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ST. XAVIER'S COLLEGE (AUTONOMOUS)

**1st SEMESTER EXAMINATION
B.B.A.
NOV - DEC 2010**

**BUSINESS MATHEMATICS &
STATISTICS - I**

BMSA3101

Tuesday, December 07, 2010 9:30 am to 12:30 pm

Time allowed: **3 hours**

Full Marks: **75**

Instructions:

- Use fountain pen or ball-point pen of blue or black ink.
- Answer in your own words as far as practicable.
- Do not write anything on the Question paper other than your Roll No.

Group – A

BUSINESS MATHAMETICS

Answer **QUESTION NO. 1** and **ANY THREE** questions from the rest.

1. Answer **ANY FOUR** questions. [4×2 = 8]
- (a) If 2, x , 50 are in G.P., find the value of x .
- (b) If one root of $x^2 - 7x + m = 0$ is 2, find the other root and the value of m .
- (c) If ${}^nC_7 = {}^nC_3$, find nC_2 .
- (d) Taking $\log_{10} 2 = 0.3010$, find the value of $\log_8 10$.
- (e) If $f(x - 1) = x^2 - 1$, find $f(x - 2)$.
- (f) Examine the continuity of $f(x)$ at $x = 0$
where $f(x) = x + 1$ when $x \neq 0$
 $= 1$ when $x = 0$.
- (g) Find $\frac{dy}{dx}$ if $e^{2x} = \log(2y)$.
2. (a) The 5th term of an A.P. is 16 and its 13th term is 30. Find the sum of its first 29 terms.
(b) If the ratio of the two roots of the equation $2x^2 + 5x + n = 0$ be 2 : 3, find the value of n .
(c) Show that $23 \log \frac{16}{15} + 17 \log \frac{25}{24} + 10 \log \frac{81}{80} = 1$ (Base = 10) [3+3+3 = 9]
3. (a) Find the term (in the simplified form) independent of x in the expansion of $(2x - \frac{1}{x^2})^9$.
(b) How many odd numbers of five digits can be formed of the digits 0,1,2,3,4?
(c) Sum of three consecutive terms of an A.P. is 15. If 1 is subtracted from the 2nd term, the terms are in G.P. Find the terms. [3+3+3 = 9]
4. (a) Out of 12 consonants and 5 vowels, how many different words can be formed, each consisting of 3 consonants and 2 vowels?
(b) If $a^2 + b^2 = 23ab$, prove that $\log \left(\frac{a+b}{5}\right) = \frac{1}{2}(\log a + \log b)$.
(c) Find the middle term in the expansion of $(\frac{x^2}{3} + \frac{3}{x^2})^8$. [3+3+3 = 9]
5. (a) Find the domain of the function $\log(x^2 - 5x + 6)$.
(b) If $\lim_{x \rightarrow 2} \frac{ax^2 - b}{x - 2} = 4$, find the values of a and b .
(c) If $f(x) = \sqrt{x}$, using first principle find the derivative of $f(x)$. [3+3+3 = 9]
6. (a) $f(x) = \begin{cases} k^2x^2 - 3kx & \text{when } x \leq 1 \\ 2kx - 6 & \text{when } x > 1 \end{cases}$
Find the value of k for which $f(x)$ is continuous at $x = 1$.
(b) Find $\frac{dy}{dx}$ if $e^y = x \log(x + y)$
(c) If $y = \frac{1+x}{1-x}$, show that $(1 - x)^3 \frac{d^2y}{dx^2} = 4$. [3+3+3 = 9]

Group – B

BUSINESS STATISTICS

Answer **QUESTION NO. 7** and **ANY THREE** from the rest.

7. Answer **ANY FIVE** questions. [5×2 = 10]

- (a) If $\bar{x} = 20$, S.D(x) = 2 and $y = 3x - 15$, find \bar{y} and S.D(y).
- (b) Find the M.D. (about median) from the data : 1, 5, 8, 3, 2
- (c) What are Primary data and Secondary data?
- (d) If $b_{yx} = 0.8$ and $r_{xy} = 0.4$, find b_{xy} .
- (e) If Laspeyres' and Paasche's Price index numbers are 125.6 and 154.3 respectively, find Fisher's Price index number.
- (f) If $y = x^2 - 2$, prove that $\Delta^3 y = 0$.
- (g) Find the mean when coefficient of variation = 5% and variance = 4.
- (h) The first two moments of a distribution about 2 are 1 and 16 respectively. Find mean and variance of the distribution.

8. (a) Draw a Histogram to represent the following frequency distribution:

Daily Wages (Rs.)	300-349	350-399	400-449	450-499	500-549	550-599
No. of workers	115	340	220	175	80	35

(b) Find the First and Third Quartiles from the following distribution:

Class limits	130-134	135-139	140-144	145-149	150-154	155-159	160-164	165-169
frequency	5	10	13	20	24	17	9	2

[6+4 = 10]

9. (a) Find C.V. from the following distribution:

Marks	20-30	30-40	40-50	50-60	60-70	Total
No. of Students	2	35	46	12	5	100

(b) Find the mode of the following distribution:

Daily income(Rs.)	100-110	110-120	120-130	130-140	140-150	150-160	160-170	170-180
No. of workers	16	24	59	100	41	31	19	10

[6+4 = 10]

10. (a) Using Lagrange's Interpolation formula find $f(x)$ when $x = 0$, given the following table:

x	-1	-2	2	4
$f(x)$	-1	-9	11	69

(b) Show that $-1 \leq r \leq 1$.

[6+4 = 10]

11. (a) Find the coefficient of correlation from the following data:

X	1	2	3	4	5	6	7
Y	6	8	11	9	12	10	14

(b) The Karl Pearson's coefficient of skewness of a distribution is 0.32. Its S.D. is 6.5 and the mean is 29.6. Find the Mode. Also find its median.

[6+4 = 10]

12. (a) Calculate Fisher's Ideal Price Index Number from the following data:

Commodity	Base year		Current year	
	Price	Quantity	Price	Quantity
A	4	40	8	34
B	2	18	2	25
C	5	12	5	52
D	1	24	10	46

(b) You are given the following data:

	x	y
A.M.	20	25
S.D.	5	4

and correlation coefficient between x and y is 0.6. Find the regression equation of x on y and hence find the value of x when $y = 30$.

[6+4 = 10]
