MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

MCA I Year II Semester (R18) Supplementary End Semester Examinations – September 2021

(Regulations: R18)

PROBABILITY AND 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 Part-A or B only

Q.1(A) (i) State and prove addition theorem on probability.   12M
(ii) 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?

OR

Q.1(B) Let X denote, the number of holes that for can be drilled per bit. The density for X is   12M
given the following table:

x	1	2	3	4	5	6	7	8
$p(x)$	0.02	0.03	0.05	0.2	0.4	0.2	0.07	$p(8)$

(i) Find $p(8)$
(ii) Find the table for F
(iii) Use F to find the probability that a randomly selected bit can be used to
drill between three and five holes inclusive.
(iv) Find $p(X \leq 4)$ and $p(X < 4)$. Are these probabilities the same?
(v) Use F to find the probability that $p(4 \leq X \leq 7)$

Q.2(A) For the following bivariate probability distribution find, (i) $E(X)$ and $E(Y)$ (ii) V(X) and   12M
V(Y) (iii) correlation coefficient between X and Y

X\Y	0	1	2	3	4
0	0	0	0	0	1/35
1	0	0	0	12/35	0
2	0	0	18/35	0	0
3	0	4/35	0	0	0

OR

Q.2(B) Let X denote the temperature (°C) and let Y denote the time in minutes that it takes   12M
for the diesel engine on an automobile to get ready to start. Assume that the joint
density for (X,Y) is given by $f(x,y) = c(4x + 2y + 1);\quad 0 \leq x \leq 40, 0 \leq y \leq 2$

i) Find the value of c that makes this a density
ii) Find the marginal densities for X and Y.
iii) Find the probability that on a randomly selected day it will take at least one
minute for the car to be ready to start.
iv) Find the probability that on a randomly selected day the air temperature will
exceed $20°C$.
v) Are X and Y independent?

Q.3(A) A computer terminal can pick up an erroneous signal from the keyboard that does not   12M
show up on the screen. This creates a silent error that is difficult to detect. Assume
that for a particular keyboard the probability that this will occur per entry is 1/1000.
In 5000 entries Find the expression fordendity. Also find the probability that (i) No
silent error (ii) At least 2 silent errors (iii) At most 3 silent errors occur (iv) write the
expression for m.g.f (v) Find mean and variance.

OR

Q.3(B) (i) Derive m.g.f for normal distribution?   12M
(ii) Among diabetic, the fasting blood glucose level X may be assumed to be
approximately normally distributed with mean 106 milligrams and S. D. 8 milligrams.
   i)   Find the probability that randomly selected diabetic will have blood glucose
        level between 90 and 122 mg.
   ii) Find $P[X \leq 120\text{mg}]$
   iii) Find the point that has the property that 25% of all diabetic have a fasting
        glucose level of this value or lower.

Q.4(A) (i) Explain the following: 12M
Null and alternative hypotheses (ii) Types of errors (iii) Level of significance (iv) Standard
error.
(ii) Random samples of 400 men and 600 women were asked whether they would like
to have a flyover near their residence. 200 men and 325 women were in favour of the
proposal. Test the hypothesis that the proportions of men and women in favour of the
proposal, are same against that they are not, at 5% level.

OR

Q.4(B) A random sample of 10 boys had the following I.Q.: 70, 120, 110, 101, 88, 83, 95, 98,   12M
107, 100. Do these data support the assumption of a population mean I.Q. of 100 (Test
at 5% significance level)? Also find 95% confidence interval for population mean I.Q.

Q.5(A) The following table shows the lives in hours of four brands of electric lamps:Brand   12M
    A: 1610, 1610, 1650, 1650, 1680, 1700, 1720, 1800
    B: 1580, 1640, 1640, 1700, 1750
    C: 1460, 1550, 1600, 1620, 1640, 1660, 1740, 1820
    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.

OR

Q.5(B) Analyse the following L.S.D. data: 12M

	I	II	III	IV
I	12(A)	19(C)	10(B)	8(D)
II	18(C)	12 (B)	6(D)	7(A)
III	22(B)	10(D)	5(A)	21(C)
IV	12(D)	7(A)	27(C)	17(B)

*** END***

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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 Part-A or B only

Q.1(A)   i) What is a variable? What are the rules for declaring variables? Give examples of   8M
valid and invalid variables.
ii) Distinguish between printf() and scanf() in the C language.   4M

OR

Q.1(B)   i) Write a C program to swap (exchange) the values of two variables without using   6M
temporary variable.
ii) Explain about different relational operators in C language with example.   6M

Q.2(A)   i) Explain about different types of branching statements in C.   6M
ii) Write a C program to check whether the given number n is prime or not.   6M

OR

Q.2(B)   i) Explain for loop and nested for loop with suitable example.   6M
ii) Write a c program to find sum of series 1!+2!+3!+4!+.......+n!   6M

Q.3(A)   i) Write a program in C to search for an element using linear search technique.   6M
ii) What is an array? How one-dimensional and two-dimensional arrays are declared
and initialized. Give suitable example.   6M

OR

Q.3(B)   i) Define string. Write a c program to find whether the given string is palindrome or   6M
not.   6M
ii) Write a c program to swap two numbers using call by value and call by reference.

