2, 19. Discuss about the height of the above binary search tree.

    b   Give an algorithm for quick sort and explain its time complexity. Trace   K4   CO5   [7M]
the algorithm for the following data: 65 70 75 80 85 60 55 50 45.

<div style="text-align:center">*****</div>

ADITYA ENGINEERING COLLEGE (A)

MCA – I Semester End Examinations Regular (AR20) – AUG 2021

OBJECT ORIENTED PROGRAMMING WITH JAVA

Time: 3 hours

Max. Marks: 70

Answer ONE question from each unit
All Questions Carry Equal Marks (5 x 14 = 70M)
All parts of the questions must be answered at one place only

UNIT – I

1	a	Explain the different parts of a Java program with an appropriate example.	K2	CO1	[7M]
	b	What is meant by byte code? Briefly explain how Java is platform independent.	K1	CO1	[7M]

OR

2	a	List the primitive data types available in Java and explain.	K1	CO1	[7M]
	b	Discuss about precedence of operators and associativity.	K6	CO1	[7M]

UNIT – II

3	a	What is inheritance and how does it help to create new classes quickly.	K1	CO2	[7M]
	b	Explain the polymorphism and overloading with an example.	K2	CO2	[7M]

OR

4	a	Write the benefits of packages and interfaces.	K1	CO2	[6M]
	b	How can we add a class to a package? Write about relative and absolute paths.	K1	CO2	[8M]

UNIT – III

5	a	Differentiate between multiprocessing and multithreading. What is to be done to implement these in a program?	K4	CO3	[7M]
	b	What is an Exception? How is an Exception handled in JAVA?	K1	CO3	[7M]

OR

6	a	Write a java program that illustrates the application of multiple catch statements.	K1	CO3	[8M]
	b	Write about some Java's built-in exceptions.	K1	CO3	[6M]

UNIT – IV

7	a	Explain user interface components in AWT.	K2	CO4	[6M]
	b	Write a program to create a frame window that responds to key strokes.	K1	CO4	[8M]

OR

8	a	What is a Layout manager? Explain different types of Layout managers.	K1	CO4	[6M]
	b	Explain different mouse and keyboard events with syntax.	K2	CO4	[8M]

UNIT – V

9	a	Discuss about different applet display methods in brief.	K4	CO5	[7M]
	b	What are the various components of Swing? Explain.	K1	CO5	[7M]

OR

10	a	What is an applet? Explain the life cycle of Applet with a neat sketch.	K1	CO5	[7M]
	b	What are the subclasses of JButton class of swing package?	K1	CO5	[7M]

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H.T.No: 2 1 A 9 1 F 0 0 7 5

Course Code: **203MC1T01**

ADITYA ENGINEERING COLLEGE (A) 2022

MCA – I Semester End Examinations Regular & Supplementary (AR20) – MAY 2022

BUSINESS COMMUNICATION
(Master of Computer Applications)

Time: 3 hours

Max. Marks: 70

Answer ONE question from each unit
All Questions Carry Equal Marks
All parts of the questions must be answered at one place only

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UNIT – I

1 a List three situations in your experience, where you would prefer to use written communication? With reasons   K2   CO1   [7M]

   b What do you mean by "NOISE" in communication process?   K2   CO1   [7M]

OR

2 a What speakers can do to ensure better listening?   K1   CO1   [7M]

   b Define Communication? What are the purposes of it?   K1   CO1   [7M]

UNIT – II

3 a Difference between formal and informal communication   K2   CO2   [7M]

   b What is meant by status-consciousness? How does it impede the smooth flow of communication?   K3   CO2   [7M]

OR

4 a Define Emotion explain the role of emotions in communication   K3   CO2   [7M]

   b What is Grapevine? Discuss its advantages and disadvantages   K2   CO2   [7M]

UNIT – III

5 a What is Paralanguage? How does silence affect the quality of non-verbal communication?   K2   CO3   [7M]

   b Write explanatory notes on body posture and gestures   K3   CO3   [7M]

OR

6 a Explain the importance of Haptics handshakes, with examples   K3   CO3   [7M]

   b Explain the importance of non-verbal communication in business communication   K3   CO3   [7M]

UNIT – IV

7 a Distinguish between Minutes and proceedings of a meeting   K2   CO4   [7M]

   b Draft a circular addressing to your customers and dealers announcing the opening of a new branch   K3   CO4   [7M]

OR

8 a What is the difference between CV and Resume? What are the points that should kept in mind while preparing Resume?   K3   CO4   [7M]

   b Draft a Circular letter of credit in favor of the sales manager of your firm M.D.K Ravi Chandra ,who is going out on a tour to Northern India   K3   CO4   [7M]

UNIT – V

9 a Write an exploratory note on appearance and body posture of a speaker?   K3   CO5   [7M]

   b Write the opening paragraph of a formal presentation on the topic" How Extra Circular activities contribute to your personality development   K2   CO5   [7M]

OR

10 a What are the Guidelines for success of an interview?   K1   CO5   [7M]

   b A Group Discussion is the creative approach to knowledge-Explain   K3   CO5   [7M]

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ADITYA ENGINEERING COLLEGE (A)

MCA – I Semester End Examinations Regular (AR20) – MAY 2022

MATHEMATICAL AND STATISTICAL FOUNDATIONS
(Master of Computer Applications)

Time: 3 hours   Max. Marks: 70

Answer ONE question from each unit
All Questions Carry Equal Marks
All parts of the questions must be answered at one place only

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UNIT – I

1 a If the probability density of a random variable is given by   K3   CO1   [7M]

$$f(x) = \begin{cases} kx^2 & if\ x > 0 \\ 0 & if\ x < 0 \end{cases}$$

Find the value of k and the probability that the random variable takes on a value between (i) between $\frac{1}{4}$ and $\frac{3}{4}$ (ii) greater than $\frac{2}{3}$. Also, find its mean and variance.

   b For the continuous random variable X whose probability density function   K3   CO1   [7M]
is given by $f(x) = \begin{cases} cx(2-x), & for\ 0 \le x \le 2 \\ 0, & otherwise \end{cases}$

Find c and mean and variance of X.

