WALCHAND COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)
Vishrambag, Sangli – 416415
Second Year B.Tech. Computer Science and Engineering
ESE , EVEN SEMESTER, AY 2022-23
Applied Mathematics for Computer Science and Engineering (6CS225) | ESE

PRN: _____

& Date: Tuesday, 09/05/2023 Time: 10.00 am to 12 noon

Max Marks | 50

IMP: Verify that you have received question papers with correct course code, branch etc.

tructio ns
a) All questions are compulsory.
b) Part A and Part B must be solved in separate answer sheet.
c) Writing question number on answer book is compulsory otherwise answers may not be assessed.
d) Assume suitable data wherever necessary.
e) Figures to the right of question text indicate full marks.
f) Mobile phones, smart gadgets and programmable calculators are strictly prohibited
g) Except PRN anything else writing on question paper is not allowed.
h) Exchange/Sharing of stationery, calculator etc. not allowed.

on the right of marks indicates course outcomes (Only for faculty use)

		Marks	
	PART A		
A)	Define Relative cardinality of fuzzy set and also Find relative cardinality of $X = \{1,2,3,4\}$, $A = \{(1,0.1),(2,0.9)\ (3,0.7)\ (4,0.2)\}$	5	CO1
B)	Show that the following set of vectors is basis for $M_{2\times2}(R)$ $\begin{bmatrix}1 & 0\\ -1 & 2\end{bmatrix}, \begin{bmatrix}0 & -1\\ -1 & 0\end{bmatrix}, \begin{bmatrix}0 & -8\\ -12 & -4\end{bmatrix}, \begin{bmatrix}3 & 6\\ 3 & -6\end{bmatrix}$	5	CO1
C)	Define (i)Dimension of Vector space (ii) Orthogonal vectors (iii) Orthonormal basis	5	CO1
D)	What are the subspace of R^3	2	CO2
	PART B		
A)	Perform Min-Max Normalization for range 0,1 on the following - $V_i = 93600$ $Max_A = 98000$ $Min_A = 13000$	2	CO3

B) Find Mean, Mode, Median for following –

i. **Mean**

No. of bulbs	No. of boxes
0 - 4	3
4 - 8	4
8 - 12	5
12 - 16	3
16 - 20	1

ii. **Mode**

Marks	Frequency
0 - 20	2
20 - 40	7
40 - 60	9
60 - 80	8
80 - 100	3

iii. **Median**

Class Interval	Frequency
0 - 15	3
15 - 30	7
30 - 45	12
45 - 60	14
60 - 75	20
75 - 90	24

C) Find Percentile & Quantile for 13 -

1,3,5,7,11,13,15,19,22,16

Q3 A) Discuss *Loss Function* with block diagram.

B) Demonstrate the term Intersection Over Union with example.

A) Environmental scientists want to solve a two-class classification problem for predicting whether a population contains a specific genetic variant. They can use a confusion matrix to determine how many ways automated processes might confuse the machine learning classification model they're analyzing. Assuming the scientists use 500 samples for their data analysis, a confusion matrix of the model is given below,

		Predicted	
		Yes	No
Actual	Yes	260	105
	No	50	85

4 CO2

Calculate

a. Accuracy
b. True Positive Rate
c. Precision
d. False Positive Rate

B) Solve following equation using Chinese Remainder Theorem

$$X \equiv 2(\text{mod } 3)$$
$$X \equiv 3(\text{mod } 5)$$
$$X \equiv 2(\text{mod } 7)$$

4 CO3

A) Using Euclidian algorithm identify GCD of 350 and 225. 4 CO2

B) Calculate primitive roots of 5. 3 CO2

C) Using Fermat's little theorem prove that 107 is prime number. (Use K=3) 3 CO3

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