Roll No. _____

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Shree Damodar College of Commerce & Economics, Margao-Goa
FYB.Com, Semester- I, Semester End Examination,October 2019
Commercial Arithmetics-I(CC-4)

Duration: 2 hours

Maximum Marks: 80

INSTRUCTIONS:

1. Start each question on fresh page.

2. All questions are compulsory (internal choice is provided).

3. Figures to the right indicate maximum marks.

4. Non Programmable Calculator is permitted.

Q.1 Attempt the following: [5X4=20marks]

(a) Test the validity of the following arguments:
   If he work hard, he will be successful. He was not successful. Therefore, he did not work hard.

(b) What Principal amounts to ₹4500 in five years at 5% p.a. to be compounded half-yearly.

(c) How many permutations can be be made out of the letter of the word 'ARRANGE'? In how many of them vowels occur together?

(d) Find the three numbers in AP such that their sum is 27 and third number is two times the first number.

(e) Solve the following system of equations using Cramer's rule:
   $x + 5y = 6$, $2x + y = -2$.

OR

Q. I Attempt the following: [5X4=20marks]

(v) Construct the truth table for the following statement:
   $(p \vee q) \iff q$.

(w) In how many years, the amount of money will be double the Principal at simple interest of 10% per annum?

(x) If $P(n,r) = 504$ and $C(n,r) = 84$, find n and r.

(y) Find the sum of first 50 terms of the series $2, 12, 22, 32, 42, \ldots$.

(z) Find $|A|$ if $A = \begin{bmatrix} 6 & -10 & 2 \\ 2 & -3 & -2 \\ 1 & 1 & 3 \end{bmatrix}$

Q.2 Attempt the following: [5X4=20marks]

(a) Find the effective interest rate (correct to 3 decimal places) of 12% p.a. compounded half-yearly.

(b) If $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$ and $A = \{2, 4, 6\}$, $B = \{1, 2, 3, 4\}$.
Find $(i)(A \cup B)^c$, $(ii)A \cap B$.

(c) For a G.P. $3, 6, 12, 24 \ldots$ find S_8.

(d) Find B if $A = \begin{bmatrix} 1 & 1 \\ 4 & 2 \end{bmatrix}$ and $A + B = A^2$

(e) In how many ways a committee of 5 members can be selected from 6 men and 4 women, consisting of 2 men and 3 women?

OR

Q. II Attempt the following: [5X4=20marks]

(v) A loan of ₹80,000 is to be returned in 4 monthly installments at the rate of 12% p.a. Find the EMI using the flat rate interest method?

(w) If $U = \{x | x \in \mathbf{N}, x$ is odd such that $10 < x < 25\}$ be the universal set, $A = \{13, 19, 21, 23\}$, $B = \{x | (x - 11)(x - 15)(x - 17)(x - 19) = 0\}$. Verify that
$(i)(A - B)^c = A^c \cup B$, $(ii)(A \cap B)^c = A^c \cup B^c$.

(x) Mohan invests ₹50 in the first month and then doubles, his investment every month for 10 months. Find his last investment and the total investment over 10 months.

(y) Solve the matrix equation for X such that $A - 2B = X$. Given
$A = \begin{bmatrix} -2 & 0 \\ 1 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 5 \\ -7 & 2 \end{bmatrix}$.

(z) If $C(n, 8) = C(n, 2)$, find $C(n, 6)$.

Q.3 Attempt the following: [5X4=20marks]

(a) A housing society having 12 members wants to collect a sinking fund of ₹1,66,680 for repairs within a period of 3 years. If the rate of interst is 15% p.a. to be componded yearly, how much yearly payment each member has to make towards the fund, so as to meet the requirements.

(b) In a survey of 120 students, the numbers studying various languages were found to be : Spanish 30, German 20, French 50, Spanish and French 10, Spanish and German 8, German and French 10, all the three languages 5. How many students had French as their only language?

(c) Prove that the following pairs of statements are equivalent:
$\sim p \implies (p \implies q)$; $p \implies (q \implies p)$

(d) In how many ways can 8 students stand in a row such that 2 particular students are (i) always together (ii) never together.

(e) Yasmeen saves ₹32 during the first month, ₹36 in the second month and ₹40 in the third month. If she continues to save in this manner, in how many months will she saves ₹2000?

OR

Q. III Attempt the following: [5X4=20marks]

(v) Pankaj has taken a loan of ₹50,000 which is to be repaid over 2 years in EMI, with 12% p.a. Calculate the EMI using reducing balance method.

(w) If U is the universal set and A and B are subsets of U such that $n(U) = 100$ $n(A^c) = 80$, $n(B^c) = 75$, $n[(A \cap B)^c] = 72$, find $n(A \cup B)$.

(x) Check whether following statement is tautology or not
$\sim (p \iff q) \iff [(p \wedge (\sim q)) \vee (q \wedge (\sim p))]$.

(y) In how many ways can a committee of 5 be chosen from 8 candidates so as to include both the youngest and oldest.

(z) Find three numbers in G.P. such that their product is 729 and sum of the squares of first and second is 90.

Q.4 Attempt the following: [5X4=20marks]

(a) The difference between simple and compound interest on a sum of money put out for 3 years at 5% pa is ₹2000. Find the sum.

(b) A Co-operative Society has 10 dozen books on Accountancy, 8 dozen books on Marketing and 5 dozen books on Mathematics. Selling price of each book is ₹75, ₹80 and ₹100 respectively. How much amount will be received from selling all the books? Solve the problem by method of matrix.

(c) Sum of three numbers in A.P. is 45 and sum of squares of its first and third term is 500. Find the numbers.

(d) Find the present value of an annuity of ₹5000, paid at the end of each year for 3 years, at 12% pa compounded half yearly.

(e) There are 8 questions in part A and 5 in part B of a question paper. In how many ways can a student answer 5 questions if he has to choose atleast 2 from each part?

OR

Q. IV Attempt the following: [5X4=20marks]

(v) In what time would a sum of money double itself at simple interest of 5% pa?

(w) If $A = \begin{bmatrix} -2 & 0 & 1 \\ 1 & 2 & 3 \end{bmatrix}$ $B = \begin{bmatrix} 0 & 1 \\ 2 & 3 \\ 1 & -1 \end{bmatrix}$. Find AB.

(x) The third term of a G.P. is 12 and the sixth term is 96. Find the first term and the common ratio of the progression.

(y) Amit lend his friend ₹10,000 at a token interest of 2% per annum, to be compounded half-yearly. Calculate the amount due to him at the end of 4 years.

(z) In how many ways can 7 girls be arranged in a row such that two of them Kavita and Komal should be on either end.

End of exam