DD-010-001107   Seat No. _____

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

March - 2022

Mathematics : Paper - 107

(Business Mathematics - 1) (Old Course)

Faculty Code : 010

Subject Code : 001107

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

1   (a)   If $f : R \to R$, then find domain, co-domain and   **7**
            range of function $y = 2x + 3$.

     (b)   If $f(x) = 2x^2 + 3x - 1$, then find $f(-1)$ and $f(2) - f(1)$.   **7**

OR

1   (a)   If $f : N \to R$, then find domain, co-domain and   **7**
            range of $f(x) = 4x - 5, x \in \{1, 2, 3\}$.

     (b)   If $f : R \to R, g : R \to R, f(x) = 2x + 1$ and $g(x) = 3x + 2$, then   **7**
            prove that $fog = gof$.

2   Evaluate any **four** :   **14**

     (1) $\lim\limits_{x \to 0} \dfrac{e^{2x} - 1}{x}$

     (2) $\lim\limits_{x \to 2} x^3 - 1$

     (3) $\lim\limits_{x \to 1} \dfrac{\sqrt{x + 2} - \sqrt{3}}{x - 1}$

     (4) $\lim\limits_{n \to \infty} \dfrac{n^2 + 5n + 6}{(n + 4)(n + 5)}$

     (5) $\lim\limits_{x \to -1} \dfrac{x^3 + 1}{x^2 - 1}$

     (6) $\lim\limits_{x \to 3} \dfrac{x^3 - 27}{x - 3}$

3 (a) Prove that sum of n terms in Arithmetic Progression   **7**

is $S_n = \dfrac{n}{2}[2a + (n-1)d]$.

(b) Find the sum of all natural numbers between 500   **7**
and 1000 which are divisible by 13.

OR

3 (a) Obtain the sum of the following series.   **7**
0.5 + 0.55 + 0.555 + ... up to n terms.

(b) Product of 3 numbers in G.P. is 27000 and their sum   **7**
is 130. Find three numbers.

4 (a) Prove that ${}^n P_r + r \, {}^n P_{r-1} = {}^{n+1} P_r$.   **7**

(b) Using each letter once only from the word 'KINJAL',   **7**
how many new words can be formed ? How many words
can be formed in which vowels are comes together ?

OR

4 (a) Find the value of ${}^{12}C_9 + {}^{11}C_8 + {}^{10}C_7 + {}^{10}C_6$ using   **7**

${}^n C_r + {}^n C_{r-1} = {}^{n+1}C_r$.

(b) Out of 6 males and 5 females a committee of 5 is to   **7**
be formed. Find the number of ways in which it can
be done so that among the persons chosen in the
committee there are at least one female.

5 (a) Find the value of $\left(1 + \sqrt{5}\right)^5 - \left(\sqrt{5} - 1\right)^5$.   **7**

(b) Find the middle term in the expansion of $\left(\dfrac{x}{2} + 2\right)^{10}$.   **7**

OR

5 (a) Using mathematical induction prove that,   **7**

$2 + 5 + 8 + ... + (3n - 1) = \dfrac{n}{2}(3n + 1)$.

(b) Find sum of series :

(i) $40 + 41 + ... + 60$.   **3**

(ii) $20^3 + 21^3 + 22^3 + ... + 30^3$.   **4**

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