B. B. A. (Sem. I) Examination
December - 2019
Mathematics
(Elements of Business Mathematics)
(New Course)

Time : **2.30** Hours]　　　　　　　　　　[Total Marks : **70**

1 **(A)** Using each letter once only from the word **10**
'VRUTIKA', how many new words can be formed so that
vowels are at third, fourth and sixth places only? How
many words can be formed in which the three vowels
always come together?

(B) Prove that $^nC_r + {}^nC_{r-1} = {}^{n+1}C_r$ Hence find the value of **10**

$$C_9^{12} + C_8^{11} + C_7^{10} + C_6^{10}.$$

OR

1 **(A)** Define : Permutation and prove that **10**
$$^{n+1}P_r + r\ {}^{n-1}P_{r-1} = {}^nP_r.$$

(B) Out of 5 males and 6 females a committee of 5 is **10**
to be formed. Find the :number of ways in which it
can be done. so that among the persons chosen in the
committee there are (1) at least one female (2) not more
than 3 males.

2 **(A)** Define Arithmetic Progression. Prove that sum of n **10**
terms in Arithmetic Progression is
$$S_n = \frac{n}{2}\big[2a + (n-1)d\big].$$

(B) Product of 3 numbers in G.P. is 216 and sum of **10**
them is 26. Find three numbers.

OR

2 **(A)** Find the sum all natural numbers between 500 and **10**
1000 which are divisible by 13.

(B) Obtain the sum of the following series. **10**

$6 + 66 + 666 + \ldots up$ to n terms

3 (A) Find the coefficient of x^{-12} in the expansion **8**

of $\left(x - \dfrac{1}{x^3} \right)^{12}$.

(B) If the middle term in the expansion of $\left(\dfrac{x}{2} + 2 \right)^8$ is **7**

1120, then find x.

OR

3 (A) Find the term containing x^4 in the expansion of **8**

$\left(\dfrac{x}{a} - \dfrac{a}{x} \right)^9$.

(B) Find the value of $\left(2 + \sqrt{3} \right)^7 + \left(2 - \sqrt{3} \right)^7$. **7**

4 (A) Using mathematical induction prove that, **8**

$1^2 + 2^2 + 3^2 + \ldots + n^2 = \dfrac{n}{6}(n+1)(2m+1)$.

(B) Find sum of series :

(i) $50 + 51 + \ldots + 99$ **3**

(ii) $40^3 + 41^3 + 42^3 \ldots + 50^3$ **4**

OR

4 (A) Using mathematical induction prove that, **8**

$\dfrac{1}{2.5} + \dfrac{1}{5.8} + \dfrac{1}{8.11} + \ldots + \dfrac{1}{(3n-1).(3n+2)} = \dfrac{n}{2(3n+2)}$

(B) Find sum of series : $1 \times 3 + 3 \times 5 + 5 \times 7 + 7 \times 9 + \ldots up$ to **7**

n terms