

Enrollment No: _____

Exam Seat No: _____

C.U. SHAH UNIVERSITY

Summer Examination-2020

Subject Name: Mathematics

Subject Code: 4CS01IMT1

Branch: B.Sc.I.T.

Semester: 1

Date: 02/03/2020

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 $A \cup B$ is denoted by _____. (01)

- a) $A \cap B$ b) $A \cup B$ c) $A \subset B$ d) $A \supset B$

b) If $A = \{2, 4, 5, 7\}$ then _____ elements in $P(A)$. (01)

- a) 14 b) 16 c) 15 d) 17

c) If $A = \begin{bmatrix} 1 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$ then $AB =$ _____. (01)

- a) $\begin{bmatrix} 1 & 1 \end{bmatrix}$ b) $\begin{bmatrix} 0 & 0 \end{bmatrix}$ c) $\begin{bmatrix} 0 \end{bmatrix}$ 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 $A - B =$ _____. (01)

- a) $\begin{bmatrix} 1 & 1 \\ 8 & 3 \end{bmatrix}$ b) $\begin{bmatrix} 1 & 1 \\ -3 & 8 \end{bmatrix}$ c) $\begin{bmatrix} 1 & -1 \\ 3 & 8 \end{bmatrix}$ d) $\begin{bmatrix} 1 & 1 \\ 3 & 8 \end{bmatrix}$

e) If $A = A^T$ then A is _____. (01)

- a) skew symmetric b) symmetric c) Lower Triangular d) none of these

f) Complete the series 0, 3, 8, 15, ? (01)

- a) 23 b) 24 c) 25 d) 22

g) 20% of 4000 are _____. (01)

- a) 850 b) 600 c) 800 d) 80

h) In a certain code, INDIA is written as JOEJB, how is GERMANY written in that code? (01)

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

i) Complete the series 7, 10, 8, 11, 9, 12, ? (01)

- a) 11 b) 13 c) 12 d) 10



j) $\frac{d}{dx}(e^{2x}) = \underline{\hspace{2cm}}$. (01)

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

k) $\frac{d}{dx}(a^x) = \underline{\hspace{2cm}}$. (01)

- a) a^x b) 1 c) 0 d) $a^x \log a$

l) $\int \sin x dx = \underline{\hspace{2cm}} + c$. (01)

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

m) $\int 1 dx = \underline{\hspace{2cm}} + c$. (01)

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

n) $\frac{d}{dx}(\log x) = \underline{\hspace{2cm}}$. (01)

- 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 (14)

a) If $A = \{1,2,3,4,5\}, B = \{2,4,6,8\}, C = \{x|x \in N, x \text{ is multiple of } 3, x < 10\}$ then prove that $(A \cup B) \cup C = A \cup (B \cup C)$. (05)

b) If $U = \{-1,0,1,2,3,4,5\}$ be universal set and $A = \{-1,0,1\}$ is a given set. Then verify (05)
 (i) $A \cup A' = U$ (ii) $A \cap A' = \emptyset$ (iii) $(A')' = A$

c) Find the number of subsets of set $A = \{1,2,3\}$. Also find power set of A . (04)

Q-3 Attempt all questions (14)

a) If $A = \begin{bmatrix} 4 & 8 & 1 \\ -2 & -2 & -1 \\ 6 & -4 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 8 & 4 & 0 \\ 6 & -2 & 8 \\ 4 & -1 & -6 \end{bmatrix}$ then find AB . (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)

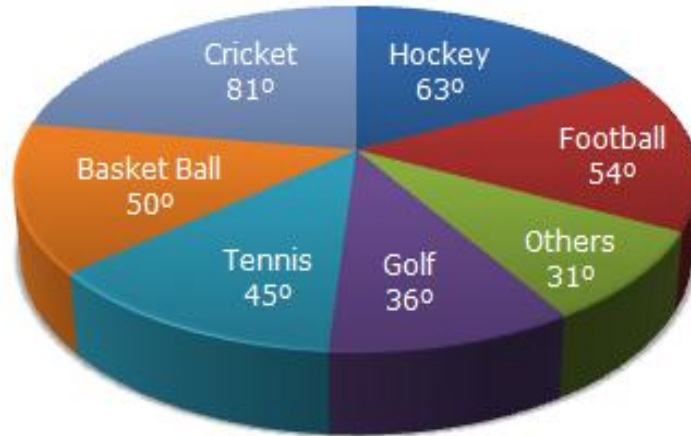
c) If $A = \begin{bmatrix} 1 & 2 & 3 \\ 1 & 3 & 5 \\ 1 & 5 & 12 \end{bmatrix}$ then find $adj(A)$. (04)

