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B.C.A./B.B.A. (CA) (Semester III) EXAMINATION, 2018

304 : BUSINESS MATHEMATICS (Theory)

(2013 PATTERN)

Time : Three Hours

Maximum Marks : 80

N.B. :— (i) *All* questions are compulsory.

(ii) Figures to the right indicate full marks.

(iii) Use of non-programmable pocket calculator is allowed.

1. (a) Attempt any *one* of the following : [1×6=6]

(i) The ratio of prices of two cars was 3 : 4, three years later, when the price of first had risen by 10% and that of the second by ₹ 7,000, the ratio becomes 11 : 15. Find the new prices of the cars.

(ii) Rohit purchased 200 toys at ₹ 20 each. He sold all toys at ₹ 30 each. Find out total profit and percentage of profit earned.

(b) Attempt any *two* of the following : [2×5=10]

(i) Makarand invests some amount and losses 10% in the first year but in the next year, he gains 20% of what he had at the end of first year. If there is an increase of ₹ 1,440 in his capital at the end of two years, find his original capital.

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- (ii) A man purchases eggs at ₹ 65 per dozen and sells them at ₹ 7 per egg. Find his gain or loss percent.
- (iii) Find the rate of simple interest, if the sum of money triple itself in 14 years.

2. (a) Attempt any *one* of the following : [1×6=6]

- (i) A Refrigerator set was bought for ₹ 14,000 and sold for ₹ 16,400 through a broker who charges commission 4% on purchase and 5% on sales. Find the total gain or the loss in the transaction.
- (ii) Manasi purchased flat for ₹ 5,60,000. For this purpose she has taken loan from Bank for 5 years at 9% p.a. Find out the EMI to be paid by her.

(b) Attempt any *two* of the following : [2×5=10]

- (i) The ratio of salaries of Jagriti and Pravin is 6 : 7 while the ratio of salaries of Pravin and Nilesh 3 : 5. Find the ratio of salaries of A, B and C. If the salary of Nilesh is ₹ 17,500. Find salary of Jagriti.
- (ii) At what price should an article costing ₹ 510 be sold, so that after giving 15% cash discount and a profit of 20% is made ?
- (iii) Find the compound interest on ₹ 6,200 at $4\frac{1}{2}\%$ p.a. in the third year.

3. (a) Attempt any *one* of the following : [1×6=6]

(i) Solve the following system of linear equations by matrix inversion method :

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

$$x + y + z = 0$$

$$4x - y - 3z = 20.$$

(ii) Obtain the inverse of the following matrix by adjoint method :

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

(b) Attempt any *two* of the following : [2×5=10]

(i) Compute :

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

(ii) A and B two type of fertilizers available at ₹ 30 and ₹ 50 per kg respectively. Fertilizer A contains 20 units of potash, 10 units of nitrogen and 40 units of phosphorus. Fertilizer B contains 15 units of potash, 20 units of nitrogen and 10 units of phosphorus. The requirement of potash, nitrogen and phosphorus is at least 1800, 1700, 1600 units. Formulate the problem as L.P.P. in order to minimize the total cost.

- (iii) If 75 persons can perform a piece of work in 12 days of 10 hours each. How many persons could perform of piece of work twice as large in half the number of days working 8 hours daily ?

4. (a) Attempt any *one* of the following : [1×6=6]

- (i) Solve the following L.P.P. using graphical method :

$$\text{Maximize : } Z = x + 2y$$

Subject to the condition :

$$x + y \leq 10$$

$$0 \leq x \leq 75$$

$$0 \leq y \leq 60$$

- (ii) Solve the following transportation problem by using Vogel's approximation method in order to minimize total transportation cost :

		Destination					Availabilities
		D ₁	D ₂	D ₃	D ₄	D ₅	
Origin	O ₁	3	5	8	9	11	20
	O ₂	5	4	10	7	10	40
	O ₃	2	5	8	7	5	40
Demand		10	15	25	20	30	

(b) Attempt any *two* of the following : [2×5=10]

(i) Obtain the initial basic feasible solution to the following transportation problem by using least cost method :

		Destination				Total Supply
		D ₁	D ₂	D ₃	D ₄	
Warehouses	W ₁	50	150	70	60	40
	W ₂	80	70	90	10	60
	W ₃	15	90	80	80	50
	Total Demand	20	70	50	10	150

(ii) Find the amount of ₹ 6,000 at 12% p.a. in 3 years compounded quarterly.

(iii) When an article is sold at a gain of 10% it fetches ₹ 10 more than if it were sold at a loss of 10%. Find the cost price of the article.

5. (a) Attempt any *one* of the following : [1×6=6]

(i) What is transportation problem ? Explain the method to solve by North-West corner method.

(ii) Find the difference between compound interest and simple interest on a sum of ₹ 3,000 at 10% p.a. for two years.

(b) Attempt any *two* of the following : [2×5=10]

(i) Explain the following terms :

(1) Compound Interest

(2) Cash Discount

(3) Trade Discount.

(ii) Find the values of x and y if :

$$\begin{bmatrix} x & y \\ 1 & 2 \end{bmatrix} \begin{bmatrix} 2 & 3 \\ 5 & 1 \end{bmatrix} = \begin{bmatrix} 3 & 11 \\ 12 & 5 \end{bmatrix}.$$

(iii) What number must be subtracted from each of 9, 11, 15, 19 so that the differences will be proportional ?