B. B. A. (Sem. I) Examination

March - 2021

Mathematics

(Elements of Business Mathematics)

(New Course)

Time : $2\frac{1}{2}$ Hours]   [Total Marks : 70

Instructions : (1) Write answer in Chronological Order.

(2) Attempt any four questions out of 8 given.

1   (a)   Define : Premutation and prove that   **10**

$${}^{n}P_{r} + r\,{}^{n}P_{r-1} = {}^{n+1}P_{r}.$$

(b)   Using each letter once only from the word   **7.5**
'DEVANSHEE', how many new words can be formed ?
How many words can be formed in which all vowels
always come together ?

2   (a)   Prove that ${}^{n}C_{r} + r\,{}^{n}C_{r-1} = {}^{n+1}C_{r}$. Hence find the value   **10**
of $C_{9}^{15} + 2\,{\overset{15}{\underset{8}{C}}} + {\overset{15}{\underset{7}{C}}}$.

(b)   Out of 5 men and 6 women a committee of 5 is to   **7.5**
be formed. Find the number of ways in which it can be
done so that among the people chosen in the committee
there are (1) at least two women (2) not more than 3
men.

3   (a)   Define Airthmatic Progression. Prove that sum of n   **10**
terms in Arithmetic Progression is $S_{n} = \frac{n}{2}\left[2a + (n-1)d\right]$.

(b)   The sum of three numbers in A.P. is 24 and their   **7.5**
product is 440. Find numbers.

4　(a)　Obtain the sum of the following series :　　　　　10

　　　　8 + 88 + 888 + ... up to n terms.

　　(b)　Products of 3 numbers in G.P. is 216 and their sum　　7.5

　　　　is 26.

5　(a)　Find the value of $\left(3+\sqrt{2}\right)^5 + \left(3-\sqrt{2}\right)^5$.　　　　10

　　(b)　Find the third term in the expansion of $\left(2x-3x^2\right)^7$.　7.5

6　(a)　Find the coefficient of x^{32} and x^{-17} in the expansion　10

　　　　of $\left(x^4 - \dfrac{1}{x^3}\right)^{15}$.

　　(b)　If the middle term in the expansion of $\left(\dfrac{x}{2}+2\right)^8$ is　7.5

　　　　1120, then find x.

7　(a)　Using mathematical induction prove that,　　　　10

　　　　2.5 + 5.8 + 8.11 + ... + (3n – 1). (3n + 2) = n(n^2 + 6n + 1)

　　(b)　Using mathematical induction prove that,　　　　7.5

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

8　(a)　Find the sum of series :　　　　　　　10

　　　　$1 \times 3 + 3 \times 5 + 5 \times 7 + 7 \times 9 + ...$ up to n terms.

　　(b)　Find the sum of series :

　　　　(i)　50 + 51 + ... + 99　　　　　　　3

　　　　(ii)　$40^3 + 41^3 + 42^3 + ... + 50^3$　　　　4.5