OR

2 a Two marbles are drawn in succession from a box containing 10 red, 30   K3   CO1   [7M]
white and 15 orange marbles, with replacement being made after each
draw. Find the probability that (i) both are white (ii) first is red second is
white.

   b If the probability density of a random variable is given by   K3   CO1   [7M]
$f(x) = \begin{cases} k(1-x^2)\ if\ 0 < x < 1 \\ 0\ \ otherwise \end{cases}$. Find the value of k and the probability
that the random variable takes on a value between i) between $\frac{1}{10}$ and $\frac{2}{10}$
ii) greater than $\frac{1}{2}$.

UNIT – II

3   A population consists of five numbers 2,3,6,8 and 11. Consider all possible   K3   CO2   [14M]
samples of size two which can be drawn with replacement from this
population. Find
i) The mean of the population
ii) The standard deviation of the population
iii) The mean of the sampling distribution of means
iv) The standard deviation of the sampling distribution of means.

OR

4 a The tensile strength (1000 psi) of a new composite can be modeled as a   K3   CO2   [7M]
normal distribution. A random sample of size 25 specimens has mean
45.3 and standard deviation 7.9. Does this information tend to support or
refute the claim that the mean of the population is 40.5

4　b　A research worker wants to determine the average time it takes a mechanic　K3　CO2　[7M]
to rotate the tires of a car, and she wants to be able to assert with 95%
confidence that the mean of her sample is off by at most 0.50 minute. If
she can presume from past experience that $\sigma = 1.6$ minutes, how large a
sample will she have to take.

UNIT – III

5　a　The dynamic modulus of concrete is obtained for two different concrete　K3　CO3　[7M]
mixes. For the first mix, $n_1 = 33$, $\bar{x} = 115.1$ and $s_1 = 0.47$ psi. For the
second mix, $n_2 = 31$, $\bar{y} = 114.6$ and $s_2 = 0.38$. Test with $\alpha = 0.05$, the null
hypothesis of equality of mean dynamic modulus versus the two-sided
alternative. Also construct a 95% confidence interval of the difference in
mean dynamic modulus.

　　b　The following random samples are measurements of the heat-producing　K3　CO3　[7M]
capacity (in millions of calories per ton) of specimens of coal from two
mines:

Mine - 1	8260	8130	8350	8070	8340	
Mine - 2	7950	7890	7900	8140	7920	7840

Construct a 99% confidence interval for the difference between means.

OR

6　a　To compare two kinds of bumper guards, 6 of each kind, were mounted on　K3　CO3　[7M]
a certain kind of compact car. Then each car was run into a concrete wall
at 5 miles per hour and the following are the costs of the repairs (in rupees)

Bumper Guard 1	407	448	423	465	402	419
Bumper Guard 2	434	415	412	451	433	429

Use the 0.01 level of significance to test whether the difference between
two sample means is significant.

　　b　Measuring specimens of nylon yarn taken from two spinning machines, it　K3　CO3　[7M]
was found that 8 specimens from the first machine had a mean denier of
9.67 with a standard deviation of 1.81 while 10 specimens from the second
machine had a mean denier of 7.43 with a standard deviation of 1.48.
Assuming that the populations sampled are normal and have the same
variance, test the null hypothesis $\mu_1 - \mu_2 = 1.5$ against the alternative
hypothesis $\mu_1 - \mu_2 > 1.5$ at the 0.05 level of significance.

UNIT – IV

7　a　Prove that a group G is abelian iff $(a * b)^2 = a^2 * b^2$.
　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　K3　CO4　[7M]
　　b　Determine whether $H_1 = \{ 0, 5, 10\}$ and $H_2 = \{ 0, 4, 8, 12\}$ are subgroups　K3　CO4　[7M]
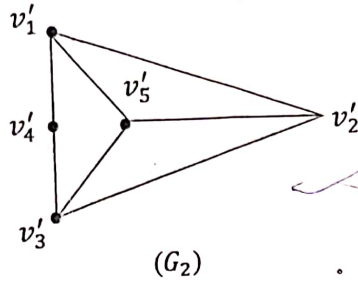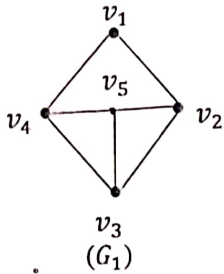of $(Z_{15}, +_{15})$

OR

8　a　Find $G.C.D(615, 1080)$, and find integers u and v such that
　　　$G.C.D(615, 1080) = 615u + 1080v$　　　　　　　　　　　　　　　K3　CO4　[8M]

　　b　Use the definition of addition and multiplication in Z_m to find $7 +_{11} 9$ and $7 \cdot_{11} 9$.　K3　CO4　[6M]

UNIT – V

9 a Verify whether the following graphs are isomorphic or not.   K3 CO5 [7M]

(G_1) (G_2)

b Define subgraph, vertex deleted subgraph, edge deleted subgraph and cut   K3 CO5 [7M]
vertex.

