

Goa Vidyaprasarak Mandal's
GOPAL GOVIND POY RAITURCAR COLLEGE OF COMMERCE AND
ECONOMICS,PONDA GOA
B.COM. (SEMESTER I) SUPPLEMENTARY EXAMINATION
MAY/JUNE 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) Show that $(p \wedge q) \wedge \sim (p \vee q)$ is a contradiction.
- b) A sum of money lent out at simple interest amount to ` 3000 in 2 years and Rs. 3900 in 5 years. Find the sum of money and the rate of interest.
- c) If ${}^{10}P_{r-1} : {}^{11}P_{r-2} = 30:11$, find r.
- d) Find the sum $5 + 9 + 13 + 17 + \dots$ up to n terms.
- e) If $A = \begin{bmatrix} 2 & 1 \\ -1 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 5 \\ 7 & 2 \end{bmatrix}$, find the matrix X such that $A + 3B + 2X = 0$.

OR

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

- p) Show that $p \rightarrow [p \rightarrow (p \wedge q)]$ is a tautology.
- q) The simple interest on a certain sum for 1.5 years at 12% per annum is ` 60 less than the simple interest on the same sum for 3 years at 10% p.a. Find the sum.
- r) 4 boys and 5 girls are made to stand in a line for a dance competition. How many different arrangement can be done so that, no two boys are together?
- s) If for a G.P. 2,10,50,250,.....find its T_n and S_n .
- t) If $A = \begin{bmatrix} 3 & -2 \\ 4 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 0 \\ 3 & 1 \end{bmatrix}$, find the matrix $3A - 2B + 4I$, where I is the identity matrix of order 2.

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

- a) What is the rate per cent per annum if a sum doubles itself in 17 years at compound interest?
- b) Use Cramers's Rule to solve the following equations:
$$\frac{1}{x} - \frac{3}{y} = 4 \text{ and } \frac{2}{x} + \frac{5}{y} = 3.$$

- c) In a group of 20 adults, there are 8 males and 9 vegetarians. Find by using Venn diagram, the number of female non vegetarians if the group contains 5 male vegetarians.
- d) In a G.P. the fourth and seventh terms are 24 and 81 respectively. Find the first term and common ratio.
- e) There are 5 gentlemen and 4 ladies. In how many ways can a group of 2 men and 2 ladies be formed?

OR

Q.II Attempt the following:

(5 x 4 = 20)

- p) ₹ 5000 are invested in a term deposit scheme that fetches interest at 6% per annum compounded quarterly. What will be the interest after 1 year?
- q) Using Cramer's rule, solve the following equations.
 $2x - 3y = 3, 4x + 5y = 5.$
- r) A and B are such that A has 25 members, B has 20 members and $A \cup B$ has 35 members. Draw a Venn diagram to represent the above situation. Also find the number of members in the set $A \cap B$.
- s) The fourth term of a G.P. is 54 and the seventh term is 1458, 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) Construct the truth table for $(p \wedge q) \vee \sim (p \wedge q)$.
- b) If $A = \{x/x^2 - 4x - 5 = 0\}$ and $B = \{x/x^2 - 8x - 9 = 0\}$. Find $A \cup B, A \cap B, A - B$ and $B - A$.
- c) Find the amount received when a sum of ₹ 5000 is invested at 12% per annum for 3 years, if the interest is compounded
 - i) half yearly
 - ii) quarterly.
- d) If ${}^nC_r = 120$ and ${}^nP_r = 720$, find the value of n and r.
- e) If the 5th terms of the A.P. is 35 and its 9th term is 59, find its nth term.

OR

Q III. Attempt the following:

(5 x 4 = 20)

- p) Verify using truth table that $\sim (p \vee q) = (\sim p) \wedge (\sim q)$.
- q) Find x if $\begin{vmatrix} x & 1 & 2 \\ 2 & x & 1 \\ 1 & 3 & 2 \end{vmatrix} = 0.$

- r) Find the amount and the compound interest on ₹ 15000 for 4 years at 12% calculated on yearly basis.
- s) A group has 4 girls and 5 boys. If 4 persons out of these are to be selected, find the total number of choices if i) there is no restriction on gender ii) 2 boys and 2 girls are to be selected.
- 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.

OR

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

- a) Find the present value of an annuity of ₹ 3000, paid at the end of each year for 4 years, at 11% compounded annually.
- b) How many words can be formed from letters of the word COMPUTER, so that it begins with a vowel and end with a consonant?
- c) Find the amount of annuity of ₹ 3000, payable at the end of each half-yearly for 8 years, the interest rate being 14% compounded half yearly.
- d) Find the principal, if the compound interest payable quarterly at 11% per annum for 3 years is ₹ 500.
- e) If $A = \begin{bmatrix} 1 & 2 \\ -2 & 1 \end{bmatrix}$, find the matrix $A^2 + 2A$

OR

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

- p) Find the present value of an ordinary annuity of ₹ 3,500 p.a. for 3 years at 12% per annum.
- q) From 4 singers and 7 dancers, a committee of 4 is to be formed. In how many ways this can be done, if the committee contains
 - i) Exactly 3 singers
 - ii) At least 3 dancers.
- r) Find the sum of all the numbers between 100 and 300, which are exactly divisible by 4.
- 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.
- f) If $A = \begin{bmatrix} 1 & 3 \\ 2 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 2 & 1 \\ 3 & 1 \end{bmatrix}$, find the matrix $A^2 + B^2$