GOVERNMENT COLLEGE OF COMMERCE AND ECONOMICS

BORDA – MARGAO, GOA

B. Com (Sem – I) SEMESTER END EXAMINATION , OCTOBER 2019

CC 4 COMMERCIAL ARITHMETIC - 1

Duration : 02 hours. Max.Marks:80

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

3) Use of calculator is allowed.

1. Attempt the following :

a) Write down the truth table for the following compound statement **(5 x 4=20)**
$(\sim p \wedge \sim q) \leftrightarrow (\sim q \wedge p)$

b) In what time will the interest on the sum of money be $\frac{4}{5}th$ of the amount at 10% simple interest ?

c) In how many ways can 4 books of Mathematics, 5 books of Statistics and 2 books of Economics be arranged on a shelf so that
(i) The books of Mathematics, Statistics and Economics are always together respectively.
(ii) The books of Mathematics are never together.

d) For an A.P., if the fifth term is 35 and the ninth term is 59, find the nth term of the A.P.

e) Evaluate the following determinant

$$\begin{vmatrix} 5 & 10 & -15 \\ 10 & -5 & 20 \\ -10 & 5 & -15 \end{vmatrix}$$

OR

I. v) Write down the truth table for the following compound statement: **(5 x 4=20)**

$$(p \rightarrow \sim p) \rightarrow \sim (q \rightarrow p)$$

w) Find the simple interest on Rs. 7,800 from 15th November 2015 to 14th February 2016 at 6% per annum.

x) In how many ways can a five digit number be formed from the digits 1, 2,3,5,6,8,9 such that
(i) Repetition of digits is allowed.
(ii) No repetition of digits is allowed.

y) Shambu bought a smart phone costing Rs. 10,000 on monthly instalments. If his first instalment was Rs. 1,000 and every instalment was to be increased by Rs, 500, find out when should he pay the entire amount towards the price of the smart phone.

z) A cooperative society has 10 dozens of books on Physics, 8 dozens of books on Chemistry and 5 dozens of books on Mathematics. Selling price of each book is Rs. 8.30, Rs. 3.45 and Rs. 4.50 respectively. Find the total amount that will be received from selling all the books.

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

a) Find the compound interest on Rs. 2500 in $2\frac{1}{2}$ years at 4% per annum compounded annually. Also find the amount.

b) Find the cofactors of the matrix $A = \begin{bmatrix} 10 & -1 & -2 \\ -4 & 0 & 0 \\ 0 & -9 & 19 \end{bmatrix}$

c) If X = $\{n \mid n \in$ N and $n \leq 15\}$, A = $\{2n / n \in N$ and $n \leq 7\}$, B =$\{3n / n \in N$ and $n \leq 5\}$ then verify De Morgan's laws.

d) Find the sum of all natural numbers from 600 to 800 which are exactly divisible by 4.

e) Find the number of distinct permutations of the word "MISSISSIPPI".

OR

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

v) A fixed term maturity plan of SBI Mutual fund declared 18% compound interest per annum. Find the effective rate of interest if the interest is to be compounded half yearly.

w) If $A=\begin{bmatrix}-1 & 0 & -1\\ 2 & -2 & 0\\ -3 & -3 & 0\end{bmatrix}$ $B=\begin{bmatrix}2 & 3\\ 5 & 1\\ 0 & 4\end{bmatrix}$ Find AB and BA if they exist.

x) If $A=\{2x/x\in N\ ;\ 1\le x\le 6\}$, $B=\{x/2x^2-7x+5=0\}$ $C=\{x/(x-2)(x-6)(x-7)=0\}$ find (i) $A\cup B\cup C$ (ii) $A\cap B\cap C$

y) If the sum of the n terms of an A.P. with first term as 1 and common difference 5 is 286, find n .

z) In how many ways can the letters of the word SOCIETY be arranged so that the word begins with a vowel and ends with a consonant.

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

a) Test the validity of the following argument in symbolic form :

$p\rightarrow q$, $p\wedge q$, $\sim q \vdash \sim p$

b) In a group of 400 people, 250 can speak English and 200 can speak Konkani. Using Venn diagram, find the number of people speaking both the languages.

c) Find the amount for the ordinary annuity with periodic payment as Rs. 10,000, at the rate of interest 10% per annum for 1 year. The period of payment being half yearly.

d) From a pack of 52 cards, two cards are to be selected at random. Find the number of selections such that
(i) both are of the same colour.
(ii) One is Red and the other is a spade card.

e) If the second term of a G.P. is 24 and its fifth term is 81, find its first term and the common ratio.

OR

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

v) Test the validity of the following argument:
If Seema is sad then she has failed the exam.
Seema has not failed the exam. Therefore she is not sad.

w) In a class, 20 students chose Geography, 25 students chose Geology and 20 students chose Geometry. Of these, 12 students chose both, Geology and Geometry, 12 students chose both, Geography and Geology and 11 students chose both, Geography and Geometry. If six students chose all the three subjects, find by using Venn diagram, the total number of students in the class.

x) A Housing Society having 12 members wants to collect a Sinking Fund of Rs. 1,66,680 for repairs within a period of 3 years, with the rate of interest compounded at 15% per annum. How much yearly payment will each member have to make towards the Fund, so as to meet the requirements?

y) Three cards are selected at random from a pack of 52 cards. Find the number of selections such that
(i) Two cards are of clubs and the other is a red card
(ii) All three cards are of the same suit.

z) A sum of Rs. 72,800 is to be repaid in six monthly installments such that each installment is three times the previous instalment. Find the first and the last installment.

Attempt the following: **(5 x 4=20)**

a) Miss Sanober is promised the final amount of an ordinary Annuity with quarterly payments of Rs. 5,000 each and duration of two years at 4% interest to be compounded quarterly. What would be the present value of the Annuity ?

b) Velita has taken a loan of Rs. 20,000 which is to be repaid in three monthly instalments. If the rate of interest is 9% per annum compounded monthly, find the EMI amount using the Reducing Balance Method.

c) In how many ways can a committee of six be formed from 7 lawyers and 5 directors such that
(i)The committee must contain 4 lawyers and 2 directors.
(ii)The committee consists of at most 2 directors.

d) Find the sum of 2+22+222+2222+.....upto n terms.

e) Solve the following equations using Cramer's rule.
$x+y+z+2=0, \quad x-y+z=3, \quad 2x-y-3z+1=0$

OR

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

v) Mr. Ahmed is promised the final amount of a half yearly ordinary annuity with periodic payment of Rs. 2,000, the duration of the annuity being 3 years and the rate of interest as 15%, to be compounded half yearly. Find the present value of the annuity.

w) A loan of Rs. 60,000 is to be repaid in 3 equal monthly installments , the rate of interest being 24% per annum. Find the EMI amount using the Reducing Balance Method.

x) In how many ways can a cricket team of 11 be formed from 2 wicket keepers, 5 bowlers, 6 batsmen, and 4 all rounders such that
(i) The team consists of 1 wicket keeper, 4 all rounders, 3 bowlers and 3 batsmen.
(ii) The team consists of 1 wicket keeper, 4 batsmen and at least 3 all rounders.

y) Find the sum of 7+77+777+7777+..... upto n terms.

z) If $A = \begin{bmatrix} -10 & 0 & 0 \\ 0 & -10 & 0 \\ 0 & 0 & -10 \end{bmatrix}$, then find $A^2 - AI$ where I is a unit matrix of order 3.

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