OR

10   State and prove 5- color theorem.   K3 CO5 [14M]

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ADITYA ENGINEERING COLLEGE (A)

MCA – I Semester End Examinations Regular & Supplementary (AR20) – May 2022

COMPUTER ORGANIZATION AND OPERATING SYSTEMS

(Master of Computer Applications)

Time: 3 hours   Max. Marks: 70

Answer ONE question from each unit
All Questions Carry Equal Marks
All parts of the questions must be answered at one place only

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UNIT – I

1	a	What are the operational steps needed to execute any machine instruction? Explain with an example and neat diagram.	K2	CO1	[7M]
	b	Explain about multiprocessor and multi computers.	K2	CO1	[7M]

OR

2	a	Explain about Memory locations and addresses in detail.	K2	CO1	[7M]
	b	Explain about Instructions and Instruction sequencing in detail.	K2	CO1	[7M]

UNIT – II

3	a	Explain about Performing an Arithmetic or Logic Operation.	K2	CO2	[7M]
	b	Explain about Micro Programmed Control.	K2	CO2	[7M]

OR

4	a	How do you fetch a word from memory? Explain in detail with an example.	K2	CO2	[7M]
	b	Explain Micro program sequencing.	K2	CO2	[7M]

UNIT – III

5	a	Explain about types of system calls in Operating Systems.	K2	CO3	[7M]
	b	Explain about FCFS CPU Scheduling Algorithm in detail.	K2	CO3	[7M]

OR

6	a	Explain about Operating Systems Structures.	K2	CO3	[7M]
	b	Explain about Process Scheduling in detail.	K2	CO3	[7M]

UNIT – IV

7	a	Explain about the critical-section problem with an example.	K2	CO4	[7M]
	b	Explain about Recovery Starvation in detail.	K2	CO4	[7M]

OR

8	a	Explain about Peterson's Solution with an example.	K2	CO4	[7M]
	b	Explain about Detection and Avoidance.	K2	CO4	[7M]

UNIT – V

9	a	Explain about LRU and MFU Page-Replacement Algorithms in detail.	K2	CO5	[7M]
	b	Explain about Disk Scheduling in detail.	K2	CO5	[7M]

OR

10	a	Explain about Paging concept in detail with an example.	K2	CO5	[7M]
	b	Explain in detail about File-System implementation	K2	CO5	[7M]

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ADITYA ENGINEERING COLLEGE (A)

MCA – I Semester End Examinations Regular & Supple (AR20) – MAY 2022

DATA STRUCTURES
(Master of Computer Applications)

Time: 3 hours   Max. Marks: 70

Answer ONE question from each unit
All Questions Carry Equal Marks
All parts of the questions must be answered at one place only

UNIT – I

1 a What is a variable? What are the rules for declaring variables? Give examples for valid and invalid variables?   K2 CO1 [8M]

   b Explain about different types of branching statements in C   K2 CO1 [6M]

OR

2 a Write a C program for to find a sum of series 1! +2! +3! +----+n!   K2 CO1 [7M]

   b Describe while and do-while loop with example each.   K2 CO1 [7M]

UNIT – II

3 a Summarize the declaration and initialization of structure with an example   K2 CO2 [6M]

   b What is pointer? What are the features of pointers? Write a C program to print address of variable and data with pointer.   K2 CO2 [8M]

OR

4 Explain different types of file handling functions in C with example   K2 CO2 [14M]

UNIT – III

5 a Discuss single linked list and doubly linked list   K2 CO3 [7M]

   b How circular linked list is organized. Discuss its operations   K2 CO3 [7M]

OR

6 a Explain the types of data structures in detail   K2 CO3 [9M]

   b What is recursion discuss types recursion with an example.   K2 CO3 [5M]

UNIT – IV

7 What is hash function? Explain collision resolution methods of the hashing   K2 CO5 [14M]

OR

8 a Write the program to implement Push and Pop operation in the stack   K2 CO5 [7M]

   b Discuss array and linked list representation of queue.   K2 CO5 [7M]

UNIT – V

9 Write a program to implement selection sort and calculate its complexity with example   K2 CO4 [14M]

OR

10 a What is BST? Explain the operations of BST   K2 CO4 [4M]

    b Construct Binary Search Tree for following elements 47, 12, 75, 88, 90, 73, 57, 1, 85, 50, 62 apply inorder, preorder, postorder traversal.   K2 CO5 [10M]

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ADITYA ENGINEERING COLLEGE (A)
MCA – I Semester End Examinations Regular & Supple (AR20) – MAY 2022

OBJECT ORIENTED PROGRAMMING WITH JAVA

Time: 3 hours   Max. Marks: 70

Answer ONE question from each unit
All Questions Carry Equal Marks (5 x 14 = 70M)
All parts of the questions must be answered at one place only

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UNIT – I

1 a Explain the significance of public, protected and private access specifiers in inheritance. K2 CO1 [7M]
   b What is the purpose of constructor in Java programming? K2 CO1 [7M]

OR

2 a Describe the structure of a typical Java program with an example. K3 CO1 [7M]
   b What is an array? How do you declare the array in java? Give examples. K2 CO1 [7M]

UNIT – II

3 a Define inheritance. What are the benefits of inheritance? How to prevent a class from inheritance? K2 CO2 [7M]
   b What is polymorphism? Explain different types of polymorphisms with examples. K2 CO2 [7M]

