Roll No. .....

Subject Code—2164

B.B.A. (First Year) EXAMINATION

(New Scheme)

BBA-105

BUSINESS MATHEMATICS

Time : 3 *Hours* *Maximum Marks :* 100

Note : Attempt any *Five* questions. All questions carry equal marks.

1. Clarify the concept of Business mathematics and discuss its scope and importance with the help of suitable examples. **20**

2. (a) The population of a city grows at the rate of 2·5% p.a. If the present population is 20,50,000, find its population after 11 years.

(b) What amount should be set aside at the end of each year to amount to Rs. 1,48,970 at the end of 8 years at 5% per annum compounded annually ?

(c) At what rate will Rs. 1,000 amount to Rs. 1,500 in 12 years at compound interest ? **7+7+6**

3. (a) Solve the following euqations :

$$x^2 - 3xy + 2y^2 = 6$$

$$x^2 - xy + y^2 = 21$$

(b) Solve the equations : **10+10**

$$\frac{x-1}{x-2} + \frac{x-3}{x-4} = \frac{x-5}{x-6} + \frac{x-7}{x-8}$$

4. (a) Evaluate :

$45 + 47 + 49 + \ldots\ldots\ldots + 99$

(b) Find the sum of 50 terms of the sequence 7, 7·7, 7·77, 7·777,.....

(c) Show that : **5+10+5**

$$3\log 4 - 2\log 6 + \log(18)^{3/2} = \log\left(96\sqrt{2}\right)$$

5. Solve the following system of simultaneous linear equations using matrix algebra :

$$x + y + 2z = 4$$

$$2x - y + 3z = 9$$

$$3x - y - z = 2$$ **20**

6. (a) Let P = $\{a, b, c\}$ and Q = $\{k, l, m, n\}$. Determine the Cartesian product of P and Q.

   (b) If A = $\{1, 2, 4, 5\}$, B = $\{a, b, c, f\}$, C = $\{9, 5\}$, compute $A \cup C$, $(A \cup C) \times B$.

   (c) Prove that : **5+5+10**

   $(A \times B) \cap (P \times Q) = (A \cap P) \times (B \cap Q)$

7. (a) Find median from the following data :

Score	Frequency
0–5	6
5–10	12
10–15	50
15–20	120
20–25	225

25–30	250
30–35	185
35–40	110
40–45	32
45–50	10

(b) Calculate Standard Deviation for the following distribution : 10+10

Class	Frequency
4–8	11
8–12	13
12–16	16
16–20	14
20–24	14
24–28	9
28–32	17
32–36	6
36–40	4

8. (a) Find the probability that a leap year. selected at random. will contain 53 sundays.

(b) Three dice are thrown simultaneously. Find the probability of getting sum less than 5.

(c) A bag contains 5 red balls, 3 black balls and 4 white balls. A ball is drown out of bag at random. What is the probability that the ball drawn is either red or white ? **6+6+8**

9. (a) Evaluate :

$$\lim_{x \to 0} \frac{\sqrt{x+a} - \sqrt{a}}{x}$$

(b) Differentiate w.r. to x :

$$\sqrt{\frac{x^2 - 2ax}{a^2 - 2ab}}$$

(c) Find the maximum and minimum values of : **6+6+8**

$$2x^3 - 9x^2 - 24x - 20$$

10. (a) Integrate :

$$\int \frac{x^5}{\sqrt{x^2+1}}\,dx$$

(b) Integrate : **10+10**

$$\int x^2 (\log x)^2\,dx$$