Roll No. ....

Total No. of Questions : 07] [Total No. of Pages : 02

Paper ID [C0202]

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BBA (Sem. - 1st)

BUSINESS MATHEMATICS (BB - 102)

Time : 03 Hours Maximum Marks : 60

Instruction to Candidates:

1) Section - A is **Compulsory**.
2) Attempt any **Four** questions from Section - B.

Section - A

Q1) *(10 × 2 = 20)*

a) If A and B are two sets then show that, $A \subseteq B \Leftrightarrow B^c \subseteq A^c$

b) Verify that the proposition $p \vee \sim(p \wedge q)$ is a tautology.

c) If ${}^{15}C_r : {}^{15}C_{r-1} = 11:5$ find r.

d) State Binomial theorem for positive integral index.

e) If x, $2x + 2$, $3x + 3$, - - - - are in G.P., find the fourth term.

f) Evaluate $\underset{x \to 1}{Lt} \dfrac{x-1}{2x^2 - 7x + 5}$.

g) What is the maximum value of $\dfrac{\log x}{x}$?

h) State Cramer's rule to solve simultaneous equations.

i) If a, b, c are in A.P., then prove that, $(a - c)^2 = 4(b^2 - ac)$

j) Show that, $7\log\dfrac{16}{15} + 5\log\dfrac{25}{24} + 3\log\dfrac{81}{80} = \log 2$.

Section - B

(4 × 10 = 40)

Q2) (a) For any two sets A and B, show that, $(A \cup B)^c = A^c \cap B^c$.

(b) For any logical statements p, q and r, show that, $p \wedge (q \vee r) = (p \wedge q) \vee (p \wedge r)$.

Q3) (a) Solve $3x^2 - 4\sqrt{3x^2 - 4x + 1} = 4x - 4$.

(b) Find the number of different permutations of the letters of the word BANANA.

Q4) (a) Find the term independent of x in the expansion of $(3x - \frac{2}{x^2})^{15}$.

(b) The p^{th} term of an A.P. is a and q^{th} term is b. Prove that the sum of its (p + q) terms is $\frac{p+q}{2}\left[a + b + \frac{a-b}{p-q}\right]$

Q5) (a) The r^{th}, s^{th} and t^{th} terms of a G.P. are R, S and T respectively. Prove that, $R^{s-t} S^{t-r} T^{r-s} = 1$.

(b) Evaluate, $\underset{x \to 3}{Lt} \frac{x-3}{\sqrt{x-2} - \sqrt{4-x}}$.

Q6) (a) If $y = \frac{x}{2}\sqrt{a^2 + x^2} + \frac{a^2}{2}\log[x + \sqrt{x^2 + a^2}]$, prove that $\frac{dy}{dx} = \sqrt{x^2 + a^2}$.

(b) Find the maximum value of the product of two numbers whose sum is 12.

Q7) (a) State and prove the base changing formula of logarithms.

(b) Solve the = ns, $3x + y + 2z = 3$; $2x - 3y - z = -3$; $x - 2y + z = 4$ by using matrix inversion method.

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