



Chumey Higher Secondary School
BUSINESS MATHEMATICS
Annual Examination-2022



Three Hours

Class: XI Com and Arts

Full Mark: 100

Index Code:

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All working, including rough work, should be done on the same sheet as, and adjacent to the rest of the answer.

The intended marks for questions or parts of questions are given in bracket [].

Mathematical formulae are given at the end of this question paper.

The use of calculator (Fx-82) or (Fx-100) is allowed.

READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. **Do not** write for the first fifteen minutes. This time is to be spent in reading the questions. After having read the questions, you will be given three **hours** to answer all questions.
2. There are two sections. **Section A** and **Section B**.
3. Write your answers to each question in the **given space**. The mark for the question is given in the **brackets**.
4. Do not forget to write down your **INDEX CODE** clearly on the answer script provided.

Section A [30 Marks]

Answer *ALL* questions.

Directions: Read the following questions carefully. For each question there are four alternatives A, B, C and D. Choose and **Circle** the correct alternative answer.

Question 1

[15 x2 = 30 Marks]

i. What is the number of terms in the expansion of $(4x^2 + 2y)^{10}$?

- A 2
- B 11
- C 10
- D 20

ii. The log of any number to the same base is

- A 0
- B -1
- C unity
- D Infinity

iii. The 7th term of 22, 27, 32.....

- A 52
- B 37
- C 40
- D 47

iv. Evaluate the determinant $\begin{vmatrix} 1 & -3 \\ 4 & 2 \end{vmatrix}$

- A 10
- B -10
- C 14
- D -14

v. What is the value of $\log 5 + \log \frac{1}{5}$?

- A 0
- B 1
- C infinity
- D Number itself

- vi. What is the derivative of $(2 - 7x)^2$?
- A $2(2 - 7x)$
 B $14(2 - 7x)$
 C $-7(2 - 7x)^2$
 D $-14(2 - 7x)$
- vii. Value of $3^{\log_3 7}$ is
- A 3
 B 7
 C 27
 D $\log_3 7$
- viii. The Geometric Mean of -3 and -12 is
- A 6
 B -6
 C 7.5
 D -7.5
- ix. Find the sum of 10 terms of $5+8+11+\dots\dots\dots$
- A 37
 B -37
 C 185
 D -185
- x. Three number of terms in an A.P. are
- A $a + d, a, a - d$
 B $a - d, a, a + d$
 C $\frac{a}{r}, a, ar$
 D $ar, a, \frac{a}{r}$

- xi. Find the value of ${}^{15}C_3$?
- A 3
 B 15
 C 18
 D 455
- xii. Expand $(1+4x)^3$.
- A $1+12x+48x^2-64x^3$
 B $1-12x+48x^2+64x^3$
 C $1-12x+48x^2-64x^3$
 D $1+12x+48x^2+64x^3$
- xiii. Evaluate: $5^0 \times 4^{-1} + 8^{\frac{1}{3}}$.
- A 2
 B $\frac{1}{3}$
 C $\frac{1}{4}$
 D $\frac{9}{4}$
- xiv. What are partial fractions of $\frac{5x-4}{(x-2)(x+1)}$?
- A $\frac{2}{x-2} + \frac{3}{x+1}$
 B $\frac{2}{x-2} - \frac{3}{x+1}$
 C $\frac{3}{x+1} - \frac{2}{x-2}$
 D $-\frac{3}{x+1} - \frac{2}{x-2}$
- xv. Cramer's rule does not apply if
- A $D = 0$
 B $D \neq 0$
 C $D = 1$
 D $D \neq 1$

SECTION B [70 Marks]

Answer any **10** questions. All questions in this section have **equal** marks. [10x7=70]

Question 2

a) Find the value of determinant of $\begin{vmatrix} 1 & 2 & -1 \\ 3 & 0 & 4 \\ 4 & -4 & 5 \end{vmatrix}$. [3]

- b) The second term of a G.P. is 18 and the fifth term is 486. Find (a) the first term, (b) the common ratio. [4]

Question 3

a) Evaluate : $\sqrt[3]{(16)^{-\frac{3}{4}} \times (125)^{-2}}$ [3]

b) Using determinants, prove that the points (11,7), (5,5) and (-1,3) are collinear. [4]

Question 4

a) Differentiate x^2 using first principles.

