Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY

Summer Examination-2019

Subject Name: Mathematics
Subject Code: 4CS01IMT1 **Branch: B.Sc.I.T.**
Semester: 1 **Date: 19/03/2019** **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 A and B are disjoint sets then $A \cap B =$ _____.
a) ϕ b) U c) singleton set d) none of these

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

c) If $A = \begin{bmatrix} 3 & -1 \\ 0 & -2 \end{bmatrix}$ is a square matrix then $adjA$ _____.
a) $\begin{bmatrix} 3 & 0 \\ 1 & -2 \end{bmatrix}$ b) $\begin{bmatrix} -3 & 1 \\ 0 & 2 \end{bmatrix}$ c) $\begin{bmatrix} -2 & 1 \\ 0 & 3 \end{bmatrix}$ d) none of these

d) If $A = \begin{bmatrix} 1 & 2 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$ then $AB =$ _____.
a) $\begin{bmatrix} 1 & 2 \end{bmatrix}$ b) $\begin{bmatrix} 0 & 0 \end{bmatrix}$ c) $\begin{bmatrix} 6 \end{bmatrix}$ d) Not possible

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

f) Complete the series 1, 3, 6, 11, ?
a) 16 b) 17 c) 18 d) 20

g) 20% of 5000 are _____.
a) 120 b) 1000 c) 1200 d) 250

h) In a certain code, GUJARAT is written as HVKBSBU, how is GERMANY written in that code?
a) HFSNBOZ b) HDSNBMZ c) HFRNBOZ d) HFSNAOZ

i) Which one of the following is an even prime number?
a) 2 b) 4 c) 5 d) 6

j) $\frac{d}{dx}\left(e^{2x}\right) = \_\_\_\_\_$.

a) e^{2x} b) $2e^{2x}$ c) $\frac{e^{2x}}{2}$ d) none of these

k) $\frac{d}{dx}\left(3^2\right) = \_\_\_\_\_$.

a) 9 b) 1 c) 0 d) none of these

l) $\int 2\,dx = \_\_\_\_\_$.

a) $2x + c$ b) 2 c) 0 d) none of these

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

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

n) $\frac{d}{dx}(\log x) = \_\_\_\_\_$.

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

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

Q-2 Attempt all questions

a) If $A = \{2,3,5,6\}; B = \{1,2,3,5\}; C = \{1,2,4,6\}$ 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 $U = \{a,b,c,d,e,f,g,h\}, A = \{a,b,c,f,g\}$ and $B = \{c,d,e,g,h\}$ then prove that **(05)**

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 $A = \begin{bmatrix} 4 & 1 \\ 2 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 7 & 3 \\ 6 & 4 \end{bmatrix}$ then find matrix $A + 2B$ and $3A - 4B$. **(05)**

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

c) Find A^2 for the matrix $A = \begin{bmatrix} 1 & 0 & 1 \\ -1 & 2 & 3 \\ 0 & -3 & 2 \end{bmatrix}$. **(04)**

Q-4 Attempt all questions

a) 1.) If 0.75 : x :: 5 : 8, then find x. **(02)**

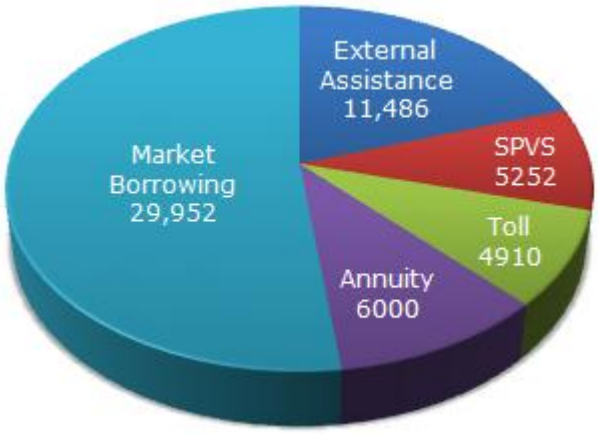
2.) Two numbers are respectively 20% and 50% more than a third number. What is the ratio of the two numbers? **(03)**

b) Complete the following series. **(05)**

1.) 22, 21, 23, 22, 24, 23, _____
2.) 53, 53, 40, 40, 27, 27, _____
3.) ELFA, GLHA, ILJA, _____, MLNA
4.) P_5QR, P_4QS, P_3QT, _____, P_1QV
5.) F2, ___, D8, C16, B32,

c) The following pie-chart shows the sources of funds to be collected by the National Highways Authority of India (NHAI) for its Phase II projects. Study the pie-chart and answers the question that follow. **(04)**

Sources of funds to be arranged by NHAI for Phase II projects (in crores Rs.)



1.) The approximate ratio of the funds to be arranged through Toll and that through Market Borrowing is
2.) If NHAI could receive a total of Rs. 9695 crores as External Assistance, by what percent (approximately) should it increase the Market Borrowing to arrange for the shortage of funds?

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 was _____. **(05)**

2.) If a person walks at 14 km/hr instead of 10 km/hr, he would have walked 20 km more. How many distance travelled by him?

b) A sum fetched a total simple interest of Rs. 4016.25 at the rate of 9% per annum in 5 years. What is 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.) A man buys a cycle for Rs. 1400 and sells it at a loss of 15%. What is the selling price of the cycle? **(05)**

2.) Sam purchased 20 dozens of toys at the rate of Rs. 375 per dozen. He sold each one of them at the rate of Rs. 33. What was his percentage profit?

b) Study the following table gives the percentage of marks obtained by seven students in six different subjects in an examination and answers the questions. **(05)**

The Numbers in the Brackets give the Maximum Marks in Each Subject.

Student	Subject (Max. Marks)					
	Maths	**Chemistry**	**Physics**	**Geography**	**History**	**Computer Science**
	(150)	**(130)**	**(120)**	**(100)**	**(60)**	**(40)**
Ayush	90	50	90	60	70	80
Aman	100	80	80	40	80	70
Sajal	90	60	70	70	90	70
Rohit	80	65	80	80	60	60
Muskan	80	65	85	95	50	90
Tanvi	70	75	65	85	40	60
Tarun	65	35	50	77	80	80

1.) What was the aggregate of marks obtained by Sajal in all the six subjects?
2.) What is the overall percentage of Tarun?

c) Find the inverse of the matrix $A = \begin{bmatrix} 3 & -1 & 2 \\ 4 & 1 & -1 \\ 5 & 0 & 1 \end{bmatrix}$. **(04)**

Q-7 Attempt all questions

a) Evaluate $\int (x^2+1)e^x\,dx$ by method of integration by parts. **(05)**

b) Find: $\int \frac{(1+\log x)^2}{x}\,dx$ **(05)**

c) Find: $\int (2x-3)^2\,dx$ **(04)**

Q-8 Attempt all questions

a) Find the differentiation of $\frac{x^2+3}{x^2+1}$ with respect to x. **(05)**

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

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