Special

FYBCOM Semester End Assessment (Regular/Repeat)

June 2023

Course Title: COMMERCIAL ARITHMETIC - I

Course Code: UCAC101   **Category: Core Course**   **Semester: I**

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

Instructions:

1. The question paper contains 4 questions spread across 3 pages.
2. All questions are compulsory however internal choice is available.
3. You may answer randomly but every main question attempted should be answered serially.
4. Figures to the right in brackets indicate maximum marks.
5. Use of calculator is strictly forbidden..

Q1. Attempt the following.   **(4 x 5 =20)**

a. Construct a truth table for the statement "$[p \vee (\sim q)] \wedge (\sim p)$".

b. If $X = \{1, 2, 3, \ldots, 10\}$ is the universal set such that $A = \{1, 2, 3, 5, 6, 9\}$, $B = \{1, 2, 3, 5, 7, 8\}$ and $C = \{2, 3, 4, 5, 7, 9\}$ are its subsets, then verify the following: (i) $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$ (ii) $B^C \cap A = A - B$

c. Find the value of n, if $5(^{n}P_4) = 3(^{n+1}P_4)$

d. If 8th term of an A. P is 15 and its 11th term is 21, then find its first term, common difference and n^{th} term.

OR

QI. Attempt the following.   **(4 x 5 =20)**

p. Check whether the following statement is tautology, contradiction or contingency.
$$[(\sim p) \wedge (\sim q)] \vee (p \leftrightarrow q)$$

q. If $X = \{1, 2, \ldots, 12\}$ is the universal set such that $P = \{1, 2, 3, 5, 6, 9\}$, $Q = \{1, 2, 3, 5, 7, 8, 12\}$, $R = \{2, 4, 6, 8, 10, 12\}$ are its subsets then verify that
(i) $P \cap (Q \cup R) = (P \cap Q) \cup (P \cap R)$ (ii) $(P \cup Q)^C = P^C \cap Q^C$

r. Find the total number of arrangements for the letters of the word "**CHAMPIONS**" such that vowels are at end points.

s. Find T_n and S_n of the Geometric Progression 5, 15, 45, , ….. And hence find T_7 & S_6.

Q2. Attempt the following.   **(4 x 5 =20)**

a. Calculate the Simple Interest on ₹5000 at the rate of interest 6.5% p.a for 4 years.

b. Find the values of a, b and c if $3\begin{bmatrix} 3 & -2 \\ a & b \\ 3 & c \end{bmatrix} + \begin{bmatrix} 1 & 0 \\ -1 & 4 \\ -7 & -2 \end{bmatrix} = \begin{bmatrix} 10 & -6 \\ -7 & 1 \\ 2 & -3 \end{bmatrix}$

c. Are the statements "$(p \vee \sim q) \wedge (\sim p \vee q)$" & "$(p \wedge q) \vee [\sim (p \vee q)]$" equivalent? Justify.

d. In a class of 120 students with 80 boys, 35 boys failed in Commercial Arithmetics, Find the number of girls failed in Commercial Arithmetics if total number of students who passed in Commercial Arithmetics is 70.

OR

QII. Attempt the following. (4 x 5 =20)

p. If ₹2000 amounts to ₹2500 at S.I. in 4 years, find the rate of interest. Also find, if a sum of ₹6000 is kept at the same rate of interest, what will be the amount received.

q. Using Cramer's rule solve the system of equations $\begin{array}{l} 2x - 3y = 1 \\ 3x + 2y = 8 \end{array}$

r. Test the validity of the following argument

The poem is readable if and only if the print is clear
The print is not clear
Therefore the poem is not readable

s. In a class of 50 students of Banking and accounting, 23 students have taken Banking. Out of these, 15 have taken Banking but not Accounting. Using Venn diagram, find the number of students who have taken Banking and Accounting both, and those who have taken Accounting but not Banking.

Q3. Attempt the following. (4 x 5 =20)

a. In how many ways a 5 digit number can be formed using the digits 1, 2, 3, 4, 5, 6 such that (i) digits are repeated (ii) digits are not repeated.

b. The sum of first n terms of a G. P is 510 with its first term as 2 and common ratio equal to 2. Find the number of terms and n^{th} term of a G. P.

c. A loan of ₹90,000 is to be returned in 3 monthly instalments at the rate of 12% per annum. Find the EMI (Equated Monthly Instalment).

d. Find matrix X if $2A + X - 3B = C$, where:

$$A = \begin{bmatrix} 1 & -2 & 3 \\ -1 & 2 & 4 \end{bmatrix}, B = \begin{bmatrix} -2 & 3 & 2 \\ 1 & 4 & -6 \end{bmatrix}, C = \begin{bmatrix} 4 & 3 & 1 \\ -1 & 2 & -3 \end{bmatrix}$$

OR

QIII. Attempt the following. (4 x 5 =20)

p. There are 6 students and 3 lecturers in a class, of which 4 members are to be selected. In how many ways this can be done if:
   a) There is no restriction on selection
   b) At least 2 lecturers are to be selected

q. A newly married wife was given ₹ 2000 after completion of 1st month of their marriage by her husband and promised that he will increase the amount by ₹ 400 for every successive month. Find the total money she will be having on the day of their 1st marriage anniversary. Also calculate the amount she got on the day of her marriage anniversary.

r. Ramesh borrows ₹1000 from Suresh at compound interest of 12% per annum, to be compounded on quarterly basis. What amount is due to him after 6 months? Also state his interest.

s. Find $\begin{vmatrix} 5 & -2 & 3 \\ 4 & 0 & 1 \\ 2 & -3 & 0 \end{vmatrix}$.

Q4. Attempt the following.

(4 x 5 =20)

a. Out of 4 SP's and 5 DSP's, a committee of 4 is to be formed such that it contains
   (i) not less than 2 DSP's   (ii) exactly 3 SP's.
b. Find the sum $14 + 10 + 6 + 2+$ .... Upto 20 terms.
c. Which scheme is beneficial to public, a simple interest at 9% p.a for 9 years or a compound interest at 8% p.a for 8 years to be compounded quarterly?
   [Given that $(1.02)^{32} = 1.884$]
d. Simran bought a car for ₹15 lacs on 1st January 2011. If rate of depreciation of a car is 20%, find its value on 1st January 2015. Aslo calculate its scrap value if estimated life of car is 20 years. [Given that $(0.8)^{20} = 0.012$].

OR

QIV. Attempt the following.

(4 x 5 =20)

p. From a pack of cards, two cards are to be selected at random. Find the number of selections in each of the following cases.
   i.   Exactly one card is an Ace
   ii. One Spade card and one Heart card

q. Find the sum $9 + 99 + 999 +$ .... Upto n terms.

r. In how many years, the amount of money will be double the principal at simple interest of 15% per annum?

s. Find the maturity value of an ordinary annuity towards the investment of ₹10000 per year at 6% rate of interest to be compounded yearly for 5 years. Also calculate the capital invested. [Given that $(1.06)^5 = 1.36$]

*************************All The Best*************************