Q-4 Attempt all questions (14)

a) Find the inverse of the matrix $A = \begin{bmatrix} 1 & 1 & 2 \\ 1 & 9 & 3 \\ 1 & 4 & 2 \end{bmatrix}$. (05)



- b) Complete the following series. (05)
- 1) 21, 9, 21, 11, 21, 13, 21, ____
 - 2) 58, 52, 46, 40, 34, _____
 - 3) 3, 4, 7, 8, 11, 12, _____
 - 4) 2, 4, 9, 16, 25, 36, _____
- c) The circle-graph given here shows the spending of a country on various sports during a particular year. Study the graph carefully and answer the questions given below it. (04)



- 1) What percent of total spending is spent on Tennis?
- 2) If the total amount spent on sports during the year be Rs. 1,80,00,000, the amount spent on Basketball exceeds on Tennis by _____

Q-5 Attempt all questions (14)

- 1) In a mixture 60 litres, the ratio of milk and water 2: 1. If this ratio is to be 1: 2, then
 - a) the quantity of water to be further added is _____. (05)
 - 2) If $0.75: x :: 5 : 8$, then x is equal to _____. (05)
- b) There is 60% increase in an amount in 6 years at simple interest. What will be the compound interest of Rs. 12,000 after 3 years at the same rate? (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 (14)

- a) 1) The percentage profit earned by selling an article for Rs. 1920 is equal to the percentage loss incurred by selling the same article for Rs. 1280. At what price should the article be sold to make 25% profit? (05)
- 2) When a plot is sold for Rs. 18,700, the owner loses 15%. At what price must that plot be sold in order to gain 15%?



- b) Study the following table and answer the questions. (05)
 Number of Candidates Appeared and Qualified in a Competitive Examination
 from Different States Over the Years.

STATE	Years									
	1997		1998		1999		2000		2001	
	App.	Qual.	App.	Qual.	App.	Qual.	App.	Qual.	App.	Qual.
M	5200	720	8500	980	7400	850	6800	775	9500	1125
N	7500	840	9200	1050	8450	920	9200	980	8800	1020
O	6400	780	8800	1020	7800	890	8750	1010	9750	1250
P	8100	950	9500	1240	8700	980	9700	1200	8950	995
R	7600	870	7600	940	9800	1350	7600	945	7950	885

- 1) Total number of candidates qualified from all the states together in 1997 is approximately what percentage of the total number of candidates qualified from all the states together in 1998?
- 2) What is the average candidates who appeared from State Q during the given years?
- 3) The percentage of total number of qualified candidates to the total number of appeared candidates among all the five states in 1999 is?

- c) In certain coding system fill the blank. (04)
- 1) CMM, EOO, GQQ, _____, KUU
 - 2) FAG, GAF, HAI, IAH, _____
 - 3) ELFA, GLHA, ILJA, _____, MLNA
 - 4) SCD, TEF, UGH, _____, WKL

Q-7 Attempt all questions (14)

- a) Evaluate $\int x^2 \sin x \, dx$ by method of integration by parts. (05)
- b) Find: $\frac{d}{dx} \left(\frac{x \cos x}{1+x^2} \right)$ (05)
- c) Find: $\int (5x^4 + 3x^2 + \sin 2x) \, dx$ (04)

Q-8 Attempt all questions (14)

- a) Find the differentiation of $\frac{e^x(x^2+2)}{x^3}$ w.r.t. x . (05)
- b) If $x = at^2$ & $y = 2at$ then find $\frac{dy}{dx}$. (05)
- c) Find: $\int \frac{(1 + \log x)^2}{x} \, dx$ (04)

