

**SARASWAT VIDYALAYA'S
SRIDORA CACULO COLLEGE OF COMMERCE & MANAGEMENT STUDIES
KHORLIM, MAPUSA, GOA**

B.Com - Honors / B.Com - General (w. e. f. 2017-18)

**F.Y.B.COM. SEMESTER END EXAMINATION, NOVEMBER, 2022
SEMESTER I**

Subject:- COMMERCIAL ARITHMETIC - I. (CC-4, CC: UCAC101)
(CBCS Revised Course)

M.Marks:- 80
Duration:- 2 hrs

- Instructions:-
1. Attempt all the questions.
 2. Use of non-programmable calculator is allowed.
 3. Each question carries marks as shown in bracket
 4. Sub-questions of a question should be answered continuously.
 5. Log table / graph paper will be supplied on request.

Q.1. Attempt the following:

(5x4 = 20)

a) Let A = Set of letters in the word "PROGRESS"

B = Set of letters in the word "REGRESS"

C = Set of letters in the word "DEPRESS"

Verify that : i) $(A \cup B) \cap C = (A \cap C) \cup (B \cap C)$

ii) $(A \cap B) \cup C = (A \cup C) \cap (B \cup C)$

b) Find four numbers in an A.P. such that their sum is 16 and the sum of their square is 84.

c) Solve the following determinant

$$\begin{vmatrix} x & 1 & 2 \\ 2 & 1 & 2 \\ 9 & -1 & x \end{vmatrix} = 0$$

d) Translate the following verbal statement into symbolic form.

- i) Konkani does not have an alphabet and English has an alphabet.
- ii) Konkani does not have an alphabet than English has an alphabet.
- iii) Konkani has an alphabet or English does not have an alphabet.

.OR.

Q.I. Attempt the following:

(5x4 = 20)

w) Write the number of elements in the following sets:

1. $A = \{1, 2, 3\}$

2. B = Set of letters in the word "malayalam"

3. $C = \{ \Phi \}$

4. $D = \{0, 1, 2, 3, \dots, 9\}$

5. $E = \{\Phi, \{1\}, \{2\}, \{1,2\}\}$

x) If for an A.P., $d = 10$ and $S_{30} = 4500$, find a and T_{30} .

y) Solve the following equations using determinant
 $x + z = 0$, $2x + 3y + 3z - 5 = 0$ and $x + y + z = 2$

z) Let a : Varun is a boy.

b : Varun is a good cricketer.

Translate the following into simple verbal statements:

i) $\sim a \leftrightarrow b$

ii) $\sim a \rightarrow (a \wedge b)$.

iii) $\sim(\sim a)$.

Q.2. Attempt the following:

a) In how many ways can the letters in the word "STRANGE" be arranged so that the vowels may appear in the extreme positions. (5x4 = 20)

b) Find the simple interest on Rs. 1,000/- for 3 and half years at 5% p.a. Also find the amount after 3 years.

c) In a group of 13 students, 7 play cricket, 8 play hockey and 6 play football, 3 play hockey and football, 2 play cricket and football and 4 play cricket and hockey. Each student plays at least one of the three games. How many play all the three games?

d) If $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ then show that $A^2 - 5A + 7I$ is a null matrix, where I is an identity matrix.

.OR.

Q.II. Attempt the following:

w) How many numbers can be formed between 100 and 600 out of the digits 2,4,5,6,8 and 9? (5x4 = 20)

x) Find the time required to earn Rs. 400/- as simple interest on the principle of Rs. 2000/- at the rate of 10% per annum.

y) Out of 200 students appearing in the examination, 140 passed in maths and 100 passed in statistics. If 40 of them failed in both, find the

percentage of students who have passed in both.

z) Find the value of a, b and c from the following the matrix equation:

$$\begin{bmatrix} a & 2 \\ b & a \end{bmatrix} + \begin{bmatrix} 2b & -b \\ c & -c \end{bmatrix} = \begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}$$

Q.3. Attempt the following:

(5x4 = 20)

a) Test the validity of the statement:

If I wear a helmet then I can drive a scooter. I cannot drive a scooter.

Therefore I do not wear a helmet.

b) Find n if ${}^n C_5 = 30 {}^n C_3$

c) How many terms of the A.P. series : 2, 6, 10, 14 ----- must be added to get the total of 4232?

d) Find the Accumulated amount and compound interest on Rs. 20,000/- for 3 years at 5% p.a. payable semi-annually.

.OR.

Q.III. Attempt the following:

(5x4 = 20)

w) If ${}^{10} C_x - {}^9 C_4 = {}^9 C_3$, find x

x) Verify the following statement is a tautology by constructing truth table:

$$[p \wedge (p \rightarrow q)] \rightarrow q$$

y) The gate receipts of a show amounted to Rs. 6500/- in the first night and showed a drop of Rs. 110/- every succeeding night. If the operational expenses of the show is Rs. 1000/- a night, find on which night the show ceases to be profitable? Also find the total profit during these nights.

z) Find the amount of an annuity if payment of Rs. 5000/- is made semi-annually for nine years at 7% p.a. payable half yearly $((1.035)^{18} = 1.8575)$

Q.4. Attempt the following:

(5x4 = 20)

a) A student is to answer 8 out of 10 questions in an examination. How many choices has he? How many choices he has if he must answer the first three questions?

b) If $A = \begin{bmatrix} 2 & 1 \\ 0 & -1 \end{bmatrix}$, $B = \begin{bmatrix} 0 & -1 \\ 3 & 1 \end{bmatrix}$, verify that $|AB| = |A| * |B|$

c) A company borrows a loan of Rs. 60000 /- on the condition to repay it with compound interest at 6% per month. Further it is also agreed upon to repay the entire loan amount in Four equal instalments. Find the amount of EMI.

d) Identify whether the given sequence is an A.P. or G.P.

3, -6, 12, -24,

Write down if possible the n^{th} term of this sequence.

.OR.

Q.IV. Attempt the following:

(5x4 = 20)

w) In how many ways can a committee of 5 be formed from 4 boys and 6 girls so as to include at least 2 boys in the committee.

x) A factory employs 50 unskilled and 20 skilled workers. If unskilled worker is paid at the rate of Rs. 75 per day whereas skilled worker is paid at the rate of Rs. 100 per day, find the total payment made to the workers per day using matrix.

y) A person has taken a loan of Rs. 60,000/- from a money lender who charges a high interest of 6 % per month. The person returns the loan in equal installment of Rs. 17316 in 4 months, starting with first installment at the end of 1st month, second month and so on. Calculate the interest component and the principal repayment component of the EMI for each month.

z) Find the sum, S_n of the series $2 + 22 + 222 + 2222 + \dots$

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