

(7 pages)

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B.B.A. (CBCS) DEGREE EXAMINATION, APRIL 2014.

Second Semester

Business Administration — Main

BUSINESS MATHEMATICS

(For those who joined in July 2012 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL the questions.

Choose the correct answer.

1. If $A(-3, 3)$ and $B(5, 9)$ then the distance between A and B is
 - (a) 0
 - (b) 1
 - (c) 10
 - (d) None of the above
2. The change in total cost when one more unit is produced is called
 - (a) Average cost
 - (b) Variable cost
 - (c) Marginal cost
 - (d) None of the above

3. The differential coefficient of $\frac{1}{x}$ with respect to x is

- (a) $\frac{2}{x^2}$
- (b) $-\frac{1}{x^2}$
- (c) $\frac{1}{x^2}$
- (d) None of the above

4. If the demand function is $y = 4 - 5x$, for what value of x will elasticity of demand be unitary?

- (a) 0.4
- (b) 0.45
- (c) 0.5
- (d) None of the above

5. Let $y = f(x)$ be a continuous function. As x increases, if y also increases then $y = f(x)$ is said to be

- (a) Constant function
- (b) Increasing function
- (c) Decreasing function
- (d) None of the above

6. The difference between total revenue and total cost is called

- (a) Marginal revenue
- (b) Average revenue
- (c) Profit
- (d) None of the above

Page 2 Code No. : 40767



7. The interest for one unit of time is multiplied by the number of units of time under
 (a) Simple interest (b) Compound interest
 (c) Annuity (d) None of the above
8. The value due on the legally due date from a bill of exchange is called
 (a) Exchange value (b) Face value
 (c) Banker's gain (d) None of the above
9. Two matrices can be added if and only if they are of the _____.
 (a) Inverse order (b) Same order
 (c) Different order (d) None of the above
10. If in a diagonal matrix all the diagonal elements are equal, then that matrix is called
 (a) Diagonal matrix (b) Scalar matrix
 (c) Square matrix (d) None of the above

PART B — (5 × 5 = 25 marks)

Answer ALL the questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Find the point of intersection of the lines $3x + 4y - 13 = 0$ and $2x - 7y + 1 = 0$.
 Or
 (b) Find the equation of the straight line which passes through the point (2, -1) and (4, 5).

Page 3 Code No. : 40767

12. (a) Find the differential coefficient of y with respect to x ; when $y = (x^2 + 1)(3x^2 - 2x^3)$.

Or

- (b) Find the elasticity of demand when the demand is $q = \frac{20}{(p+1)}$ and $p = 3$.

13. (a) Find the maximum and minimum values of the cost function $C = 5 + 2x^2 - x^3$.

Or

- (b) The total revenue function is given by $R = x + 3x^2$. Find the marginal revenue and demand function.

14. (a) At 10% compound interest per annum, a principal accumulated to Rs. 8,650 in 5 years. Find the principal.

Or

- (b) Calculate the rate of interest of a bill of Rs. 6,611.25 whose true discount for 5 months is Rs. 161.25.

15. (a) Solve the equations by Matrix method :

$$3x + 2y = 8$$

$$5x - 3y = 7.$$

Or

Page 4 Code No. : 40767
 [P.T.O.]



(b) Find the rank of $C = \begin{pmatrix} 3 & 2 & 1 \\ 0 & 4 & 5 \\ 3 & 6 & 6 \end{pmatrix}$.

PART C — (5 × 8 = 40 marks)

Answer ALL the questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Find the intercepts of the line $9x + y + 18 = 0$ with the co-ordinate axes. Do the points $(-2, 0)$, $(0, -18)$ and $(-4, 18)$ lie on the line?

Or

- (b) A company expects fixed costs to be Rs. 30,000 and variable cost to be Rs. 42,000 when the sales will be Rs. 60,000.
- Write down the equation relating sales and expenses.
 - Find the break-even point.
 - What will be the profit when the sales is Rs. 1,20,000?

Page 5 Code No. : 40767

17. (a) A man has to pay Rs. 5,000 initially and then Rs. 300 for every month for 3 years, for a small flat he has bought. Find the relationship between the amount (y) he has paid and the number of months (x) since he bought the flat, assuming the relationship to be linear.

Or

- (b) A company expects that total fixed cost will be Rs. 25,000 and that variable cost will be Rs. 75,000 on sales of Rs. 1,25,000.
- Find the relation between total cost and sales.
 - Find the break even point.
 - What will be the profit for sales of Rs. 1,00,000?

18. (a) A telephone company has a profit of Rs. 2 per telephone when the number of telephones in the exchange is not over 10,000. The profit per telephone decreases by 0.01 paise for each telephone over 10,000. What is the largest possible profit?

Or

- (b) A rectangular field is y metres long, x metres wide. What is the minimum amount of fence which will enclose 10,000 square metres?

Page 6 Code No. : 40767



19. (a) The difference between true discount and banker's discount on a bill due after 6 months discounted at 6% per annum is Rs. 27. Find the True discount, Banker's discount and the Face value of the bill.

Or

- (b) Mr. X borrows Rs. 1,716. He repays Rs. 250 at the end of each year. In how many years can he clear the debt if the rate of compound interest is 7.5% p.a.?
20. (a) Solve by Inverse matrix method :
- $$\begin{aligned} 2x - y + 3z &= 1 \\ x + y + z &= 2 \\ x - y + z &= 4. \end{aligned}$$

Or

- (b) Find the rank of $A+B$ and AB when
- $$A = \begin{pmatrix} 1 & 1 & -1 \\ 2 & -3 & 4 \\ 3 & -2 & 3 \end{pmatrix} \text{ and } B = \begin{pmatrix} -1 & -2 & -1 \\ 6 & 12 & 6 \\ 5 & 10 & 5 \end{pmatrix}.$$

