Shree Damodar College of Commerce & Economics

FYBCOM, Semester I, Semester End Examination-October, 2018
Commercial Arithmetic-I

Time: 2 hours

Maximum Marks: 80

INSTRUCTIONS:

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

2. Figures to the right indicate full marks.

3. Non Programmable Calculator are allowed.

Q.1 Attempt the following: [5X4]

(a) Check whether the statement is tautology : $(p \wedge q) \wedge \sim p$.

(b) What is the present value of an investment of ₹2000 due in 6 years if money is worth 5% compounded semi-annually.

(c) In how many ways can be letters of the word STATISTICS be arranged?

(d) Determine the A.P whose fifth term is 19 and the difference of the eighth term from the thirteenth term is 20.

(e) If $A = \begin{bmatrix} 5 & 2 & 3 \\ 3 & 4 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 6 & 1 \\ 0 & 4 & 2 \end{bmatrix}$, find $3A - 2B$.

OR

Q. I Attempt the following: [5X4]

(v) Construct the truth table for $\sim (\sim p \wedge \sim q)$.

(w) If ₹2000 amounts to ₹2700 at simple interest 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 after 8 years?

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

(y) The third term of a geometric progression is 12 and the sixth term is 96. Find the first term and the common ratio of the progression

(z) Find x and y if $\begin{bmatrix} x+3 & 1 \\ -3 & 3y-4 \end{bmatrix} = \begin{bmatrix} y & 1 \\ -3 & 2x \end{bmatrix}$.

Q.2 Attempt the following: [5X4]

(a) Ajit deposited ₹15000 at the end of each year for 15 years in a bank. The bank pays interest at 9% pa compounded annually, what would be the sum to his credit at the end of that period.

(b) Find the power set of $\{1,2,3\}$.

(c) The sum of three numbers in a GP is 26 and their product is 216. Find the numbers.

(d) Find k if the following set of equations are consistent.
$x + y = 3$; $5x + 6y = 17$; $2x - 3y = k$.

(e) If $^nP_r = 504$ $^nC_r = 84$, find n and r.

OR

Q. II Attempt the following: [5X4]

(v) A person has taken a loan of ₹80,000 to be returned in 5 monthly instalments at the rate of 12% pa compounded monthly. Find the EMI using the reducing balance method.

(w) If U={1,2,3,4,5,6} be the universal set, $A \cup B = \{2, 3, 4, 5, 6\}$. Find $A' \cap B'$. Also if $A - B = \{2, 3\}$, find B.

(x) 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 save ₹2000?

(y) If $A = \begin{bmatrix} 1 & 2 \\ a & b \end{bmatrix}$ and $A^2 = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, find the value of a and b.

(z) If $^{25}C_r = {}^{25}C_{2r+1}$, find $^rC_5$.

Q.3 Attempt the following: [5X4]

(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 interest is 15% pa to be compounded yearly, how much yearly payment each member has to make towards the fund , so as to meet the requirements.

(b) In a class of 30 students of English and French. 15 students have taken English, 10 students have taken English but not French. Find the number of students who have taken (i) French (ii) French but not English.

(c) 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.

(d) 5 boys and 4 girls are to be seated in a row such that the girls occupy the even places. How many such arrangements are possible.

(e) Find the sum of the first 100 numbers of the series: $1, 11, 21, 31 \ldots$.

OR

Q. III Attempt the following: [5X4]

(v) Sudhir gave ₹5000 to his friend with the understanding that, he would be paid back ₹10,000 at the end of 7 years. Find the rate of compound interest to be calculated on half-yearly basis. ($\sqrt[14]{2} = 1.05$)

(w) If A= letter of the word " ARITHMETIC"; B= letter of the word "MATHEMATICS". verify (i) $A \cup B = (A - B) \cup B$.

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

(y) A man has 6 friends. In how many ways can he invite one or more of them at dinner?

(z) The population of a town increases at the rate of 10% annually. Its present population is 2,00,000. What will be its population at the end of 5 years.

Q.4 Attempt the following: [5X4]

(a) What principal will yield ₹500 as simple interest at 16% pa in (i) 1 year (ii) 5 years.

(b) Find $|A|$, if $A = \begin{bmatrix} 2 & 5 & 1 \\ -3 & 4 & 2 \\ 1 & 2 & -1 \end{bmatrix}$.

(c) Find the number of terms in the geometric progression $6, 12, 24, \ldots, 1536$.

(d) Find the present value of an annuity of ₹2000, paid at the end of each year for 4 years, at 11% pa compounded half yearly.

(e) How many even number greater than 300 can be formed with the digits 1,2,3,4 and 5, when no repetitions being allowed?

OR

Q. IV Attempt the following: [5X4]

(v) What sum will become ₹73,205 in 4 years, if the rate of interest is 10 % compounded yearly.

(w) Find the inverse of the matrix $A = \begin{bmatrix} 2 & 5 \\ 6 & 2 \end{bmatrix}$.

(x) Find three numbers in A.P. whose sum is 15 and the product is 45.

(y) Find the effective rate of interest when the interest is compounded at 10% pa payable quarterly.

(z) In an examination paper on Mathematics 11 questions are set. In how many different ways can you choose 6 questions to answer? If however, question number 1 is made compulsory, in how many ways can you select to answer 6 questions in all.