OR

4 a Write a programme to demonstrate all the uses of keyword super. K3 CO2 [7M]
   b Give an example where interface can be used to support multiple inheritance. K3 CO2 [7M]

UNIT – III

5 a Write a program with nested try statements for handling exception. K3 CO3 [7M]
   b Write a program to create four threads using Runnable interface. K3 CO3 [7M]

OR

6 a Explain different blocks associated with exception handling. K2 CO3 [7M]
   b With an example, demonstrate the concept of user defined packages. K3 CO3 [7M]

UNIT – IV

7 a List and explain different types of Layout managers with suitable examples. K2 CO4 [7M]
   b Explain in detail Adapter classes, inner classes with appropriate example. K2 CO4 [7M]

OR

8 a Explain AWT class hierarchy. K2 CO4 [7M]
   b Illustrate the use of Grid Bag layout. K3 CO4 [7M]

UNIT – V

9 a What is the difference between init( ) and start ( ) methods in an Applet? When will each be executed? K2 CO5 [7M]
   b Write the applets to draw the Cube and Circle shapes. K3 CO5 [7M]

OR

10 a How to move/drag a component placed in Swing Container? Explain. K2 CO5 [7M]
    b Write the applets to draw the Cube and Cylinder shapes. K3 CO5 [7M]

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H.T.No: ☐☐☐☐☐☐☐☐☐☐

Course Code: 203MC1T03

ADITYA ENGINEERING COLLEGE (A)
MCA – I Semester End Examination Regular & Supplementary (AR20) – Feb 2023

COMPUTER ORGANIZATION & OPERATING SYSTEMS

Time: 3 hours   Max. Marks: 70

Answer ONE question from each unit
All Questions Carry Equal Marks (5 x 14 = 70M)
All parts of the questions must be answered at one place only

UNIT – I

1	a	Explain about Bus Structure with neat diagram.	K2	CO1	[7M]
	b	Explain about basic functional units with examples.	K2	CO1	[7M]

OR

2	a	Define Assembler. Write any five assembly language instructions with examples.	K1	CO1	[7M]
	b	Explain about direct and indirect addressing modes.	K2	CO1	[7M]

UNIT – II

3	a	Define Register. Explain about simple and conditional register transfer operations.	K3	CO2	[7M]
	b	Explain about the organization of a micro programmed control unit.	K2	CO2	[7M]

OR

4	a	What are the differences between single bus organization and multiple bus organization?	K2	CO2	[7M]
	b	Define Micro-Programming. Explain advantages of Micro-Programming.	K1	CO2	[7M]

UNIT – III

5	a	Define Operating System. Explain about Batch Processing operating systems.	K2	CO3	[7M]
	b	Define System Call. Explain about pipe() and fork() system calls.	K2	CO3	[7M]

OR

6	a	Explain about processes states with neat diagram.	K2	CO3	[7M]
	b	Explain about Round-Robin Scheduling with example.	K3	CO3	[7M]

UNIT – IV

7	a	Write about Critical Section problem with example.	K2	CO4	[7M]
	b	Explain about Dining Philosophers problem from Classic Problems of Synchronization	K2	CO4	[7M]

OR

8	a	Explain about Resource allocation graph with diagram.	K2	CO4	[7M]
	b	Define Deadlock. Explain about deadlock prevention.	K2	CO4	[7M]

UNIT – V

9	a	Define Paging. Explain about structure of page table.	K2	CO5	[7M]
	b	Explain about LRU page replacement algorithm with example	K3	CO5	[7M]

OR

10	a	Explain about SCAN disk scheduling algorithm.	K2	CO6	[7M]
	b	Explain about contiguous file allocation method with example.	K2	CO6	[7M]

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ADITYA ENGINEERING COLLEGE (A)
MCA – I Semester End Examinations Regular & Supplementary (AR20) – Feb 2023

DATA STRUCTURES

Time: 3 hours   Max. Marks: 70

Answer ONE question from each unit
All Questions Carry Equal Marks (5 x 14 = 70M)
All parts of the questions must be answered at one place only

UNIT – I

1 a Explain about formatted and unformatted input and output functions   K2 CO1 [8M]
      available in C language. Also explain different output format modifiers in
      C language.
   b Write a C program to convert the given years into number of months and   K2 CO1 [6M]
      days.

OR

2 a Explain about switch statement. What is the importance of break and   K2 CO1 [7M]
      continue in switch statement? Give examples.
   b What is an array? How to initialize, accessing, and print the array   K2 CO1 [7M]
      elements?

UNIT – II

3 a Explain the arithmetic operations on pointers with example.   K3 CO2 [7M]
   b Explain in detail about array of structure and pointer to structure with   K3 CO2 [7M]
      example.

OR

4 a Explain about call by value and call by reference with reference to   K3 CO2 [8M]
      functions. Write a function to swap the values between the variables
      using call by value and call by reference.
   b Explain how to access the elements of a union with an example.   K3 CO2 [6M]

UNIT – III

5 a Explain the advantages and disadvantages of the recursive algorithms   K3 CO3 [6M]
      compared to non-recursive algorithms.
   b Write an algorithm to perform deletion operation on doubly linked list.   K3 CO3 [8M]

OR

6 a Write an algorithm to insert new node at the beginning, at middle   K3 CO3 [7M]
      position and at the end of a Singly Linked List.
   b What is binary search? Explain binary search with algorithm and   K3 CO3 [7M]
      example.

UNIT – IV

7 a Discuss infix to prefix conversion algorithm using stack with an example. K3 CO4 [8M]

 b Define hashing, hash functions and hash table along with a labelled K3 CO4 [6M]
   diagram.

