

SARASWAT VIDYALAYA'S  
SRIDORA CACULO COLLEGE OF COMMERCE & MGMT.STUDIES  
Khorlim, Mapusa-Goa.  
B.COM FIRST SEMESTER END EXAMINATION OCTOBER, 2018  
W.E.F-2013-14

Duration:-2 Hours

Sub:- Mathematical Techniques

MAX MARKS:-80

1. All questions are compulsory however main question wise choice is available
2. Use of Calculator is strictly prohibited.
3. Each main question carries 20 marks and every sub question 5 marks.
4. Logtable/ graph paper can be had on request.
5. You may answer randomly but every main question attempted should be answered serially/ alphabetically.

Q.1 Attempt the following. (4 × 5 = 20)

- a) If  $X = \{x/x \in \mathbb{N}, x \leq 15\}$ ,  $A = \{x/x \in X, x \text{ is odd}\}$  and  $B = \{x/x \in X, x \text{ divides } x\}$  then verify that  $(A-B) \cup (A \cap B) = A$
- b) Solve the following equation  
$$\begin{vmatrix} x & x+3 \\ x+2 & x+1 \end{vmatrix} + 18 = 0$$
- c) Examine whether the proposition  
 $\sim(p \vee q) \leftrightarrow (\sim p \wedge \sim q)$  is a tautology, a contradiction or none of the two.
- d) A person invests Rs.5 in the first month and increases this monthly investment by Rs.2 every succeeding month. What will be the total investment at the end of 5 years.

**OR**

Q.1 Attempt the following. (4 × 5 = 20)

1. Solve the following equation using determinants.  
 $3x + 5y - 4z = 22$ ,  $2x - 3y + z = 3$ ,  $4y - x + 6z = 19$
2. Let  $x = \{x/x \in \mathbb{N}, x \leq 10\}$  be the Universal set and  
 $A = \{2, 5, 7\}$ ,  $B = \{1, 3, 5, 6, 8\}$ . Verify that  
i)  $(A')' = A$  and ii)  $A \cap (B - A) = \emptyset$ .
3. The sum of the first  $n$  terms of the series  $25 + 22 + 19 + 16 + \dots$  is 116. Find the numbers of terms and the last term.
4. Show that  $P(p, q) = p \rightarrow q$  and  $Q(p, q) = \sim p \vee q$  are logically equivalent.

Q.2 Attempt the following. (4 × 5 = 20)

- a) Find the value of  $x$  in the matrix equation given below

$$\begin{bmatrix} x & 2x & 3x \end{bmatrix} \begin{bmatrix} x \\ 2 \\ -1 \end{bmatrix} = [10]$$

- b) Find  $n$  if  $30 \cdot {}^nC_3 = {}^nC_5$

- c)  $X = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$  is the universal set and  $A = \{1, 4, 6, 9\}$  and  $B = \{6, 5, 7, 9\}$ , find  $A' - B'$  and  $B' - A'$ .

- d) What number should be subtracted from each of 6, 8, 15 and 23 so that the resulting numbers will be in proportion.

**OR**

Q.2 Attempt the following. (4 × 5 = 20)

- i) A person has got 15 acquaintances of whom 10 are relatives. In how many ways may he invite 9 guests so that 7 of them would be relatives.
- ii) The universal set  $X = \{x/x \text{ is a positive integer less than } 10\}$



$A=\{2,4,7,9\}$ ,  $B=\{1,5,7\}$ . Verify De Morgan's laws.

iii) Find  $a, b, c$  if  $\begin{bmatrix} a+2b & 2-b \\ b+c & a-c \end{bmatrix} = \begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}$

- iv) Monthly incomes of two persons are in the ratio 4:5 and their monthly expenditures are in the ratio 7:9. If each saves Rs.50 a month, find their monthly incomes.

Q.3. Attempt the following. (4×5=20)

- A committee of 7 is to be chosen from 13 students of whom 6 are science and 7 are commerce students. In how many ways can the selection be made so as to retain a majority on the committee for commerce students?
- Construct the truth table for  $(\sim p \vee q) \leftrightarrow p \wedge \sim q$  and comment on your finding.
- The ratio of the Present age of a father to that of his son is 5:3. Ten years hence the ratio would be 3:2. Find their present ages.
- Find the sum of all three digit numbers divisible by first two digit prime number.

OR

Q.III. Attempt the following. (4×5=20)

- Translate the following statements symbolically
  - Neither BJP nor congress won the majority in the lok sabha election (c,d)
  - If I reach late to the market then either I got up late or I missed the bus. (x,y,z)
- What number is to be added to each term of the ratio 2:5 to make it equal to 4:5.
- Find the sum of  $7+77+777+\dots$  to  $n$  terms.
- Find  $n$  if  ${}^nP_4 = 12 \cdot {}^nP_2$

Q.4. Attempt the following. (4×5=20)

- If  $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ , show that  $A^2 - 5A - 2I$  is a null matrix.
- If  ${}^{20}C_x = {}^{20}C_{x+2}$ , find  ${}^xC_6$
- A trader sells 90 umbrellas for Rs. 8,640/- . If the least price of umbrella is Rs.100/, what is the rate of trade discount.
- If for a G.P,  $S_2=8$  and  $S_4=80$ , Find the first term and the common ratio.

OR

Q.IV. Attempt the following. (4×5=20)

- Find the sum of the first 10 terms of the series 3, 6, 12, 24, -----
- The market price of a washing machine is Rs.30,000/- and it is sold for Rs.29,000/-. Find the percentage of the discount allowed.
- Find a matrix  $x$  such that  $2x+3A-2B=0$ , where  $A = \begin{bmatrix} 2 & 3 \\ -1 & 4 \end{bmatrix}$ ,  $B = \begin{bmatrix} -1 & 2 \\ 0 & 1 \end{bmatrix}$
- If  ${}^{10}C_x - {}^9C_4 = {}^9C_3$ , find  $x$ .