Q.4(A)   i) What is a pointer? What are the features of pointers? Write a C program to print
address of a variable.   6M
ii) Write a program to read and display values of an integer array. Allocate space
dynamically for the array using the calloc().   6M

OR

Q.4(B)   i) Distinguish between array of Structures and an array within structures with an   6M
example.   6M
ii) Differentiate between a structure and union with respective allocation of memory
by the compiler. Given an example of each.

Q.5(A)   A file name data.txt contains a series of integers, write a program to read these   12M
numbers, write all odd numbers to a file odd.txt and even numbers to a even.txt

OR

Q.5(B)   Explain different types of file handling function in c programming language.   12M

*** END***

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DATABASE MANAGEMENT SYSTEMS

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 Part-A or B only

Q.1(A)	Explain the functions of DBA.	12M
	OR	
Q.1(B)	Explain the overall system architecture of DBMS.	12M
Q.2(A)	Explain nested queries with examples.	12M
	OR	
Q.2(B)	Write notes on the following. (i) DDL (ii) DML	12M
Q.3(A)	What is mutivalued dependency? Explain 4NF.	12M
	OR	
Q.3(B)	Explain BCNF with an example.	12M
Q.4(A)	Explain about Lock based concurrency control mechanism.	12M
	OR	
Q.4(B)	Explain about Aries recovery algorithm.	12M
Q.5(A)	Explain the aggregate functions in SQL with example	12M
	OR	
Q.5(B)	(i) What is a Trigger? (ii) Explain about triggers in PL/SQL with example.	12M

*** END***

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OPERATING SYSTEMS

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 Part-A or B only

Q.1(A) Why the system calls are to be provided by Operating System? What system calls are provided by a typical OS? Explain in detail. **12M**

OR

Q.1(B) What is operating system? Explain the functions and objectives of operating system. **12M**

Q.2(A) Define AWK. Illustrate the fields and records in AWK. **12M**

OR

Q.2(B) Compare and contrast the Process utilities and Disk utilities. **12M**

Q.3(A) Write a short note on the following; **12M**
- i) arithmetic in shell
- ii) debugging shell scripts

OR

Q.3(B) List and explain the shell responsibilities. **12M**

Q.4(A) What is scheduling? Why is it necessary? Describe the various process scheduling algorithms available. **12M**

OR

Q.4(B) Consider a system with three processes and four resources. Resource R1 and R3 with one instance, R2 with two instance, process P1 holding an instance of R2 and waiting for r1,process P2 is holding an instance of R1 and R2 and waiting for R3,process P3 is holding an instance of R3. **12M**
- i) Draw resource allocation graph to the given system.
- ii) Is it possible to apply the Resource allocation graph algorithm to avoid deadlock? Explain

Q.5(A) What is mounting of a file system? How mounting takes place in different operating system? Explain with example. **12M**

OR

Q.5(B) What is paging? What is the need for page replacement? Discuss the basic method of paging in detail. **12M**

*** END***

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SOFTWARE ENGINEERING

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 Part-A or B only

Q.1(A) Describe "Software myth". Discuss on various types of software myths and the true   12
aspects of these myths.

OR

Q.1(B) Explain Software Engineering. Explain the Software Engineering Layers.   12M

Q.2(A) Construct the scenario based elements with a use case – "Online Shopping Cart"   12M

OR

Q.2(B) Write about flow based modeling in detail with an example   12M

Q.3(A) i. Write about architectural styles and patterns. (6M)   12M
ii. Explain how map data flow into software architecture.(6M)

OR

Q.3(B) Explain architectural context diagram for the Safe Home Security function.   12M

Q.4(A) Write about user interface analysis and design in detail.   12M

OR

Q.4(B) i. Illustrate Aesthetic design.   12M
ii. Explain about content design and Architecture design in detail.

Q.5(A) i. Discuss the importance of the test strategies for conventional software.(6M)   12M
ii. Describe Various functional and unit testing techniques in detail(6M)

OR

Q.5(B) Explain a simple notation for the representation of control flow.   12M

*** END***