OR

8 a Explain the procedure to evaluate postfix expression using stack. K3 CO4 [8M]
   Evaluate the following Postfix expression 7 3 4 + - 2 4 5 / + * 6 / 7 +.

 b Explain various operations that are performed on queue with suitable K3 CO4 [6M]
   algorithms.

UNIT – V

9 a Sketch the binary search tree resulting after inserting the following K4 CO5 [7M]
   integer keys **49, 27, 12, 11, 33, 77, 26, 56, 23, 6.**
   i) Check whether the tree is almost complete or not?
   ii) Determine the height of the tree

 b Explain the working of merge sort on the following K4 CO5 [7M]
   data: **12, 25, 5,9, 1, 84, 63, 7, 15, 4, 3.** Show all intermediate steps. Also,
   mention its time complexity.

OR

10 a What is a binary tree? Construct a binary tree given the pre-order K4 CO5 [7M]
    traversal and in-order traversals as follows:
    Pre-Order Traversal: G B Q A C K F P D E R H
    In-Order Traversal: Q B K C F A G P E D H R

 b Arrange the following list of elements in ascending order using selection K4 CO5 [7M]
   sort: **9, 3, 5, 27, 4, 67, 18, 31, 13, 20, 39, 21.** Clearly show all
   intermediate steps. Also, mention its time complexity.

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ADITYA ENGINEERING COLLEGE (A)
MCA – I Semester End Examination Regular & Supplementary (AR20) – Feb 2023

OBJECT ORIENTED PROGRAMMING WITH JAVA
(Master of Computer Applications)

Time: 3 hours   Max. Marks: 70

Answer ONE question from each unit
All Questions Carry Equal Marks
All parts of the questions must be answered at one place only

UNIT – I

1	a	Illustrate the concept of Recursion using a simple java program.	K2	CO1	[8M]
	b	Explain the Concept of Scope and Life time of a variable with a sample Java Program	K2	CO1	[7M]

OR

2	a	Explain various features of Java?	K2	CO1	[6M]
	b	Discuss in brief about inbuilt String methods mentioned below with an example each. charAt() , length(), indexOf(), toUpperCase()	K2	CO2	[8M]

UNIT – II

3	a	Demonstrate how Constructors Concept can be implemented with a sample java Program.	K2	CO2	[7M]
	b	Explain Multi-level Inheritance in detail and Demonstrate the same using a Java Program.	K3	CO2	[7M]

OR

4	a	Demonstrate Various Types of Inheritances with Suitable Example	K2	CO2	[7M]
	b	Define a Package and explain the process of creating & accessing a package using a program.	K3	CO3	[6M]

UNIT – III

5	a	Give a brief description about presumptive models.	K2	CO4	[6M]
	b	Illustrate briefly about Try, Catch, Throw and Finally blocks and demonstrate the same using a simple java Program	K2	CO4	[8M]

OR

6	a	Compare and Contrast Multi-tasking and multi-threading	K2	CO4	[6M]
	b	Demonstrate Thread Synchronization and Write a Java Program for the Same.	K2	CO4	[8M]

UNIT – IV

7	a	Write Short notes on Events, Event Listeners	K1	CO5	[6M]
	b	Explain the functionalities of user interface components with an example each.	K2	CO5	[8M]

OR

8	a	Illustrate in brief about AWT Class Hierarchy	K2	CO5	[6M]
	b	Demonstrate about Layout Manager types: boarder, grid and flow with a simple Java Program	K2	CO5	[8M]

(P.T.O)

UNIT – V

9 a   Write short notes on JFrame and JComponent, cons and Labels   K1   CO6   [6M]
   b   Demonstrate an Applet program that describes the functionality of   K3   CO6   [8M]
      Passing Parameters using Java

OR

10 a   Demonstrate the working of MVC architecture and also give its Benefits   K2   CO6   [7M]
   b   Illustrate the functionalities of JTextField, JButton and JTable in Swings.   K2   CO6   [7M]
      With the support of Simple Java Program.

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ADITYA ENGINEERING COLLEGE (A)

MCA – I Semester End Examinations Regular & Supplementary (AR20) – Feb 2023

BUSINES COMMUNICATION

Time: 3 hours   Max. Marks: 70

Answer ONE question from each unit
All Questions Carry Equal Marks (5 x 14 = 70M)
All parts of the questions must be answered at one place only

UNIT – I

1	a	Define communication? What is the purpose of business communication?	K1	CO1	[7M]
	b	Define communication? State the objectives of communications.	K2	CO1	[7M]

OR

2	a	Discuss the process of communication and its important elements?	K2	CO1	[7M]
	b	What are the types of listening skills?	K1	CO1	[7M]

UNIT – II

3	a	Give examples of internal communication?	K2	CO2	[7M]
	b	Differentiate between interpersonal communication and intrapersonal communication?	K2	CO2	[7M]

OR

4	a	Discuss the psychological barriers to effective communication?	K2	CO2	[7M]
	b	Explain the exchange theory?	K2	CO2	[7M]

UNIT – III

5	a	What are the characteristics of non verbal communication?	K2	CO3	[7M]
	b	Explain the importance of Haptics, Proxemics?	K2	CO3	[7M]

OR

6	a	Describe the significance of job interview? Discuss the kinds of questions that may be asked during an interview?	K2	CO3	[7M]
	b	Describe in brief the strategies to deal with loaded and open questions?	K2	CO3	[7M]

