Vidya Vikas Mandal's
Shree Damodar College of Commerce and Economics, Margao-Goa
FY B.Com, Semester-I Supplementary Examination August 2022
Commercial Arithmetics-I (CC4)

Duration: 2hrs **Max Marks: 80**

Instructions:

1) All questions are compulsory. (Internal choice is provided)
2) Figures to the right indicate the full marks.
3) Non-programmable calculator is allowed.

Q1 **Attempt the following questions.** **5X4=20**

a) Check if the following pairs of statements are equivalent.
$p \leftrightarrow q$, $(p \rightarrow q)$ $(q \rightarrow p)$

b) Find the Principal, if the compound interest payable annually at 12% per annum for 2 years is Rs. 2,544.

c) How many 3 digit even numbers can be formed from the digits 3, 4, 5, 6, 7,8 if the digits are not repeated?

d) Find the first term, common difference of an A.P whose 10^{th} term is 5 and 18^{th} term is 77.

e) Use Cramer's rule to solve the following equations.
$3x + 2y - z = 1$
$x - y + 5z = -2$
$2x + y = 3$

OR

QI **Answer the following questions** **5X4=20**

i) Check if the statement $(p\ q)[\sim p \text{ v } \sim q]$is a Tautology or a contradiction.

ii) If Rs.3700 amounts to Rs. 6808 in 6 years, at simple interest, find the rate of interest.

iii) How many arrangements can be done in a line of 6 doctors, 4 engineers and 3 Professors if the three teachers are always together?

iv) Find the sum of all the even numbers between 2 to 200.

v) Use Cramer's rule to solve the following equations.
$x - y + 2z = -3$
$x + 2y + 3z = 4$
$2x + y + z = -3$

Q2 **Answer the following questions.** **5X4=20**

a) Sanjay bought a TV from his friend and promised him to pay a fixed sum at the end of each year., so that after 2 years, his friend gets Rs.54,000. Assuming the rate of interest at 16% compounded annually, calculate the fixed sum which Sanjay is supposed to pay his friend on yearly basis.

b) If $A=\{1, 5, 7, 9, 10\}$, $B=\{2, 4, 6, 8, 10\}$, $C=\{2, 5, 6, 7, 10\}$ Verify that

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

c) Find the 10^{th} term and sum of first 6 terms of the sequence 80, 70, 60,..

d) Find the determinant of the matrix $M=\begin{bmatrix} -2 & 4 & 5 \\ 3 & -1 & 8 \\ 0 & 2 & 1 \end{bmatrix}$

e) How many arrangements can be made of the letters of the word "COMPANY" if the word begins with M and ends with Y?

OR

QII **Answer the following questions.** **5X4=20**

i) Find the amount of an ordinary annuity of Rs. 5550 compounded annually for 6 years at 6% per annum.

ii) In a survey of 500 people, 240 liked product A, 280 liked product B. And each person liked at least one of the two brands. Find the number of people who liked both the brands.

iii) Find 3 numbers in A.P. whose sum is 24 and the sum of their squares is 242.

iv) If $A=\begin{bmatrix} 2 & -1 \\ 3 & 3 \end{bmatrix}$, $B=\begin{bmatrix} 2 & 5 & 7 \\ -3 & -2 & 1 \end{bmatrix}$, $C=\begin{bmatrix} -1 & 6 & 4 \\ 3 & 2 & 1 \end{bmatrix}$ Verify that

$A(B+C) = AB+AC$.

v) Compute i) $\frac{5!}{2!}$ ii) 7! -4!

Q3 **Answer the following questions.** **5X4=20**

a) If the investment kept for simple interest doubles in 6 years, find the rate of interest.

b) If $n(A \cup B) = 60$, $n(A \cap B) = 20$, and $n(A) = 50$, find $n(B)$ and $n(B-A)$.

c) Check the validity of the following argument.
If I wear a blue dress then India wins.
India lost.
Therefore, I did not wear a blue dress.

d) From a pack of 52 playing cards, 3 cards are to be selected at random. Find the number of selections if i) Two are face cards ii) One is ace.

e) Siya pays her interest free loan from a friend in 14 monthly instalments such that each instalment is less than the earlier instalment by Rs.150. If her first instalment was Rs. 2500, Calculate her last instalment and the loan amount.

OR **5X4=20**

QIII **Answer the following questions.**

i) Jenny has Rs. 8000. She lent a part of it at 9% the rest at 7%. If the annual interest received by her was Rs.600, find the money she lent at 9% and 7%. Both the interests are simple interests.

ii) In a survey of 175 people, it was found that 100 liked Fruity, 70 liked Appy, 40 liked Slice. 30 liked Fruity and Appy, 20 liked Fruity and Slice, 23 liked Appy and Slice, 18 people liked all the three drinks. How many like only Fruity?

iii) Check the validity of the following argument.

p

$p \rightarrow q$

$\therefore q$

iv) In how many ways can 3 books in Mathematics, 4 books in sociology and 2 books in history be arranged on a shelf if the books of the same subject are always together?

v) Ganesh invests Rs. 10000 in the first month and increases his instalment by Rs.1000 in every subsequent month. Calculate his total investment at the end of 3 years.

Q4 **Answer the following questions.** **5X4=20**

a) Reema invested a certain amount for 4 years at 8% per annum and got a simple interest of Rs.2000. She then kept aside the interest and invested the same amount at a compound interest of 12% per annum for another 4 years. If the compound interest is to be calculated annually, Find the amount she receives at the end of the second deal.

b) Find all the minors related to the matrix $B=\begin{bmatrix} 2 & 4 & 3 \\ 3 & 6 & 0 \\ -1 & -5 & -2 \end{bmatrix}$.

c) Ramesh is repaying his debts in 8 monthly instalments which form a Geometric Progression. If his third instalment is Rs.100 and the sixth instalment is Rs. 12,500, Find his first instalment and the total amount repaid by him in the entire period of 8 months.

d) Sumit invested Rs. 4000 at 15% per annum for 6 years to be compounded annually. What is the amount received by him on maturity?

e) In how many ways can a football team of 11 players be selected from 16 players if it

i) includes 2 particular players?
ii) excludes 2 particular players?

OR

QIV **Answer the following questions.** **5X4=20**

i) What is better, a simple interest of 25% for 3 years or a compound interest of 16% compound half yearly for 2 years?

ii) If $D = \begin{bmatrix} 2 & -6 \\ 4 & 5 \end{bmatrix}$, Find $D^2 + 3A$.

iii) If the nth term of a G.P is $T_n = 2^n$, Find the first term, common ratio and the 8^{th} term.

iv) Prajakta invested Rs.10,000 in a fixed deposit scheme maturing to Rs. 20000 in 6 years and 9 months. Calculate the rate of interest if the compound interest was compounded quarterly. ($\sqrt[27]{2}$ =1.026)

v) A group consists of 4 girls and 7 boys. In how many ways can a team of 5 members be selected if the team has
   i) No girls
   ii) At least 3 girls.