Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY

Winter Examination-2020

Subject Name: Mathematics

Subject Code: 4CS01IMT1 **Branch: B.Sc.I.T.**

Semester: 1 **Date: 12/03/2021** **Time: 03:00 To 06:00** **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) Intersection of two sets A and 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 $A = \begin{bmatrix} 1 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$ then $AB =$ _____.

a) $\begin{bmatrix} 1 & 1 \end{bmatrix}$ b) $\begin{bmatrix} 0 & 0 \end{bmatrix}$ c) $\begin{bmatrix} 3 \end{bmatrix}$ d) $\begin{bmatrix} 1 \end{bmatrix}$

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, 2, 4, 7, ?

a) 11 b) 12 c) 13 d) 20

g) 20% of 400 are _____.

a) 800 b) 8000 c) 80 d) 250

h) REASON : SFBTPO :: THINK : ?
a) SGHMJ b) UIJOL c) UHNKI d) UJKPM

i) What is the next term of the given series $1+\frac{1}{3}+\frac{1}{9}+...$

a) $\frac{1}{81}$ b) $\frac{1}{72}$ c) $\frac{1}{32}$ d) none of these

j) $\frac{d}{dx}(\log x)=$_____.

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

k) $\frac{d}{dx}(e^x)=$_____ .

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

l) $\frac{d}{dx}(8)=$_____ .

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

m) $\int 2\,dx=$_____.

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

n) $\int \sin x\,dx=$_____.

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

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

Q-2 Attempt all questions

a) If $A=\{1,2,4,5\};B=\{2,3,4\};C=\{1,2,3\}$ 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) $A=\begin{bmatrix}1 & -1\\ -2 & 2\end{bmatrix}$ and $B=\begin{bmatrix}1 & -3\\ 0 & 2\end{bmatrix}$ then find matrix $3A+2B$ and $A-4B$. **(05)**

b) If $A=\begin{bmatrix}2 & 3\\ 1 & 4\end{bmatrix}$ and $B=\begin{bmatrix}5 & 1\\ 0 & 3\end{bmatrix}$ are two matrices then verify that $(AB)^T = B^T A^T$ **(05)**

c) If $A=\begin{bmatrix}3 & -1 & 2\\ 4 & 1 & -1\\ 5 & 0 & 1\end{bmatrix}$ and $B=\begin{bmatrix}-1 & 2 & 3\\ 3 & 2 & 1\\ 0 & -4 & 3\end{bmatrix}$ then find X such that $X-A-2B=0$. **(04)**

Q-4 Attempt all questions

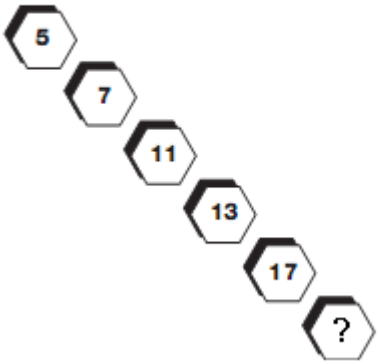
a) Find the inverse of the matrix $A=\begin{bmatrix}3 & -1 & 2\\ 4 & 1 & -1\\ 5 & 0 & 1\end{bmatrix}$. **(05)**

b) **(02)**

Which letter replaces the question mark?

(02)

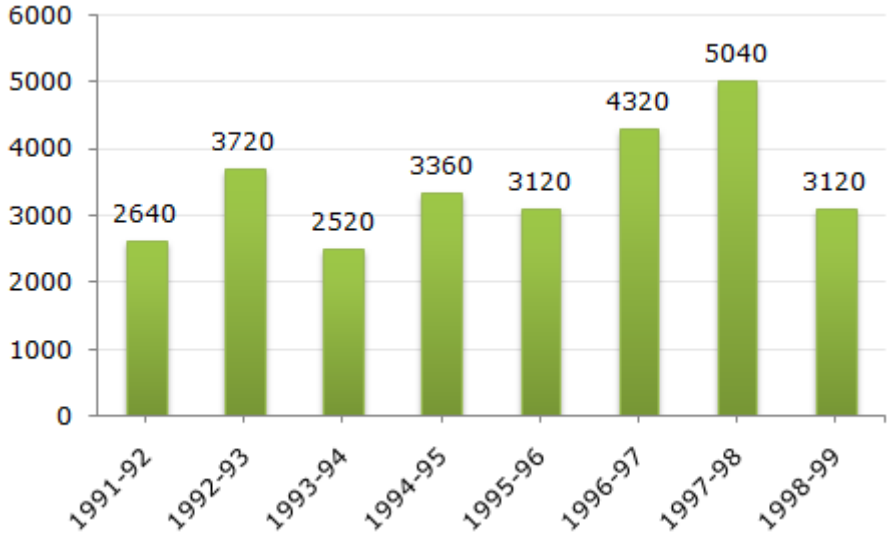
Which number completes the puzzle?



Look at this series: 31, 29, 24, 22, 17, ... What number should come next? **(01)**

c) The bar graph given below shows the foreign exchange reserves of a country (in million US $) from 1991 - 1992 to 1998 - 1999. **(04)**

Foreign Exchange Reserves Of a Country. (in million US $)



1.) The foreign exchange reserves in 1997-98 was how many times that in 1994-95?

2.) What was the percentage increase in the foreign exchange reserves in 1997-98 over 1993-94?

Q-5 Attempt all questions

a) 1.) A and B together have Rs. 1210. If $\frac{4}{15}$ of A's amount is equal to $\frac{2}{5}$ of B's amount, how much amount does B have? **(05)**

2.) The length and breadth of a room are 8 m and 6 m respectively. A cat runs along all the four walls and finally along a diagonal order to catch a rat. How much total distance is covered by the cat?

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

c) Two students appeared at an examination. One of them secured 9 marks more than the other and his marks was 56% of the sum of their marks. What were the marks obtained by them? **(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 find the value of *x*. **(03)**

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. **(02)**

b) The following table gives the percentage of marks obtained by seven students in six different subjects in an examination. **(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)**
Avush	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 are the average marks obtained by all the seven students in Physics? (Rounded off to two digit after decimal)

2.) The number of students who obtained 60% and above marks in all subjects is?

c) 1.) What least number must be added to 1056, so that the sum is completely divisible by 23? **(04)**

2.) Find the sum of first five prime numbers.

Q-7 Attempt all questions

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

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

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

Q-8 Attempt all questions

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

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

c) Find: $\int(4x-3)^2\,dx$ **(04)**