Roll No.

97667

BCA 2nd Semester (Full & Re-Appear) Examination – May, 2024

MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE

Paper: BCAN08

Time: Three Hours]

Maximum Marks: 80

Before answering the questions, candidates should ensure that they have been supplied by correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note: Attempt five questions in all. Question No. 1 is compulsory and attempt four more questions by selecting one question from each Unit. All questions carry equal marks.

- (a) If the mean of 17, 9, 11, x and 15 is 12, find the value of x.
 - (b) What do you mean by regression?
 - (c) What is directed graph?

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P. T. O.

- (d) What is regular graph?
- (e) Convert the decimal number 27 into binary number.
- (f) Find the g.c.d. of 858 and 325.
- (g) Define congruence with the help of example.
- (h) What is Fibonacci sequence?

UNIT - I

2. (a) Find the average marks of students from the following data:

Marks (more than)	0	10	20	30	40	50	60	70 up to 80
	100	97	87	73	50	25	6	2

(b) Calculate the standard deviation of the following frequency distribution:

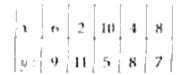
Class Interval :	0-4	4-8	8-12	12-16
No. of Students	4	8	2	1

(a) Calculate the Karl Pearson's coefficient of correlation for the following data:

x :	5	10	15	20	22	25	30
<i>y</i> :	10	12	8	7	6	5	3

97667-11,300-(P-4)(Q-)(24) (2)

(b) Find the equation of regression lines for the data given below.



UNIT - II

- (a) Write linear search algorithm and analyze its complexity.
 - (b) Describe the characteristics of algorithm and explain its time complexity and worst case complexity.
- 5. (a) Find a graph whose adjacency matrix is:

$$A = \begin{bmatrix} 0 & 1 & 1 & 2 \\ 1 & 0 & 2 & 1 \\ 1 & 2 & 1 & 0 \\ 2 & 1 & 0 & 0 \end{bmatrix}$$

(b) Define the degree of a vertex and prove that the number of vertices of odd degree is always even.

UNIT - III

- 6. (a) What is minimum spanning tree? Explain with example the Kruskal's algorithm for constructing the minimum spanning tree.
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P. T. O.

- (b) What do you mean by tree traversal 2 Explain preorder traversal with the help of example.
- 7. (a) (i) Convert decimal number (123.123)₁₉ to binary number.
 - (ii) Convert the binary number (110011.011)₂ to decimal number.
 - (b) Use bubble sort to put the elements of the list 7,8,4,6, 1,0,9 in increasing order.

UNIT - IV

- **8.** (a) Solve the recurrence relations : $a_n + 2 a_{n-1} + a_{n-2} = 0$, for $n \ge 2$. https://www.mdustudy.com
 - (b) Using Principle of Mathematical Induction show that 10²ⁿ⁻¹ + 1 is divisible by 11 for all positive integers n.
- (a) Multiply 1011 by 0110 by divide-and conquer integer multiplication method.
 - (b) Encrypt the message "HARD WORK" by using encryption function f(p) = (3p + 7) mod 26.