

**BACHELOR OF BUSINESS  
ADMINISTRATION II YEAR  
EXAMINATION, 2010**

**Paper — BBAD-401**

**MATHEMATICS for BUSINESS and  
ECONOMICS**

*Time : 2½ Hours*

*Maximum Marks : 70*

*(Write your Roll No. at the top immediately  
on receipt of this question paper.)*

*Answer all Sections as per instructions given in each  
Section. Marks are shown in each Section.*

**SECTION - I** (1 × 10 = 10)

*Answer 10 questions.*

*Each question carries 1 mark.*

Fill in the blanks:

1. The distance between the points P(-5,2) and Q (-3,-4) is \_\_\_\_\_.
2. If  $A = \begin{bmatrix} 2 & 7 \\ 8 & 1 \end{bmatrix}$  and  $k = 4$  then  $kA = \begin{bmatrix} & \\ & \end{bmatrix}$ .
3. The limit of  $\lim_{x \rightarrow a} \frac{x^2 - a^2}{x - a}$  is \_\_\_\_\_.

P.T.O.

4. The transpose of matrix  $A = \begin{bmatrix} 1 & 4 & 7 \\ 2 & 0 & 3 \\ 0 & 5 & 2 \end{bmatrix}$  is  $A^T = \begin{bmatrix} & & \end{bmatrix}$ .
5. The derivative of  $y = x^3$  is \_\_\_\_\_.
6. The \_\_\_\_\_ point is the lowest level of output at which there is no loss, and also no profit.
7. The sum of 15 terms of the series 10, 15, 20, 25, ..... is \_\_\_\_\_.
8. In a linear programming model the original problem is known as the \_\_\_\_\_ problem and the associated one as its \_\_\_\_\_.
9. Demand function written as  $x = D(p)$  where  $p$ , the \_\_\_\_\_ is an independent variable and  $x$ , the \_\_\_\_\_ is a dependent variable.
10. Economic order quantity is a function of annual \_\_\_\_\_, \_\_\_\_\_ cost and cost of \_\_\_\_\_.

**SECTION - II** (5 × 6 = 30)

*Answer SIX questions.  
Each question carries 5 marks.*

11. Find the length of the perpendicular from the point (2,5) on the line  $4x - 3y + 18 = 0$ .

12. The total cost of manufacturing  $x$  units of a product is assumed to be linear. It consists of a fixed cost plus a variable cost. If the total cost of manufacturing 200 units is Rs. 5000, and the total cost of manufacturing 400 units is Rs. 8000, find the cost function. What is the fixed cost of production ?

13. If  $A = \begin{bmatrix} 1 & 3 \\ 0 & 2 \\ 4 & 8 \end{bmatrix}$  and  $B = \begin{bmatrix} 3 & 7 \\ 8 & 5 \\ 4 & -2 \end{bmatrix}$

Find  $A + B$  and  $A - B$ .

14. Find the limit of  $y = 2x + 5$  as  $x \rightarrow 2$ .

15. If  $y = u^2 + 3u - 2$  and  $u = 2x^4$ , using Chain rule find  $(dy/dx)$ .

16. Evaluate the following intergrals:

i)  $\int (x^3 + 15) dx$

ii)  $\int 15 \cdot x^5 \cdot dx$

iii)  $\int (12x^3 - 8x^2 + 15x - 10) dx$

iv)  $\int (e^{12x}) dx$

v)  $\int 5^x \cdot dx$

17. Population of India was 84 crores in 1991 and 103 crores in 2001. Assuming that this growth continues and the rate of increase is proportional to population (i.e. exponential growth), estimate the population in the year 2011.
18. If Rs. 2000 is invested at 10% rate of interest per annum, what will be the amount after 3 years if the interest is compounded: (i) annually (ii) quarterly (iii) continuously.

**SECTION - III** (3 × 10 = 30)

*Answer THREE questions.*

*Each question carries 10 marks*

19. A company decides to set up a small production plant for manufacturing electronic clocks. The cost for initial set up is Rs. 9 lakhs. The additional cost for producing each clock is Rs. 300. Each clock is sold at Rs. 750. During the first month 1,500 clocks were produced and sold:
- Determine the total cost function  $C(x)$  for the production of  $x$  clocks.
  - Determine the revenue function  $R(x)$
  - Determine the profit function  $P(x)$ .
  - How much profit or loss the company incurs during the first month when all the 1500 clocks are sold?
  - Determine the break-even point.

20. Find the rank of the matrix A,

$$A = \begin{bmatrix} 1 & 3 & 4 & 3 \\ 3 & 9 & 12 & 3 \\ 1 & 3 & 4 & 1 \end{bmatrix}$$

21. Solve the following equations by using Cramer's rule:

$$2x + y + z = 7$$

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

$$x + 2y - 3z = 4$$

22. i) A spherical balloon is being inflated at the rate of 5 cubic feet per second. How fast is the radius of the balloon increase in 15 seconds after the start?

ii) If  $4x^3 + 2x^2y + 3xy^2 + 5y^2 = 0$ , find  $(dy/dx)$ .

23. What do you understand by linear programming problem? Give a brief description with graphical sketch method of illustration to define objective function, decision variables, constraints and feasible region.