

**MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE**

(UGC-AUTONOMOUS)

**MCA I Year II Semester (R18) Supplementary End Semester Examinations – July 2022****PROBABILITY & STATISTICS**

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.  
In Q.no 1 to 5 answer either A or B only

Q.No	Question	Marks	CO	BL																
Q.1(A)	a) State and prove addition theorem for two events? b) When a computer goes down, there is a 75% chance that it is due to an overload and a 15% chance that is due to software problem. There is an 85% chance that it is due to an overload or a software problem. What is the probability that both of these problems are at fault? What is the probability that there is a software problem but no overload?	6M 6M	1	2 3																
<b>OR</b>																				
Q.1(B)	(a) Let X denotes the minimum of two numbers that appear when a pair of fair dice is thrown once. Determine i) Expectation ii) Variance (b) If p.d.f of a random variable is $f(x) = ce^{- x }$ , $-\infty < x < \infty$ . Find i) c value ii) mean iii) variance.	6M 6M	1	4 4																
Q.2(A)	For the following bivariate probability distribution obtain, (i) marginal distributions of X and Y (ii) the conditional distribution of X given Y=0 (iii) the conditional distribution of Y given X=1	12M	2	4																
<table border="1" style="margin: auto;"><tr><td>X\Y</td><td>0</td><td>1</td><td>2</td></tr><tr><td>0</td><td>0.02</td><td>0.08</td><td>0.10</td></tr><tr><td>1</td><td>0.05</td><td>0.02</td><td>0.25</td></tr><tr><td>2</td><td>0.03</td><td>0.12</td><td>0.15</td></tr></table>					X\Y	0	1	2	0	0.02	0.08	0.10	1	0.05	0.02	0.25	2	0.03	0.12	0.15
X\Y	0	1	2																	
0	0.02	0.08	0.10																	
1	0.05	0.02	0.25																	
2	0.03	0.12	0.15																	
<b>OR</b>																				
Q.2(B)	The joint density for $(X, Y)$ is given by $f(x, y) = \frac{x^2 y^3}{16}$ , $0 \leq x \leq 2, 0 \leq y \leq 2$ . Obtain the correlation coefficient between X and Y?	12M	2	4																
Q.3(A)	During one stage in the manufacture of IC chips, a coating must be applied. If 70% of chips receive a thick enough coating, find the probability that, among 10 chips, (i) at least 8 will have thick enough coatings, (ii) at most 5 will have thick enough coatings and (iii) exactly 3 will have thick enough coatings.	12M	3	3																
<b>OR</b>																				
Q.3(B)	Let X be a Gamma random variable with $\alpha = 3, \beta = 4$ a) What is the expression for the density for X? b) What is the Moment generating function for X? c) Find $\mu, \sigma^2, \sigma$	12M	3	3																

- Q.4(A) A new computer network is being designed. The makers claim that it is compatible with more than 99% of the equipment already in use. 12M 4 4
- Set up the null and alternative hypothesis needed to get evidence to support this claim.
  - A sample of 300 programs is run, and 298 of these run with no changes necessary. That is, they are compatible with the new network. Can  $H_0$  be rejected?
  - What practical conclusion can be drawn on the basis of your test?

OR

- Q.4(B) A machine is designed to produce insulating washers for electrical devices of average thickness of 0.25 cm. A random sample of 10 washers was found to have the average thickness of 0.24 cm with a S.D of 0.02 cm. Test the significance of deviation at 5% *l.o.s.* Also construct 95% confidence limits for true mean thickness? 12M 4 4

(value of *t*-statistic for 9 df at 5% *l.o.s* is 2.262)

- Q.5(A) The following table shows the lives in hours of four brands of electric lamps: 12M 5 4
- Brand A:** 1600, 1610, 1650, 1680, 1700, 1720, 1800  
**Brand B:** 1580, 1640, 1640, 1700, 1750  
**Brand C:** 1460, 1550, 1600, 1620, 1640, 1660, 1740, 1820  
**Brand D:** 1510, 1520, 1530, 1570, 1600, 1680
- By shifting the origin to 1640 in the above mentioned data, for simplification in calculation, perform an analysis of variance and test the homogeneity of the mean lives of the four brands of lamps at 5% *l.o.s.*

$$(F_{0.05}^2(3, 22) = 3.05)$$

OR

- Q.5(B) Analyze the variance in the following Latin square of yields (in kgs) of paddy where A, B, C, D denote the different methods of cultivations. 12M 5 4

D	A	C	B
122	121	123	122
B	C	A	D
124	123	122	125
A	B	D	C
120	119	120	121
C	D	B	A
122	123	121	122

Shifting the origin to 120 from the given values for simplification of calculation, examine whether the different methods of cultivation have given significantly different yields.  $F_{0.05}^2(3, 6) = 4.76$

\*\*\* END\*\*\*

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(UGC-AUTONOMOUS)

**MCA I Year II Semester (R18) Supplementary End Semester Examinations –July 2022**  
**PROGRAMMING IN C**

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.