UNIT – IV

7	a	What is the importance of resume in today's times? What are the principles should be followed in making a resume attractive?	K2	CO4	[7M]
	b	Discuss the meeting and oral presentation?	K2	CO4	[7M]

OR

8	a	What are the formal and informal reports?	K2	CO4	[7M]
	b	Draft a letter communicating the declaration of dividend to the share holders of the company?	K2	CO4	[7M]

UNIT – V

9	a	Discuss the principles of oral presentations. What are the desirable presentation skills while making presentations?	K2	CO5	[7M]
	b	Describe various strategies of assertive behavior ?	K2	CO5	[7M]

OR

10	a	Effective presentation on any chosen topic calls for effective skills? What are these skills and important considerations while making presentations?	K2	CO5	[7M]
	b	Briefly explain communication skills for group discussion?	K2	CO5	[7M]

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ADITYA ENGINEERING COLLEGE (A)
MCA – I Semester End Examination Regular & Supplementary (AR20) – Feb 2023

MATHEMATICAL AND STATISTICAL FOUNDATIONS
(Master of Computer Applications)

Time: 3 hours   Max. Marks: 70

Answer ONE question from each unit
All Questions Carry Equal Marks
All parts of the questions must be answered at one place only

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UNIT – I

1 a Suppose 3% of the people on the average are left-handed. Find   K3 CO1 [7M]
      i) the probability of finding at most one left handed ii) the probability
      of finding at least one left handed

   b If the probability density of a random variable is given by   K3 CO1 [7M]
      $$f(x) = \begin{cases} x & if\ 0 < x < 1, \\ 2 - x & if\ 1 \leq x < 2, \\ 0 & elsewhere. \end{cases}$$ Find the probabilities that the random
      variable will take on a value i) between 0.2 and 0.8; ii) between 0.6 and
      1.2; iii) greater than 1.8.

OR

2 a A class has 10 boys and 5 girls. Three students are selected at random   K3 CO1 [7M]
      one after another. Find the probability that i) first two are boys and third
      is girl ii) First and third are of same sex and the second is of opposite sex.

   b Verify the given function is probability density function or not, If a   K3 CO1 [7M]
      random variable has the probability density $f(x) = \begin{cases} 2e^{-2x} & for\ x > 0 \\ 0 & for\ x \leq 0 \end{cases}$

      Find the probabilities that it will take on a value
      i) between 1 and 3 ii) greater than 0.5 iii) less than or equal to 1.

UNIT – II

3 a A sample of 400 items is taken from a population whose standard   K3 CO2 [7M]
      deviation is 10. The mean of the sample is 40. Test whether the
      sample has come from a population with mean 38. Also, Calculate
      95% confidence interval for the population.

   b In six determinations of the melting point of tin, a chemist obtained a   K3 CO2 [7M]
      mean of 232.26 degrees Celsius with a standard deviation of 0.14 degree.
      If he uses this mean to estimate the actual melting point of tin, what can
      the chemist assert with 98% confidence about the maximum error.

OR

4 A population consists of six numbers 4,8,12,16,20 and 24. Consider all   K3 CO2 [14M]
   possible samples of size two which can be drawn without replacement
   from this population. Find i) The mean of the population ii) The standard
   deviation of the population iii) The mean of the sampling distribution of
   means iv) The standard deviation of the sampling distribution of means.

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UNIT – III

5 a A company claims that its light bulbs are superior to those of its main competitor. If a study showed that a sample of $n_1 = 40$ of its bulbs has a mean lifetime of 1647 hours of continuous use with a standard deviation of 27 hours, while a sample of $n_2 = 40$ bulbs made by its main competitor has a mean lifetime of 1638 hours of continuous use with a standard deviation of 31 hours, does this substantiate the claim at the 0.05 level of significance?   K3   CO3   [7M]

b As a part of an industrial training program, some trainees are instructed by method A, which is straight computer-based instruction, and some are instructed by method B, which also involves personal attention of an instructor. If random samples of size 10 are taken from large groups of trainees instructed by each of the two methods, and the scores which they obtained in an appropriate achievements test are   K3   CO3   [7M]

Method A	71	75	65	69	73	66	68	71	74	68
Method B	72	77	84	78	69	70	77	73	65	75

Use the 0.05 level of significance to test the claim that method B is more effective. Assume that the populations sampled can be approximated closely with normal distributions having the same variance.

OR

6 a The following random samples are measurements of the heat-producing capacity (in millions of calories per ton) of specimens of coal from two mines: K3   CO3   [7M]

Mine - 1	8260	8130	8350	8070	8340	
Mine - 2	7950	7890	7900	8140	7920	7840

Use the 0.01 level of significance to test whether the difference between the means of these two samples is significant.

b The following are the average weekly losses of worker-hours due to accidents in10 industrial plants before and after a certain safety program was put into operation: K3   CO3   [7M]

Before	45	73	46	124	33	57	83	34	26	17
After	36	60	44	119	35	51	77	29	24	11

Use the 0.05 level of significance to test whether the safety program is effective. Also construct a 90% confidence interval for the men improvement in lost worker-hours.

