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Shree Damodar College of Commerce & Economics, Margao-Goa  
FY B.Com, Semester-I, Supplementary Examination June 2023  
Commercial Arithmetic -I(CC 4)

Duration: 2hrs

Max Marks: 80

Instructions:

- 1) Start each question on fresh page.
- 2) Figures to the right indicate maximum marks.
- 3) Non programmable calculator is allowed.

Q 1) Attempt the following questions.

5X4=20

- a) Let  $A = \{1, 2, 3, \dots, 10\}$ ,  $B = \{1, 2, 4, 5, 6, 8\}$   
Find  $A \cup B$ ,  $A \cap B$  and Verify  $A-B \neq B-A$
- b) A three digit number is to be formed using the digits from 0 to 9 .How many such numbers can be formed
  - i) if the repetition of digits is not allowed.
  - ii) if the repetition of digits is allowed.
- c) For a A.P ,  $T_5 = 35$  and  $T_9 = 59$  Find the  $n$ th term and  $T_{15}$  ?
- d) Evaluate the following  $\begin{vmatrix} 1 & 3 & 1 \\ 2 & 5 & 4 \\ 6 & 1 & 5 \end{vmatrix}$
- e) Find the point of intersection for the following pair of lines using Cramers rule .  
 $4a + b = -16$   
 $7a - 3b = -47$

OR

Q 1) Attempt the following questions.

5X4=20

- i) Show that the following set of equations are consistent .  
 $3x + 4y = 11$   
 $2x - y = 0$   
 $5x - 2y = 1$
- ii) Construct the truth tables for the following statement .  
 $[p \wedge (p \rightarrow q)] \rightarrow q$

- iii) A survey was conducted in a city to study the preference of three brands of soaps Pears, Lux and Rexona. The total number of persons interviewed were 200, 92 people use Pear, 86 use lux and 83 use Rexona, 25 of them use pears and lux, 27 used pears and rexona, 26 used lux and rexona and 9 used all three.

Draw a venn diagram and find the number of people using

- a) pears only                      b) lux only

- iv) Calculate the compound interest on Rs 1000 at 4% p.a compounded for 3 years .  
Find the amount also.

- v) How many seating arrangements can be made for 6 students on  
a) 3 chairs                      b) 6 chairs ?

**Q 2) Attempt the following questions.**

**5X4=20**

- a) From a group of 4 mathematicians and 6 statisticians, a committee of 3 members is to be formed. In how many ways this can be done if the committee contains  
i) atleast 2 mathematicians  
ii) atmost one mathematicians
- b) Find the sum of all natural number from 100 to 300 which are exactly divisible by 5?
- c) Shanta invested Rs 100 in the first month and then triple her investment every month for 11 months. Find her last investment and the total investment over 11 months?
- d) Test the validity of the following argument  
Rita is either fat or unhappy. Rita is not fat therefore She is not unhappy .

e) If  $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix}$   $B = \begin{bmatrix} 7 & 1 \\ 1 & 4 \\ 2 & -1 \end{bmatrix}$  Find matrix AB and BA ?

**OR**

**Q II) Attempt the following questions.**

**5X4=20**

i) If  $P = \begin{bmatrix} 2 & 4 & 6 \\ -4 & 8 & -4 \end{bmatrix}$   $Q = \begin{bmatrix} 5 & 10 & 15 \\ -10 & 20 & -10 \end{bmatrix}$   
Find matrix a)  $5P - 2Q$                       b)  $3P + 5Q$

- ii) In what time will the interest on the sum of money be  $\frac{4}{5}$  the of the amount at 10% simple interest?

iii) Find the value of a)  ${}^6P_4$                       b)  $7! - 3!$

- iv) If  $A = \{ \text{set of letters of the word ARITHMETIC} \}$   
 $B = \{ \text{set of letters of the word MATHEMATICS} \}$   
Verify a)  $A \cup B = (A - B) \cup B$                       b)  $A - (A - B) = A \cap B$

- v) For an A.P 2,5,8,11..... Find  $T_8$  and  $S_6$

**Q 3) Attempt the following questions.**

**5X4=20**

- Find the present value of Rs 35730.48 to be paid 3 years from now with the rate of compounding at 6% per year.
- Find the sum of the term of the following A.P  $3+8+13+18+....$  upto 11 terms.
- 7 cards are selected from a pack of 52 cards .How many selections
  - will have exactly 3 diamonds and 4 hearts
  - will contain atleast one spade.
- Classify as tautology ,contradiction of fallacy for the following statement  
 $(a \rightarrow b) \leftrightarrow (\sim a \vee b)$
- Find the minor and cofactor for  $\begin{vmatrix} 4 & 5 \\ 3 & -2 \end{vmatrix}$

**OR**

**Q III) Attempt the following questions.**

**5X4=20**

- Define the following with an example
  - Diagonal matrix
  - Column matrix
- Find the compound interest on Rs 1200 at 8% annually for 2 years if the interest is calculated quarterly .?
- A smart phone costing Rs 6000 bought on monthly installments. If the first installment is Rs 500 and each subsequent installment increases by 200 .Find out when will be the entire amount of the smart phone be paid up ?
- In a group of 150 people of a certain housing society , the number of people reading newspaper Navhind Times, Herald and Gomantak Times are 50,40 and 47 respectively. 15 read both Navhind Times and Herald, 14 read both Herald and Gomantak Times, 13 read both Navhind Times and Gomantak Times and 05 read all three newspaper. Find the number of people not reading any newspaper, using venn digram.
- Find the number of distinct permutations of the letters of the following words
  - COMMITTEE
  - PROGRAMMER.

**Q 4) Attempt the following questions.****5X4=20**

- a) Find the value of  
 i)  ${}^{10}P_3$                       ii)  ${}^8C_4$
- b) Find the Principal and amount to earn Rs 150 simple interest in 6 years at the rate of 5% p.a.?
- c) Find the amount for the ordinary annuity with periodic payment as Rs 2000 at the rate of interest 12% p.a. for 2 years compounded quarterly .
- d) Using appropriate symbols, translate the following into symbolic form.  
 i) If Ashok is not drunk then he cannot meet with an accident.  
 ii) It is not true that Sona is not fat and not unhappy.
- e) Find the value of n if  $4+7+10+\dots$  upto n terms is 175.

**OR****Q IV) Attempt the following questions.****5X4=20**

- i) For a G.P. , third term is 36 and sixth term is 972. Find  $T_8$
- ii) Find the compound interest on Rs 16000 at the rate of 10% p.a. for 2 years if the interest is calculated half yearly ?
- iii) If  $A = \begin{bmatrix} 1 & 3 \\ 2 & 4 \end{bmatrix}$  Find matrix B such that  $A^2 + 2A + B = 0$ .
- iv) An organization has 7 men and 5 women ,if committee of 4 members out of these are to be selected find the total number of ways for  
 a) There is no restriction on gender  
 b) 3 men and a woman is to be selected.
- v) If  $X = \{ a, b, c, d, e, f, g, h \}$  is the universal set ,  $A = \{ a, b, c \}$  ,  $B = \{ d, e, f, g \}$   $C = \{ a, c, e, g \}$   
 Verify that      a)  $(A \cap C)^c = A^c \cup C^c$   
                          b)  $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$