In Q.no 1 to 5 answer either A or B only

Q.No	Question	Marks	CO	BL
Q.1(A)	Explain different types of operators in detail. Briefly explain implicit and explicit type conversion.	8M 4M	1 1	2 2
<b>OR</b>				
Q.1(B)	What is Identifier? List out the rules to declare an identifier. Explain structure of the C program with a suitable example?	6M 6M	1 1	1 2
Q.2(A)	a. What is control structure in C? b. Elaborate the nested control structure with suitable examples?	2M 10M	2 2	1 3
<b>OR</b>				
Q.2(B)	a. What is go-to branching? Explain in detail? b. Illustrate the use of break and continue statements with suitable examples?	6M 6M	2 2	1 2
Q.3(A)	a. What is array? Explain multi-dimensional array with suitable example? b. Differentiate between call by value and call by reference.	6M 6M	3 3	1 2
<b>OR</b>				
Q.3(B)	a. Define function? State the importance of function. b. Write a C program to multiply two matrices.	4M 8M	3 3	2 3
Q.4(A)	a. What is pointer? Discuss different types of pointer variables. b. How to pass structure variable to a functions? Explain with example?	6M 6M	4 4	1 2
<b>OR</b>				
Q.4(B)	a. Illustrate functions returning pointer variables with suitable example? b. Define union? Explain declaration and initialization of union?	6M 6M	4 4	2 1
Q.5(A)	a. Define file handling? b. What are the modes to open a file in C? Explain each with examples?	2M 10M	5 5	1 1
<b>OR</b>				
Q.5(B)	Write a C program that reads contents of a file and displays the number of characters and digits contained in file.	12M	5	3

\*\*\* END\*\*\*

Hall Ticket No: 

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Question Paper Code: 16MCA105

**MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE**  
(UGC-AUTONOMOUS)

**MCA I Year II Semester (R16) Supplementary End Semester Examinations –July 2022**  
**DATA STRUCTURES THROUGH C++**

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.  
In Q.no 1 to 5 answer either A or B only

Q.No	Question	Marks	CO	BL
Q.1(A)	What is class and object? Describe the syntax for class and object specification with example. How does it accomplish data hiding? Give an example?	12M	1	1
<b>OR</b>				
Q.1(B)	a. What is a friend function? Explain what are the rules to be using a friend function? Illustrate with an example?	6M	1	1
	b. What is a constructor? How is constructor differing from other member functions? Illustrate with an example?	6M	1	1
Q.2(A)	Explain different forms of inheritance. Illustrate with an example each type with an example?	12M	2	2
<b>OR</b>				
Q.2(B)	a. Define pure virtual functions. Write a C++ program to illustrate pure virtual functions?	6M	2	1
	b. What is template? Explain class and function templates?	6M	2	2
Q.3(A)	a. What is stack? Write its applications?	6M	3	1
	b. Write an algorithm to evaluate the postfix expression?	6M	3	1
<b>OR</b>				
Q.3(B)	a. Define queue. Write its applications?	6M	3	1
	b. Compare and contrast the differences between arrays and linked lists.	6M	3	2
Q.4(A)	a. What is hashing? What are the characteristics of a good hash function?	6M	4	1
	b. Discuss about collision resolution techniques?	6M	4	2
<b>OR</b>				
Q.4(B)	How circular linked list is organized. Discuss its operations?	12M	4	2
Q.5(A)	What is a B- Tree? How elements are inserted and deleted from the B-trees?	12M	5	1
<b>OR</b>				
Q.5(B)	a. How to construct a heap? Explain heapify operation with an example?	6M	5	3
	b. Write an algorithm to implement the heap sort and calculate its complexity?	6M	5	3

**\*\*\* END\*\*\***