UNIT – IV

7 a Show that $(Z, *)$ is a group where $*$ is defined as $a * b = a + b + 1$.   K3   CO4   [7M]

b Give an example that the union of two subgroups need not be a subgroup.   K3   CO4   [7M]

OR

8 a Use the prime factorization to find the G.C.D and L.C.M of 119 and 544.   K3   CO4   [8M]

b Define congruence relation between two integers a and b. Determine whether 17 is congruent to 5 modulo 6 and whether 24 and 14 are congruent modulo 6.   K3   CO4   [6M]
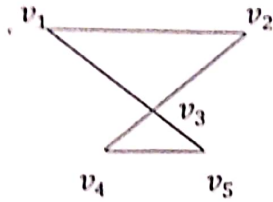
UNIT – V

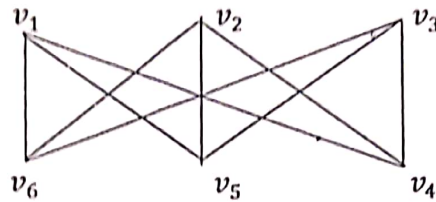9   a   Show that C_6 is bipartite graph.   K3   CO5   [7M]

     b   Verify the following graphs have an Eulerian circuit or not.   K3   CO5   [7M]

(a)   (b)

OR

10   a   Prove that the graph $K_{3,\,3}$ is not a planar graph.   K3   CO5   [7M]

     b   Give an example of a graph which is Hamiltonian but not Eulerian.   K3   CO5   [7M]

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Page 3 of 3

Code No: MC2014/R20

MCA I Semester Regular Examinations, July-2021
Data Structures

Time: 3 Hours

Max. Marks: 70

Answer any FIVE Questions One Question From Each Unit
All Questions Carry Equal Marks

UNIT-I

1. a Write an algorithm and flowchart to compute roots of quadratic equation   7M
   b Define a data type. Mention the different data types supported by C language, giving an example to each.   7M

OR

2. a Compare and contrast between if-else and switch –case statements   7M
   b Write a program to compute roots of quadratic equation using switch-case statement.   7M

UNIT-II

3. a Develop a C program to read two number and a function to swap these number using pointers   7M
   b How to pass arrays as parameters to functions? Explain with an example.   7M

OR

4. a What is a pointer? Explain dynamic memory management   7M
   b Explain various parameter passing mechanisms.   7M

UNIT-III

5. a Write an algorithm to delete an element anywhere from doubly linked list.   7M
   b Show how to reverse a single linked list.   7M

OR

6. a Write an algorithm to delete an element from doubly linked list.   7M
   b Compare singly and circular linked list while performing insertion and deletion operations.   7M

UNIT-IV

7. a Discuss Briefly about linear probing, quadratic probing with example.   10M
   b Illustrate the difference between stack and queue   4M

OR

8. a Write an algorithm for basic operations of stack.   7M
   b Write an algorithm to push and pop an element from linked stack.   7M

UNIT-V

9. a Create binary search tree for the following elements (23, 12, 45, 36, 5, 15, 39, 2, 19). Discuss about the height of the above binary search tree.   7M
   b What is a binary search tree? Write an algorithm for inserting and deleting a node in a binary search tree.   7M

OR

10. a A binary tree has seven nodes. The Preorder and Post order traversal of the tree are given below. Can you draw the tree? Justify.   7M
    Preorder : GFDABEC
    Post order : ABDCEFG
    b Explain the iterative merge sort and recursive merge sort algorithms with an example.   7M

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ADITYA ENGINEERING COLLEGE (A)

MCA – I Semester End Examinations Regular & Supple (AR20) – MAY 2022

DATA STRUCTURES
(Master of Computer Applications)

Time: 3 hours   Max. Marks: 70

Answer ONE question from each unit
All Questions Carry Equal Marks
All parts of the questions must be answered at one place only

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UNIT – I

1 a What is a variable? What are the rules for declaring variables? Give examples for valid and invalid variables?   K2 CO1 [8M]

   b Explain about different types of branching statements in C   K2 CO1 [6M]

OR

2 a Write a C program for to find a sum of series 1! +2! +3! +----+n!   K2 CO1 [7M]

   b Describe while and do-while loop with example each.   K2 CO1 [7M]

UNIT – II

3 a Summarize the declaration and initialization of structure with an example   K2 CO2 [6M]

   b What is pointer? What are the features of pointers? Write a C program to print address of variable and data with pointer.   K2 CO2 [8M]

OR

4 Explain different types of file handling functions in C with example   K2 CO2 [14M]

UNIT – III

5 a Discuss single linked list and doubly linked list   K2 CO3 [7M]

   b How circular linked list is organized. Discuss its operations   K2 CO3 [7M]

OR

6 a Explain the types of data structures in detail   K2 CO3 [9M]

   b What is recursion discuss types recursion with an example.   K2 CO3 [5M]

UNIT – IV

7 What is hash function? Explain collision resolution methods of the hashing   K2 CO5 [14M]

OR

8 a Write the program to implement Push and Pop operation in the stack   K2 CO5 [7M]

   b Discuss array and linked list representation of queue.   K2 CO5 [7M]

UNIT – V

9 Write a program to implement selection sort and calculate its complexity with example   K2 CO4 [14M]

OR

10 a What is BST? Explain the operations of BST   K2 CO4 [4M]

    b Construct Binary Search Tree for following elements 47, 12, 75, 88, 90, 73, 57, 1, 85, 50, 62 apply inorder, preorder, postorder traversal.   K2 CO5 [10M]

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ADITYA ENGINEERING COLLEGE (A)
MCA – I Semester End Examinations Regular (AR20) – AUG 2021

DATA STRUCTURES

Time: 3 hours   Max. Marks: 70

Answer ONE question from each unit
All Questions Carry Equal Marks (5 x 14 = 70M)
All parts of the questions must be answered at one place only

UNIT – I

1. a Explain arithmetic, logical and bitwise operators with examples. K2 CO1 [6M]
   b Write a C program to illustrate switch and if-else statements. K2 CO1 [8M]

OR

2. a What is the need of do-while and while loops? Discuss about their usage. K2 CO1 [6M]
      Distinguish between them.
   b Write a program to demonstrate passing an array argument to a function. K2 CO1 [8M]
      Consider the problem of finding largest of N numbers defined in an
      array.

