VPCCECM

FYBCOM Semester End Assessment (Regular/Repeat)

November 2022

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 "$[p \wedge (p \rightarrow \sim q)] \vee (\sim p \wedge q)$".

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

c. Find the value of n, if $5({}^nP_4) = 3({}^{n+1}P_4)$.

d. If 4th term of an A. P is 23 and its 11th term is 65, then find its first term, common difference and nth term.

OR

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

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

q. If X = {1, 2, ….., 12} is the universal set such that P = {1, 3, 4, 7, 10, 11}, Q = {1, 2, 5, 7, 8, 9, 12}, R = {2, 4, 6, 8, 10, 12} are its subsets then verify that
(i) $P \cup (Q \cap R) = (P \cup Q) \cap (P \cup R)$ (ii) $(P \cap Q)^C = P^C \cup Q^C$

r. In how many ways the letters of the word "CENTRAL" can be arranged so that in begins with a consonant and end with vowel?

s. Find T_n and S_n of the Geometric Progression 2, 6, 18, 54, ….. And hence find T_6 & S_6.

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

a. Calculate the Simple Interest on ₹2022 at the rate of interest 4% p.a for 3 years.

b. Find the values of *a*, *b* and *c* if $2\begin{bmatrix} 4 & 2 \\ a & b \\ -3 & c \end{bmatrix} + 3\begin{bmatrix} -1 & 0 \\ 1 & -3 \\ 3 & 2 \end{bmatrix} = \begin{bmatrix} 5 & 4 \\ -7 & 1 \\ 3 & -3 \end{bmatrix}$

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

d. In a consumer-preference survey of an item, fifty were found to use Brand A, thirty were found to use Brand B, eight were found to be in habit of using both brands A and B. Find the number of consumers using at least one of the two brands.

OR

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

p. If ₹2000 amounts to ₹2700 at S.I. in 5 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 $2x + 3y = 5$, $3x - 2y = -12$

r. Test the validity of the following argument

If it rains, there is a traffic jam
There was no traffic jam
Therefore it didn't rain

s. A survey was conducted of the television programmes watched by 100 college students. It was found that 60 students watched 'Sports Channel' and 50 watched 'Sports Channel'. Whereas 20 watched both the programmes. Find the number of students who did not watched television that day.

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

a. In how many ways a 4 digit number can be formed using the digits 0, 1, 2, 3, 4, 5 such that (i) digits are repeated (ii) digits are not repeated.

b. The sum of first n terms of a G. P is 315 with its first term as 5 and common ratio equal to 2. Find the number of terms and n^{th} term of a G. P.

c. A person borrowed ₹5000 from bank at 6% p.a for 2 years. Find the interest he has to pay if it is compounded annually.

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

$$A = \begin{bmatrix} -1 & 2 & 5 \\ 1 & 0 & -4 \end{bmatrix}, B = \begin{bmatrix} 2 & 3 & 12 \\ 10 & -4 & -2 \end{bmatrix}, C = \begin{bmatrix} 5 & -3 & -1 \\ 1 & -2 & 3 \end{bmatrix}$$

OR

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

p. There are 7 managers in a company, of which Mr. X is disliked by majority. Of these, 5 persons are to be promoted. In how many ways this can be done if:

a) The promotion has to be done randomly.
b) Mr. X is not to be selected for promotion

q. A newly married wife was given ₹ 500 after completion of 1^{st} month of their marriage by her husband and promised that he will increase the amount by ₹ 250 for every successive month. Find the total money she will be having on the day of their 1^{st} marriage anniversary. Also calculate the amount she got on the day of her marriage anniversary.

r. ABC borrows ₹2000 from XYZ at compound interest of 10% per annum, to be compounded on quarterly basis. What amount is due to him after 6 months? Also state his interest.

s. Find $\begin{vmatrix} 5 & 2 & 3 \\ 7 & 3 & -1 \\ -2 & -3 & 0 \end{vmatrix}$.

Q4. Attempt the following. **(4 x 5 =20)**

a. Out of 6 Professors and 5 students, a committee of 4 is to be formed such that it contains (i) not less than 2 students (ii) exactly 3 Professors.

b. Find the sum $1 + 5 + 9 + \ldots\ldots + 37$.

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. Suresh invested certain amount in a bank for 2 years at 7% p.a and got a simple interest of ₹280. He kept aside the interest and invested the same amount for 3 years at 8% p.a rate of interest to be compounded half yearly. Find the final amount he received and also the compound interest. [Given that $(1.04)^6 = 1.265$].

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 a king
   ii. One red card and one black card

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

r. In how many years, the amount of money will be double the principal at simple interest of 12% per annum?

s. Find the amount for the ordinary annuity with periodic payment as ₹2000, at the rate of interest 12 % p.a. for 2 years, if the period of payment is half-yearly.
[Given that: $(1.06)^4 = 1.26$]

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