

**B.B.A. Semester - 1 (CBCS) Examination****Nov/Dec - 2022 (OLD COURSE)****ELEMENTS OF BUSINESS MATHEMATICS(ELECTIVE/ALLIED)****Time: 2:30 Hours****Marks: 70****Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate marks.

Que.-1 A. Prove that  ${}^n P_r = n(n-1)(n-2)\dots(n-r+1)$ . (07)

B. How many different words can be formed with the letters of HARYANA? In how many of these (i) H and N are together. (ii) Begin with H and end with N? (07)

OR

Que.-1 A. (i) If  ${}^{20}C_{3r} = {}^{20}C_{2r+5}$ , find r. (ii) If  ${}^{2n}C_3 : {}^nC_2 = 44 : 3$  find n.

B. Prove that in usual notations  ${}^nC_r = \frac{n!}{(n-r)!r!}$   $1 \leq r \leq n$ .

Que.-2 A. If  $\frac{1}{b+c}, \frac{1}{c+a}, \frac{1}{a+b}$ , are in A. P., prove that  $a^2, b^2, c^2$  are also in A.P. (07)

B. Find five numbers in an A.P. whose sum is 15 and product of first two Terms is -1. (07)

OR

Que.-2 A. Find the sum of  $72+70+68+\dots+40$ .

B. Prove that  $\frac{1}{H-a} + \frac{1}{H-b} = \frac{2}{H}$ .

Que.-3 A. Prove that of  $(\sqrt{3} + \sqrt{2})^4 + (\sqrt{3} - \sqrt{2})^4 = 98$ . (07)

B. Find middle terms of  $(x^2 + \frac{1}{x})^6$ . (07)

OR

Que.-3 A. If  $T_{21}$  and  $T_{22}$  in the expansion of  $(1+x)^{44}$  are equal, find x.

B. Obtain the coefficient of  $x^{12}$  in the expansion of  $(1+x^3)^{12}$ .

Que.-4 A. Find the cubic polynomial which takes the following values and then obtain (1.5) (07)

| x      | 1 | 2  | 3  | 4   |
|--------|---|----|----|-----|
| Y=f(x) | 8 | 27 | 64 | 125 |

B. Give the assumptions of interpolation and extrapolation.

OR

Que.-4 A. Interpolate the missing values in the following table: (07)

| Year          | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|---------------|------|------|------|------|------|------|
| Index Numbers | 150  | 170  | 180  | ?    | 200  | 220  |

B. Estimate the profit for the year 1975 by lagrange's method. (07)

| Year                  | 1971 | 1972 | 1974 | 1979 |
|-----------------------|------|------|------|------|
| Profit ( in '000 Rs.) | 21   | 35   | 56   | 84   |

Que.-5 A.  $1 + 5 + 9 + \dots + (4n - 3) = n(2n - 1)$ . (07)

B. Prove that  $2^{4n} - 1$  is divisible by 15. (07)

OR

Que.-5 A. Find the sum of n terms of  $1.4+3.7+5.10+ \dots$

B. Find  $T_n$  if  $S_n = 2n^2 + 3n$  also find  $T_{20}$ .

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