Enrollment No: _____   Exam Seat No:_____

C.U.SHAH UNIVERSITY
Summer Examination-2018

Subject Name: Mathematics
Subject Code: 4CS01IMT1   **Branch: B.Sc.I.T.**
Semester: 1   **Date: 27/03/2018**   **Time: 02:30 To 05:30**   **Marks: 70**

Instructions:
   (1) Use of Programmable calculator & any other electronic instrument is prohibited.
   (2) Instructions written on main answer book are strictly to be obeyed.
   (3) Draw neat diagrams and figures (if necessary) at right places.
   (4) Assume suitable data if needed.

Q-1   Attempt the following questions: **(14)**
a)   If two sets A and B then A is subset of B is denoted by
   a) $A \cap B$ b) $A \cup B$ c) $A \subset B$ d) $A \supset B$

b)   If $A = \{2,4,5,7\}$ and $B = \{1,3,5,7\}$ then $A \cap B = $ _____.

   a) $\{2,4\}$ b) ϕ c) $\{5,7\}$ d) $\{1,2,3,4,5,7\}$

c)   If $A = \begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix}$ is a square matrix then $adjA$ _____.

   a) $\begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix}$ b) $\begin{bmatrix} -1 & 0 \\ 0 & -2 \end{bmatrix}$ c) $\begin{bmatrix} 2 & 0 \\ 0 & 1 \end{bmatrix}$ d) none of these

d)   If $A = \begin{bmatrix} 2 & 1 \\ 0 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 \\ -3 & -4 \end{bmatrix}$ then $A + B = $ _____.

   a) $\begin{bmatrix} 21 & 10 \\ -3 & 0 \end{bmatrix}$ b) $\begin{bmatrix} 3 & 1 \\ -3 & 0 \end{bmatrix}$ c) $\begin{bmatrix} 2 & 0 \\ 0 & 0 \end{bmatrix}$ d) $\begin{bmatrix} 2 & 0 \\ 0 & -16 \end{bmatrix}$

e)   If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ is a square matrix then $A' = $ _____.

   a) $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ b) $\begin{bmatrix} 2 & 1 \\ 3 & 4 \end{bmatrix}$ c) $\begin{bmatrix} 4 & 3 \\ 2 & 1 \end{bmatrix}$ d) none of these

f)   Complete the series 1, 4, 9, 16, ?
   a) 16   b) 15   c) 25   d) 20

g)   25% of 480 are _____.
   a) 120   b) 1000   c) 1200   d) 250

h) In a certain code, INDIA is written as JOEJB, how is GERMANY written in that code?

    a) HFSNBOZ   b) HDSNBMZ   c) HFRNBOZ   d) HFSNAOZ

i) Which one of the following is not a prime number?

    a) 31   b) 61   c) 71   d) 91

j) $\dfrac{d}{dx}(e^x) = $ _____ .

    a) e^{ax} b) e^x c) $\dfrac{1}{e^x}$ d) none of these

k) $\dfrac{d}{dx}(2^3) = $ _____ .

    a) 2^3 b) 1   c) 0   d) none of these

l) $\int \cos x\, dx = $ _____ .

    a) $\cos x + c$ b) $\sin x + c$ c) $-\cos x + c$ d) $-\sin x + c$

m) $\int x\, dx = $ _____ .

    a) $x + c$ b) $\dfrac{x^2}{2} + c$ c) 1   d) $\dfrac{1}{x} + c$

n) $\dfrac{d}{dx}(\log x) = $ _____ .

    a) $x\log x$ b) $x + \log x$ c) $1 + \log x$ d) $\dfrac{1}{x}$

Attempt any four questions from Q-2 to Q-8

Q-2 Attempt all questions

a) If $A = \{1,2,3,5\}; B = \{2,3,5\}; C = \{1,2,4\}$ then verify that   **(05)**

    i) $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$ ii) $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$

b) If $U = \{x/x \in N, x \le 6\}, A = \{x/x \in N\ \&\ x\,is\,odd\,number, x \le 6\}$ and   **(05)**

    $B = \{x/x \in N\ \&\ x\,is\,even\,number, x \le 6\}$ then prove that

    i) $(A \cap B)' = A' \cup B'$ ii) $(A \cup B)' = A' \cap B'$

c) If $A = \{a,b,c\}; B = \{b,c\}; C = \{a,c\}$, prove that $A \times (B-C) = (A \times B) - (A \times C)$.   **(04)**

Q-3 Attempt all questions

a) If $A = \begin{bmatrix} 0 & 1 \\ 2 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 \\ 0 & -3 \end{bmatrix}$ then find matrix $A + 2B$ and $3A - B$.   **(05)**

b) If $A = \begin{bmatrix} -1 & 0 \\ 2 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 1 \\ 0 & 3 \end{bmatrix}$ are two matrices then verify that $(AB)^T = B^T A^T$. **(05)**