[3]

b) The sum of three numbers in A.P. is 33, and the sum of their squares is 461. Find the numbers. [4]

Question 5

a) Find the sixth term of 2,4,8,.....

[3]

b) Find the partial fraction of $\frac{2x^2 + 7x + 23}{(x-1)(x+3)^2}$.

[4]

Question 6

a) Change $2^3 = 8$ to logarithmic form. [1]

b) Find m , if $\log_{10} m = 2$. [1]

c) Prove that: $\log \frac{26}{33} - \log \frac{65}{69} + \log \frac{55}{46} = 0$. [2]

d) If $f(x) = 3x^2 - 4x$, then find the value of x given that $f'(x) = 5$. [3]

Question 7

a) Differentiate the function w. r. t. x : $y = \frac{2x+4}{3x-5}$. [3]

b) Resolve into partial fractions: $\frac{7+x}{(1+x)(x-3)}$. [4]

Question 8

a) Solve the system of equations; $2x + y = 1$ and $x - 2y = 8$ using Cramer's rule. [3]

b) Decompose into partial fractions: $\frac{3x^2 - 5x + 1}{x^2 - 2x - 3}$. [4]

Question 9

a) If $y = 3x^2 + 2$, prove that $x \frac{dy}{dx} - 2y = -4$. [3]

b) Evaluate: $(81)^{\frac{3}{4}} - \left(\frac{1}{32}\right)^{\frac{-2}{5}} + 8^{\frac{1}{3}} \times \left(\frac{1}{2}\right)^{-2} \times (3)^0$. [4]

Question 10

a) If ${}_{18}C_r = {}_{18}C_{r+2}$, find r_{C_5} . [3]

b) Create the system of linear equations involving 2 unknown variables and solve the equations using Cramer's rule. [4]

Question 11

a) Differentiate the functions w. r. t x: $y = (x-1)^3(x+2)^4$. [3]

- b) Find the minors and co-factors of the elements of the determinant $\begin{vmatrix} -2 & 3 \\ 4 & 5 \end{vmatrix}$. [4]

Question 12

- a) Find the value of k so that $8k+4$, $6k-2$, and $2k+7$ will form an A.P. [3]

- b) Expand $(2 + 2x)^5$. [4]

Question 13

a) Find the area of the triangle whose vertices are $(3, 8)$, $(-4, 2)$, and $(5, -1)$. [3]

b) The 5th term of an A.P. is 11 and the 9th term is 7. Find the 15th term. [4]

SI No:	Formulae		
1	$t_n = a + (n - 1)d$	10	$\text{Log}_a x_1 x_2 = \text{Log}_a x_1 + \text{Log}_a x_2$
2	$S = \frac{n}{2}(a + l)$	11	$\text{Log}_a \left(\frac{x_1}{x_2}\right) = \text{Log}_a x_1 - \text{Log}_a x_2$
3	$S = \frac{n}{2}[2a + (n - 1)d]$	12	$\text{Log}_a (x_1)^n = n \text{Log}_a x_1$
4	$S_n = \frac{a(1 - r^n)}{1 - r}$	13	$\frac{d}{dx}(x^n) = nx^{n-1}$
5	$\sum n = \frac{n(n - 1)}{2}$	14	$\frac{d}{dx}(uv) = u \frac{d}{dx} v + v \frac{d}{dx} u$
6	${}^n C_r = \frac{n!}{r!(n-r)!}$	15	$\frac{d}{dx}\left(\frac{u}{v}\right) = \frac{v \frac{d}{dx} u - u \frac{d}{dx} v}{v^2}$
7	$(x+y)^n = {}^n C_0 x^n + {}^n C_1 x^{n-1} y + {}^n C_2 x^{n-2} y^2 \dots + {}^n C_r x^{n-r} y^r + \dots + {}^n C_{n-1} x y^{n-1} + {}^n C_n y^n$	16	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
8	$\left(\frac{x}{y}\right)^n = \frac{x^n}{y^n}, y \neq 0$	17	$A_{ij} = (-1)^{i+j} M_{ij}$
9	$t_n = ar^{n-1}$	18	$l = a + (n - 1)d$