Goa Vidyaprasarak Mandal's

GOPAL GOVIND POY RAITURCAR COLLEGE OF COMMERCE AND ECONOMICS, PONDA-GOA

B.COM. (SEMESTER-I) CHOICE BASED CREDIT SYSTEM

SUPPLEMENTARY EXAMINATION, MAY/JUNE 2019

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) Check whether the statement $(p \wedge q) \rightarrow (p \vee q)$ is a tautology or not.
b) Calculate the future value of 10 lac, if compound interest rate is 10% per annum for 3 years.
c) Find n, if $5\ {}^{n}P_4 = 3\ ({}^{n+1}P_4)$
d) Find the sum of numbers between 100 to 400 which are exactly divisible by 4.
e) If $A = \begin{bmatrix} 3 & 1 \\ 2 & 3 \end{bmatrix}$, find $A^2 + A$.

OR

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

p) Using truth table, prove that $\sim(p \vee q) \equiv \sim p \wedge \sim q$.
q) Calculate the time for which, interest on the sum of money becomes 4/5 th of the amount at 10% simple interest?
r) Find the number of distinct permutations of the letters of the word COMMITTEE.
s) Find 3 terms of an A.P. whose sum is15 and their product is 80.
t) If $M = \begin{bmatrix} 1 & 2 \\ 0 & 3 \end{bmatrix}$ find $5M + 2I$ where I is the unit matrix of order 2.

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

a) Find the amount of an ordinary annuity with periodic payment as of ₹ 1200 p.a. for 3 years at the rate of interest 10% per period on quarterly basis.

b) Solve using Cramers's rule the following equations

$2x - 3y = 8$ and $3x + y = 5$.

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

d) Find 3 numbers in a G.P. whose sum is 26 and the product is 216.

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

OR

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

p) Mr X invested ₹ 100 in the first month and then triple his investment every month for 11 months. Find his last investment and the total investment over 11 months.

q) Using Cramer's rule, solve the following equations.
$2x + 3y = 8, \quad 4x - 5y = 1.$

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 Mathematics 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 club has 4 boys and 5 girls. A committee of 2 boys and 3 girls is to be formed. In how many ways committee can be formed if
i) A particular boy is to be included
ii) A particular girl is to be excluded ?

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

a) Construct the truth table for $[p \wedge (p \rightarrow q)] \rightarrow q$.

b) A and B are two sets. Given :- n(A) = 40, n(AU B) = 60, $n(A \cap B) = 10$. Find n(B).

c) Ramesh 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 ${}^nC_5 = {}^nC_6$ find the value of n.

e) Jack invests ₹ 10000 in the first month and increases his investment by ₹ 500 every subsequent month. What will be his total investment at the end of 1 years?

OR

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

p) If A= {1,2}, B={2,3}, C ={2,3,4}. Verify that $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$.

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 quarterly.

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 installments, such that each installment is three times the previous installment. Find the first and the last installment.

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 KEYBOARD, so that it begins with a consonant and end with a vowel.

d) Find the sum 1 + 11 + 111 +... up to n terms.

e) 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.

OR

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

p) Meena 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) Calculate T_n and S_n of the sequence 3,7,11,15, ... Also find T_{12}.

s) Find the sum borrowed by Naresh from a bank on compound interest of 6% per year, to be calculated annually , if he had to pay back ₹ 26,460 after 2 years.

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

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