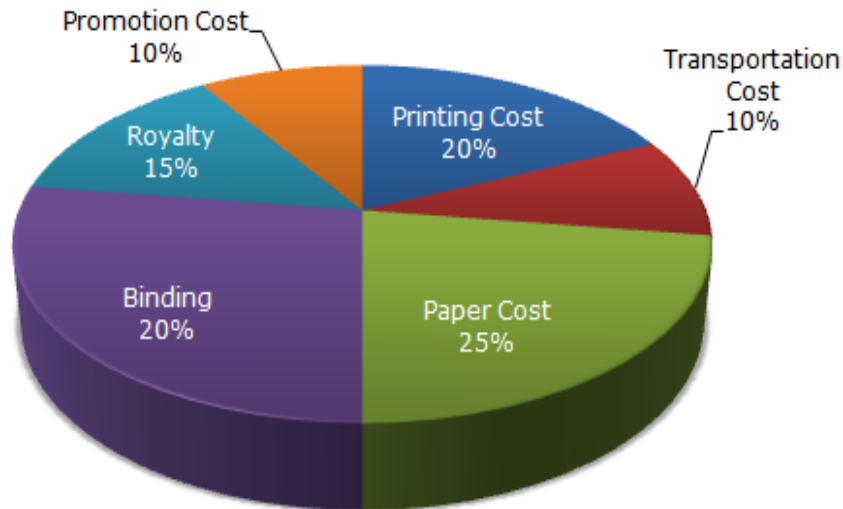**c)** Find A^2 for the matrix $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$. **(04)**

Q-4 Attempt all questions

a) Find the inverse of the matrix $A = \begin{bmatrix} 3 & -1 & 2 \\ 4 & 1 & -1 \\ 5 & 0 & 1 \end{bmatrix}$. **(05)**

b) Complete the following series. **(05)**
    1.) 7, 10, 8, 11, 9, 12,____
    2.) 36, 34, 30, 28, 24, _____
    3.) SCD, TEF, UGH, ____, WKL
    4.) F2, ___, D8, C16, B32,

c) The following pie-chart shows the percentage distribution of the expenditure incurred in publishing a book. Study the pie-chart and the answer the questions based on it. **(04)**

Various Expenditures (in percentage) Incurred in Publishing a Book

    1.) If for a certain quantity of books, the publisher has to pay Rs. 30,600 as printing cost, then what will be amount of royalty to be paid for these books?
    2.) What is the central angle of the sector corresponding to the expenditure incurred on Royalty?

Q-5 Attempt all questions
a) 1.) A father said to his son, "I was as old as you are at the present at the time of your birth". If the father's age is 38 years now, the son's age five years back **(05)**

was _____.

2.) R walked 20 m towards north. Then he turned right and walks 30 m. Then he turns right and walks 35 m. Then he turns left and walks 15 m. Finally he turns left and walks 15 m. In which direction and how many metres is he from the starting position?

b) A sum of money at simple interest amounts to Rs. 815 in 3 years and to Rs. 854 in 4 years. Find the sum. **(05)**

c) A fruit seller had some apples. He sells 40% apples and still has 420 apples. Find total number of apples he had. **(04)**

Q-6 Attempt all questions

a) 1.) The cost price of 20 articles is the same as the selling price of x articles. If the profit is 25%, then the value of x. **(05)**

2.) On selling 17 balls at Rs. 720, there is a loss equal to the cost price of 5 balls. Find the cost price of a ball.

b) Study the following table and answer the questions. **(05)**

Classification of 100 Students Based on the Marks Obtained by them in Physics and Chemistry in an Examination.

Subject	Marks out of 50				
	40 and above	30 and above	20 and above	10 and above	0 and above
Physics	9	32	80	92	100
Chemistry	4	21	66	81	100
Average (Aggregate)	7	27	73	87	100

1.) What is the different between the number of students passed with 30 as cut-off marks in Chemistry and those passed with 30 as cut-off marks in aggregate?

2.) The number of students scoring less than 40% marks in aggregate is?

c) 1.) If 0.75 : x :: 5 : 8, then find x **(04)**

2.) If 40% of a number is equal to two-third of another number, what is the ratio of first number to the second number?

Q-7 Attempt all questions

a) Evaluate $\int x^2 e^{2x}\, dx$ by method of integration by parts. **(05)**

b) Find: $\int \dfrac{(\log x)^2}{x}\, dx$ **(05)**

c) Find: $\int (x-1)^3\, dx$ **(04)**

Q-8 Attempt all questions

a) Find the differentiation of $\dfrac{x^2+1}{x+1}$ with respect to x. **(05)**

b) Find: $\dfrac{d}{dx}\left(\log\left(2x^2+3x\right)\right)$ **(05)**

c) If $x=at^2$ & $y=2at$ then find $\dfrac{dy}{dx}$. **(04)**