UNIT – II

3. a Explain function prototype and explain different methods to call the K3 CO2 [7M]
      functions.
   b Define a structure. Describe how to declare and initialize structure and its K3 CO2 [7M]
      members with an example.

OR

4. a What is a user defined function? When these functions are useful? How a K3 CO2 [6M]
      function is declared and what are the rules followed to call a function.
   b Explain about the fopen, fclose, feof, fprintf, and fscanf, functions. K3 CO2 [8M]

UNIT – III

5. a List various operations of linked list and explain how to insert a node K3 CO3 [8M]
      anywhere in the single linked list.
   b Write an algorithm to delete an element anywhere from doubly linked K3 CO3 [6M]
      list.

OR

6. a Explain the advantages and disadvantages of the recursive algorithms K3 CO3 [6M]
      compared to non-recursive algorithms.
   b What is the difference between Circular linked list and doubly linked list. K3 CO3 [8M]
      Mention the applications of each type of list.

UNIT – IV

7. a Convert given Infix expression: (a + b * c ^ d) * (e + f / g) to Postfix K3 CO4 [7M]
      expression using Stack and show the details of Stack at each step of
      conversion. (Note: ^ indicates exponent operator)
   b Discuss various collision resolution techniques with suitable examples. K3 CO4 [7M]

(P.T.O)

OR

8 a Explain the basic operations of stack with pseudo code. K3 CO4 [8M]
  b Discuss about implementation of queues using linked list. K3 CO4 [6M]

UNIT – V

9 a Describe insertion sort algorithm and trace the steps of insertion sort for K4 CO5 [6M]
   sorting the list 12, 19, 33, 26, 29, 35, 22, 37. Find the total number of
   comparisons made.
  b Write in-order, pre-order and post-order traversal of a binary tree. K4 CO5 [8M]

OR

10 a Create binary search tree for the following elements 23, 12, 45, 36, 5, 15, K4 CO5 [7M]
    39, 2, 19. Discuss about the height of the above binary search tree.
   b Give an algorithm for quick sort and explain its time complexity. Trace K4 CO5 [7M]
    the algorithm for the following data: 65 70 75 80 85 60 55 50 45.
    *****

Code No: MC2014/R20

MCA I Semester Regular/Supplementary Examinations, May-2022

DATA STRUCTURES

Time: 3 Hours

Max. Marks: 70

Answer any FIVE Questions One Question From Each Unit
All Questions Carry Equal Marks

UNIT-I

1. a How the Precedence and Associativity rules of operators help in executing a 'C' expression? What is the output of the following C code? Give Explanation.   7M

```
#include <stdio.h>
int main()
{
int h = 7;
int b = 3 * 5 + 2 * 3 < h*4 ?3 : 2;
printf("%d", b);
return 0;
}
```

   b Give the syntax of various Loop control statements supported by C. Explain their execution behavior with neat flowcharts.   7M

OR

2. a Write a C program to display the sum of the series $1 + 1/2 + 1/3 + 1/4 + 1/5 + \dots 1/N$ on console, where the value of N is taken as input.   7M

   b Explain the memory allocation strategies for various types of arrays supported by C programming with neat diagrams.   7M

UNIT-II

3. a Explain the concept of structures and unions with suitable examples.   7M

   b Distinguish between char *S and char S [ ] with a sample C program.   7M

OR

4. a Write a C program to add two distances given as input in feet and inches using structures. (*Hint*: One feet = 12 inches)   7M

   b Give the syntax for opening files in C programming. Explain various modes of opening files with an example C program.   7M

UNIT-III

5. a How to measure the complexity of an algorithm? Briefly discuss various notations used for it.   6M

   b What are the advantages of Circular Linked lists over other types of linked lists? Depict the insert, delete and search operations on Circular Linked lists with neat diagrams.   8M

OR

6. a Why selecting appropriate data structure is so important in computer applications? Elaborate on the classification of data structures.   6M

   b With neat diagrams, explain the Insert and Delete operations in Doubly Linked List data structure.   8M
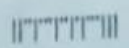
UNIT-IV

7. a   Describe the five basic operations which can be performed on Stack data structure with suitable diagrams where ever necessary.   7M

   b   Consider a Hash table of size 7 with hash function is h(k) = k % m. Insert the following elements {99,71,18,15,12,81} into a Hash table and use Quadratic probing approach to resolve the collision.   7M

OR

8. a   List and explain any four significant applications of Queue data structure in computer system.   6M

   b   What are the significant advantages of Extendible hashing over Static hashing implementations? Explain the concept of Extendible hashing technique with an example.   8M

UNIT-V

9. a   Explain the principle of Quick Sort algorithm with an example.   7M

   b   Show the resulting Binary Search Tree after inserting the elements 1, 4, 7, 10, 17, 21, 31, 25, 19, 20, 28, 42 in order into an empty tree.   7M

OR

10. a   How many passes are required to sort the following list of elements 24, 98,29,24,77, 48, 17, 65, 14, 30 using iterative merge sort.   7M

    b   Explain in detail various tree traversals techniques. Discuss their applications.   7M

*****