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B. B. A. (Semester - I) Examination - 2009

BUSINESS MATHEMATICS

(2008 Pattern)

Time : 3 Hours]

[Max. Marks : 80

Instructions :

- (1) *All questions are compulsory.*
 - (2) *Figures to the right indicate full marks.*
 - (3) *Logarithmic tables will be supplied on request.*
 - (4) *Use of private simple electronic calculator is allowed.*
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Q.1) Attempt **any four** of the following :

[16]

- (a) Define 'Direct Proportion'. Find fourth proportional to 2, 4, 6, x.
- (b) If price of milk is increased by 19% as a result of which a person gets 1 litre less in Rs. 100. Find original rate of milk.
- (c) The income of A, B, C are in the ratio 2 : 3 : 4 and their expenditure are in the ratio 5 : 7 : 9. If A saves $(\frac{1}{5})$ th of this income, find ratio of their savings.
- (d) If x varies directly as y and inversely as z and $x = 15$ when $y = 12$ and $z = 20$. Find y when $x = 10$ and $z = 25$.
- (e) Income of a person in year 2006 was Rs. 8,000. There is 10% increase of income in each of next 3 years. Find income at the end of 3rd year.
- (f) The monthly salaries of two person's are in the ratio 3 : 5. If each receives an increase of Rs. 200 in monthly salary, the new ratio is 13 : 21. Find their original salary.

Q.2) Attempt any four of the following :

[16]

- (a) A car having cost Rs. 1,00,000 was sold for Rs. 80,000 after 4 years. Find percentage of loss.
- (b) Explain the terms 'Trade Discount and Cash Discount'.
- (c) A Piano is sold for Rs. 42,500 at the loss of 15%. How much should it have been sold to earn a profit of 15%.
- (d) Mr. Prakash Paranjape gets 15% commission upto the sale of Rs. 40,000 and 20% on the sale exceeding Rs. 40,000. In a year his sales are Rs. 85,000. Find his commission.
- (e) An article is sold for Rs. 380 after allowing a trade discount of 20% and subsequently a cash discount of 5%. Find percentage of his sales.
- (f) What sum of money put at simple interest for two years at 8% p.a. will amount to Rs. 1,276 ?

Q.3) Attempt any four of the following :

[16]

- (a) What will be the compound interest on Rs. 25,000 for 5 years at the rate of 15% p.a. ?
- (b) If P is principal, r is rate of interest and n is period in years, then prove that compound interest for the nth year is :

$$I_n = \frac{Pr}{100} \left[1 + \frac{r}{100} \right]^{n-1}$$

- (c) Find EMI for a loan of Rs. 40,000 to be repaid in equal monthly instalment. Interest is charged at 14% p.a. on the loan outstanding at the beginning of each month and the time span is 10 years.
- (d) A man invested Rs.13,568 in 7% shares at 106 and Rs. 12,648 in 11% shares at 124. How much income would he get in all ?
- (e) Dr. Parshuram purchased shares of face value Rs. 3,200 by investing Rs. 4,000. What was market price of the share ? If the shares fetched 6% dividend, what percentage of dividend he got on his investment ?

- (f) Mr. Kiran holds 400 shares of face value of Rs. 150. For last two consecutive years he received bonus shares in the ratio 5 : 1 and 6 : 1 respectively. 25% dividend is declared in the current year. What is his income ?

Q.4) Attempt **any four** of the following :

[16]

- (a) Prove that

$$\begin{vmatrix} a & b & c \\ b & c & a \\ b+c & c+a & a+b \end{vmatrix} = 3abc - a^3 - b^3 - c^3$$

- (b) If any one row of the matrix A is containing all '0' elements, then what will be value of determinant of A ? Find value of |A| if

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 6 \\ 3 & 2 & 1 \end{bmatrix}$$

- (c) Compute

$$A = \left\{ 3 \begin{bmatrix} 1 & 2 & 0 \\ 0 & -1 & 3 \end{bmatrix} - \begin{bmatrix} 1 & 5 & -2 \\ -3 & -4 & 4 \end{bmatrix} \right\} \begin{bmatrix} 1 \\ 2 \\ 1 \end{bmatrix}$$

and also find A'.

- (d) Find inverse of the matrix

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 5 \\ 3 & 5 & 6 \end{bmatrix}, \text{ by adjoint method.}$$

- (e) If $A = \begin{bmatrix} 2 & 3 \\ -3 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 \\ -2 & 1 \end{bmatrix}$,

find AB and BA. State whether $AB = BA$.

(f) If $A = \begin{bmatrix} 1 & 1 \\ 1 & 2 \end{bmatrix}$, show that A satisfies

$$A^2 - 3A + I_2 = 0.$$

Q.5) Attempt any four of the following :

[16]

(a) Solve system linear equations :

$$2x - 3y = 3$$

$$4x - y = 11,$$

by using inverse of coefficient matrix.

(b) Define the terms :

(i) Permutation

(ii) Combination

Find values of ${}^{10}P_3$ and 8C_2

(c) If ${}^nC_8 = {}^nC_6$, find nC_3 .

(d) Determine value of x, if

$${}^9C_4 + {}^9C_5 + {}^{10}C_6 + {}^{11}C_7 = {}^{12}C_x.$$

(e) A committee of 3 persons is to be formed amongst 4 gentlemen and 3 ladies, so as to include atleast one gentleman and atleast one lady. In how many ways can this be done ?

(f) In a Co-operative Housing Society there are 40 members. They want to choose a Chairmen, a Vice Chairman and a Secretary from amongst themselves. In how many different ways can they do it ?