Goa Vidyaprasarak Mandal's
GOPAL GOVIND POY RAITURCAR COLLEGE OF COMMERCE AND ECONOMICS PONDA GOA
B.COM. CHOICE BASED CREDIT SYSTEM (SEMESTER - I)
EXAMINATION, OCTOBER 2018

COMMERCIAL ARITHMETIC

Duration: 2 hours **Marks: 80**

Instructions: 1. Attempt all questions
2. Figures to the right indicate full marks.

Q.1 Attempt the following: **(5 X 4 = 20)**

a) Construct the truth table for $[p \wedge (p \rightarrow q)] \rightarrow q$.
b) Find the present value of ` 35,730.48 to be paid in 3years from now with rate of compounding at 6% per year.
c) If ${}^{n}P_5 : {}^{n}P_3 = 2:1$, find n.
d) Find the sum of numbers between 100 to 300 which are exactly divisible by 3.
e) If $A = \begin{bmatrix} 3 & 1 \\ 2 & 3 \end{bmatrix}$ find 3A+5I where I is the unit matrix of order 2.

OR

Q.I Attempt the following: **(5 X 4 = 20)**

p) Test the validity of the following argument.
If I study then I will pass the exams. I will not pass the exams therefore I do not study.
q) Calculate the simple interest on ` 7800 from 15th November 2016 to14th February 2017 at 5% per annum.
r) Find the number of distinct permutations of the letters of the word SURROUNDINGS.
s) If for an A.P. $t_{10} = 20$, find S_{19}.
t) If $M = \begin{bmatrix} 1 & 2 \\ 0 & 3 \end{bmatrix}$ find $M^2 + 2M$.

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

a) Find the amount of an ordinary annuity with periodic payment as of ` 3000 p.a. for 2 years at the rate of interest 10% per period on quaterly basis.

b) Solve using Cramers's rule the following equations

$4x - 3y = 17$ and $5x + y = 7$.

c) The universal set X = {x/x is natural number less than 11}
A={2 ,4,7,9} and B = {1,3,5,7}. Verify $(A \cup B)^c = A^c \cap B^c$.

d) Find 3 numbers in a G.P. such that sum of second and third terms is 30 and the product of all 3 numbers is 1000.

e) If $5\ {}^nP_3 = {}^nC_4$ find the value of n.

OR

Q.II Attempt the following: (5 X 4 = 20)

p) A certain sum with simple interest becomes `1200 in 2 years `1300 in 3 years. Find the principal and the rate of interest.

q) Using Cramer's rule, solve the following equations.
$x + 3y = 13$, $4x - 5y = 1$.

r) Out of total 200 students appearing for a test, 140 passed in Mathematics and 100 passed in Statistics. If 50 of them failed in both Mathemetics and Statistics, find the number of students who have passed in both by using venn diagram.

s) The third term of a G.P. is 12 and the sixth term is 96. Find its first term and the common ratio.

t) A committee of 5 members is to be formed out of 6 men and 4 women. In how many ways committee can be formed to have at least 4 men?

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

a) Prove that $(p \wedge q) \rightarrow (p \vee q)$ is a tautology.

b) A and B are two sets such that A has 40 elements, AU B has 60 elements and A∩ B has 10 elements. Find the number of elements in B.

c) Sunny invested in an annuity with half- yearly period for 4 years at the rate of interest of 8% compounded half-yearly. If he received ` 27642.68 as the maturity value, what is his periodic payment ?

d) If ${}^nC_r = 120$ and ${}^nP_r = 720$, find the value of n and r.

e) John invests ` 10000 in the first month and increases his investment by ` 1000 every subsequent month. What will be his total investment at the end of 2 years?

OR

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

p) If A= {2,5}, B={2,3}, C ={3,4,5}. Verify that A∩ (B∪C)=(A∩B) ∪ (A∩C).

q) Find x if $\begin{vmatrix} x & 2 & 1 \\ 3 & 0 & 1 \\ 4 & 5 & -1 \end{vmatrix} = 0$

r) Find the amount of an annuity of ` 6000, payable at the end of each quarter for 2 years, the interest rate being 8%, compounded quaterly.

s) A 5 digit number is to be formed using the digits from 0 to 9. How many such numbers can be formed if the repetition of the digits is allowed .

t) A sum of ` 72800 is to be paid in 6 monthly instalments, such that each instalment is three times the previous instalment. Find the first and the last instalment.

Q 4. **Attempt the following:** **(5 X 4 = 20)**

a) Find the compound interest on `1000 at 8% p.a. for 2 years, compounded monthly.[Given:- log 10,000=4, log 151=2.1790, log 150=2.1761, antilog 4.0696=11740]

b) A gold bar worth 15000 appreciated at the rate of 12% per year. Find its value at the end of 3 years.

c) How many words can be formed from letters of the word CENTRAL, so that it begins with a consonant and end with a vowel.

d) Find the sum 9 + 99 + 999 +… up to n terms.

e) If P = $\begin{bmatrix} 1 & -2 \\ 2 & 0 \end{bmatrix}$, find the matrix P^2 - 3P + I .

OR

Q IV **Attempt the following:** **(5 X 4 = 20)**

p) Ameet is promised the final amount of half yearly ordinary annuity with periodic payment of ` 1600, the duration of the annuity being 3 years and the rate of interest is 10% to be compounded half-yearly. Find the present value of the annuity.

q) A committee of 4 members is to be formed from 5 professors and 7 students. In how many ways this can be done, if the committee contains
   i) Exactly 3 professors
   ii) At least 3 professors.

r) Given that 4 + 7 + 10 +… upto n terms is 175. Find the value of n.

s) Find the sum borrowed by Rahul from a bank on compound interest of 5% per year, to be calculated annually , if he had to pay back ` 26,460 after 2 years.

t) If A = $\begin{bmatrix} 1 & 2 \\ -2 & 1 \end{bmatrix}$ and B = $\begin{bmatrix} 3 & 2 \\ 1 & 1 \end{bmatrix}$, find the product AB and BA.