Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY

Winter Examination-2019

Subject Name: Mathematics

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

Semester : 1 Date : 21/11/2019 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 $A \cup B =$ _____.

a) ϕ b) U c) singleton set d) none of these

b) If $U = \{1,2,3,4,5,6\}$ and $B = \{1,2,3,4\}$ then $B' =$ _____.

a) $\{2,4\}$ b) ϕ c) $\{5,6\}$ d) $\{1,2,3,4,5,6\}$

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

a) 6 b) 5 c) 0 d) none of these

d) If $A = \begin{bmatrix} 3 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$ then $AB =$ _____.

a) $\begin{bmatrix} 1 & 3 \end{bmatrix}$ b) $\begin{bmatrix} 0 & 0 \end{bmatrix}$ c) $\begin{bmatrix} 6 \end{bmatrix}$ d) Not possible

e) If $A = \begin{bmatrix} 2 & 3 \\ 1 & 4 \end{bmatrix}$ 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, 5, 7, ?

a) 9 b) 11 c) 8 d) none of these

g) 20% of 600 are _____.

a) 120 b) 100 c) 1200 d) 1000

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 an prime number?

a) 3 b) 1 c) 5 d) 2

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

a) $-e^{-x}$ b) $-e^{x}$ c) e^{-x} d) none of these

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

a) 9 b) 23 c) 0 d) none of these

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

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

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

a) $\cos x+c$ b) $-\cos x+c$ c) $\sin x+c$ d) none of these

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

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

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

Q-2 Attempt all questions

a) If $A=\{a,b,e,f\};B=\{d,e,f\};C=\{b,d,e\}$ 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 $U=\{1,2,3,4,5,6,7,8\}, A=\{1,2,4,5,7\}$ and $B=\{2,3,4,7,8\}$ then prove that **(05)**

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

c) If $A=\{1,2,3,4\}, B=\{1,3,4,5\}$ and $C=\{2,4,6,7\}$ then find **(04)**

i) $A\cup B\cup C$ ii) $A\cap(B\cup C)$ iii) $A\cap B\cap C$ iv) $A-B$

Q-3 Attempt all questions

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

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

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

Q-4 Attempt all questions

a) 1.) If 6 : x :: 3 : 4, then find x. **(05)**

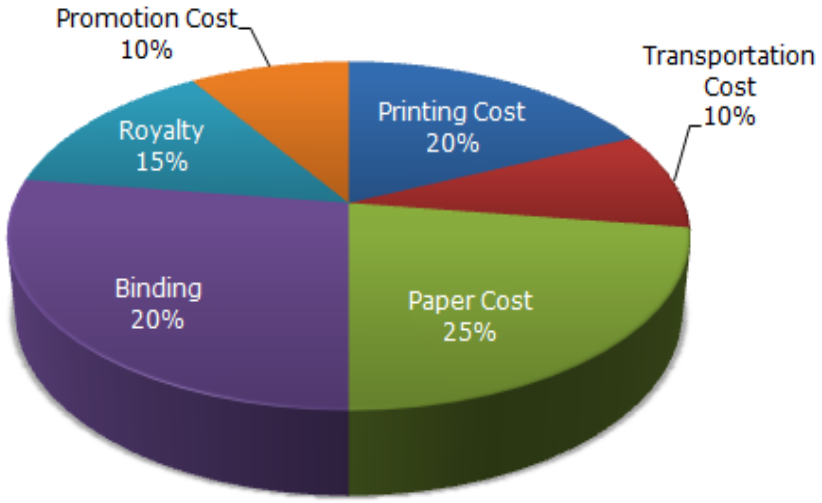
2.) The sum of two numbers are 18 and greatest number is 5 more than smallest number then find the numbers.

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

1.) 1, 1, 4, 8, 9, 27, _____, 64
2.) 5, 6, 9, 14, 21, _____
3.) ELFA, GLHA, ILJA, _____, MLNA
4.) 1, 3, 4, 6, 7, 9, _____
5.) 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) **(05)**

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?
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) Find simple and compound interest on Rs.30000 at 7% per annum for 2 years, compounded annually. **(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 **(04)**

Q-6 Attempt all questions

a) 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? **(05)**

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

Q-7 Attempt all questions

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

b) Find: $\int \frac{(\log x)^4}{x}\, dx$ **(05)**

c) Find: $\int (x+1)^2\, dx$ **(04)**

Q-8 Attempt all questions

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

b) If $x = at^2$ & $y = 2at$ then find $\frac{dy}{dx}$. **(05)**

c) Find: $\frac{d}{dx}\left(\log\left(2x^2+3x\right)\right)$ **(04)**