

PRABODHAN EDUCATION SOCIETY'S
VIDYA PRABODHINI COLLEGE OF COMMERCE, EDUCATION,
COMPUTER AND MANAGEMENT, VIDYANAGAR, PARVARI, GOA.

F.Y.B.COM SEMESTER END EXAMINATION

OCT-NOV

2018-19 (REGULAR / REPEAT)

Sub: Commercial Arithmetics - I (As Per CBCS)

Semester: I

M. Marks: 80

M. Time: 2 hrs.

INSTRUCTIONS: 1. All questions are compulsory however internal choice is available.

2. Use of calculator is strictly forbidden.

3. Figures to the right indicate marks allotted.

4. There are 4 main questions each carrying 20 marks.

5. You may answer randomly but every main question attempted should be answered serially.

Q1. Attempt the following.

(4 x 5 = 20)

a) Is the statement " $(p \rightarrow \sim q) \rightarrow (q \wedge p)$ " a tautology? Justify your answer.

b) If ${}^n P_3 = 2({}^{n+1} P_2)$, then find n.

c) If the 4th term of an A.P is 23 and its 11th term is 65, find its first term and nth term.

d) Find matrix A, if $3A + 4B - C = 0$, where $B = \begin{bmatrix} 2 & 0 & 3 & 2 \\ -1 & 4 & -3 & 0 \\ 3 & 7 & 1 & 0 \end{bmatrix}$, $C = \begin{bmatrix} 0 & 3 & 2 & 1 \\ 1 & -4 & 3 & 3 \\ 4 & 5 & 11 & -4 \end{bmatrix}$

OR

Q1. Attempt the following.

(4 x 5 = 20)

p) Check whether the statements " $(\sim p \vee q) \rightarrow q$ " and " $(p \wedge q) \leftrightarrow (\sim q \vee p)$ " are equivalent or not.

q) Ten samples of food items, of which four are adulterated, are produced for inspection. If the inspector is supposed to pick up any three samples for inspection, find how many selections will have (i) no adulterated samples (ii) at most one adulterated sample.

r) Find nth term of the A.P. 4, 7, 10, 13, Also find S_6 .

s) For what matrix X, the following equation is true: $2X - 3 \begin{bmatrix} 2 & 4 & 6 \\ -3 & 3 & 1 \end{bmatrix} + \begin{bmatrix} 0 & 3 & -3 \\ 3 & -2 & 4 \end{bmatrix} = 0$.

Q2. Attempt the following.

(4 x 5 = 20)

a) A class of 30 students plays either PUBG or Ludo. 18 students play PUBG, And out of these 18, 10 plays PUBG but not Ludo. Find the number of students who play only Ludo. Also find the students who play both the games.

b) A committee of 5 members for 'Sarvajanik Ganesh-Utsav' is to be formed from 4 teenagers and 5 veterans. In how many ways this can be done such that teenagers are in majority?

c) How much amount we will receive after 3 years when we invest ₹3000 at 5% p.a which is compounded annually?

d) A person, who borrowed ₹6500 without interest, repaid ₹40 in the first month and increased his installment of repayment by ₹30 per month. How long will it take him to repay the entire loan amount? Also state his last installment.

OR

QII. Attempt the following.

(4 x 5 = 20)

- p) Let $A = \{1, 4, 6, 7, 9, 10\}$, $B = \{2, 3, 5, 8, 9\}$, and $C = \{1, 4, 6, 8, 9\}$ be subsets of universal set $X = \{1, 2, 3, \dots, 10\}$. Verify that (i) $(A \cup B)^C = A^C \cap B^C$ (ii) $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$
- q) Find n , if ${}^{2n}P_3 = 6({}^{n+1}P_3)$.
- r) A person borrowed ₹6000 from a money-lender at 20% p.a to be compounded quarterly. Find the amount and compound interest due to him at the end of 3 years. (Given: $(1.05)^{12} = 1.80$)
- s) A machinery costing 5 lakhs has an estimated life of 15 years. Find its value after 2 years and also its scrap value if the depreciation per year is 10%. (Given: $(0.9)^{15} = 0.21$).

Q3. Attempt the following.

(4 x 5 = 20)

- a) Draw truth table for the following statement: $[(p \rightarrow q) \leftrightarrow \sim p] \wedge (\sim q)$.
- b) If $A = \{1, 3, 4, 5\}$, $B = \{2, 4, 6, 8\}$, $C = \{1, 4, 6, 7, 9\}$ are subsets of universal set $X = \{1, 2, 3, \dots, 10\}$, then verify that (i) $C - B = B^C \cap C$ (ii) $(A \cap B)^C = A^C \cup B^C$
- c) What is better, a simple interest of 13% for 5 years or a compound interest of 12% calculated monthly for 4 years? (Take $P = 100$) (Given that $(1.01)^{48} = 1.61$)
- d) Find the sum $8 + 88 + 888 + \dots$ upto n terms.

OR

QIII. Attempt the following.

(4 x 5 = 20)

- p) State whether the statement " $(p \leftrightarrow \sim q) \wedge (p \vee q)$ " is tautology or not.
- q) Let $X = \{1, 2, 3, \dots, 10\}$ be a universal set. If $A = \{1, 2, 5, 7\}$, $B = \{2, 4, 5, 6, 8\}$ and $C = \{3, 7, 10\}$ then verify that (i) $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$ (ii) $B \cap C = (B^C \cup C^C)^C$
- r) What investment will become ₹73000 in 4 years, if the rate of interest is 10% compounded yearly? (Given $(1.1)^4 = 1.46$).
- s) Find the sum $9 + 99 + 999 + \dots$ upto n terms.

Q4. Attempt the following.

(4 x 5 = 20)

- a) How many different numbers can be formed using all the digits of the following number
(i) 182863 (ii) 5182377

b) A bank offers fixed deposits for 5 years under the following schemes:

- (i) at 14%, if the interest to be calculated half yearly
- (ii) at 12%, if the interest to be calculated quarterly

State which scheme is more beneficial to the public. ($P = 100$) (Given: $(1.07)^{10} = 1.97$, $(1.03)^{20} = 1.81$)

c) Solve the system of equations using Cramer's rule

$$8x - 5y = 1$$

$$6x + 4y = 24$$

d) Find the amount for the ordinary annuity with the periodic payment as ₹1000, at the rate of interest 10% p.a, for 2 years, such that period of payments is half-yearly. Also state the capital invested. (Given: $(1.05)^4 = 1.22$).

OR

QIV. Attempt the following.

(4 x 5 = 20)

p) Find the value of ${}^6C_3 + {}^6P_2 - {}^6C_4 - {}^6P_3$.

q) In how years the amount received will be three times the principle, if kept at 20% on simple interest.

r) Find the amount for the ordinary annuity with the periodic payment as ₹2000, at the rate of interest 12% p.a, for 1 years, such that period of payments is quarterly. Also state the capital invested. (Given : $(1.03)^4 = 1.13$).

s) Find
$$\begin{vmatrix} 2 & 3 & -3 \\ 5 & 2 & 2 \\ -2 & 4 & 5 \end{vmatrix}$$
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