

(7 pages)

Reg. No. : .....

Code No. : 3597

Sub. Code : R 3 BA 22/  
B 3 BA 22

B.B.A. DEGREE EXAMINATION, APRIL 2011.

Second Semester

Business Administration — Main

BUSINESS MATHEMATICS

(For those who joined in July 2008 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL the questions.

Choose the best answer.

1. The points  $(a + 1, 1)$ ,  $(2a + 1, 3)$  and  $(2a + 2, 2a)$  are collinear, if :

- (a)  $a = -1, 2$                       (b)  $a = \frac{1}{2}, 2$   
(c)  $a = 2, 1$                         (d)  $a = \frac{-1}{2}, 2$

2. The equation of the locus of points equidistant from  $(-1, -1)$  and  $(4, 2)$  is

- (a)  $3x - 5y - 7 = 0$               (b)  $5x + 3y - 9 = 0$   
(c)  $4x + 3y + 2 = 0$               (d)  $x - 3y + 5 = 0$

3. The derivative of  $(ae^{bx} - b \operatorname{cosec} x + a \cot x)$  with respect to  $x$  is

- (a)  $abe^{bx} + b \operatorname{cosec} x \cot x - a \operatorname{cosec}^2 x$   
(b)  $abe^{bx} - b \operatorname{cosec} x \cot x + a \operatorname{cosec}^2 x$   
(c)  $abe^{bx} - b \operatorname{cosec} x \cot x - a \operatorname{cosec}^2 x$   
(d)  $abe^{bx} - b \operatorname{cosec} \cot x - a \operatorname{cosec}^2 x$

4. The derivative of  $\log_e(x^n / e^x)$  with respect to  $x =$

- (a)  $n/x + 1$                           (b)  $1/x + n$   
(c)  $n/x - 1$                           (d)  $1/x - n$

5. The largest interval in which  $f(x) = x^3 + 6x^2 + 36x + 7$  increases is

- (a)  $R$                                       (b)  $-R$   
(c)  $R+$                                     (d)  $R-$

6. The minimum value of  $6x^3 - 9x^2 - 36x + 24$  is

- (a) 36                                      (b) -72  
(c) -36                                    (d) 72

7. The simple interest is founded as

- (a)  $Pni$  (b)  $Pnr$   
(c)  $p(1+i)$  (d)  $P(1+i)^n$

8. The compound interest for Rs. 10,000 for 2 years at 10% p.a. is

- (a) Rs. 2,000 (b) Rs. 2,100  
(c) Rs. 2,200 (d) Rs. 12,000

9. The input-output analysis was propounded by

- (a) Adam Smith  
(b) Marshall  
(c) Leontief  
(d) J.M. Keynes

10. A matrix which is only one column is

- (a) a row matrix  
(b) a column matrix  
(c) a triangular matrix  
(d) a square matrix

PART B — (5 × 5 = 25 marks)

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

11. (a) Using distance formula, show that the points (1, 5), (2, 4) and (3, 3) are collinear.

Or

- (b) Find the inclination of the line whose slope is  $\frac{-1}{\sqrt{3}}$ .

12. (a) Prove that  $\frac{d(uv)}{dx} = u \frac{dv}{dx} + v \frac{du}{dx}$  where  $u$  and  $v$  are functions of  $x$ .

Or

- (b) Find the derivatives of

(i)  $(x^2 - 7)^2$

(ii)  $\frac{3x^4 - x^2 + 8}{x}$

13. (a) Find the maxima of the function  $c = 5 + 2x^2 - x^3$ .

Or

- (b) Find the maxima of the function  $2x^3 - 3x^2 - 36x + 10$ .



14. (a) Find the compound interest on Rs. 5,000 at 3, 1/2 p.a. for 3 years.

Or

- (b) Find the principal that will yield a compound interest of Rs. 205 in 2 years at 5% annum.

15. (a) If  $A = \begin{bmatrix} 9 & 1 \\ 4 & 3 \end{bmatrix}$ ,  $B = \begin{bmatrix} 1 & 5 \\ 7 & 12 \end{bmatrix}$  find  $X$  in the equation  $3A + 5B2X = 0$ .

Or

- (b) Examine whether the matrix  $A = \begin{bmatrix} 7 & 4 & 3 \\ 3 & 2 & 1 \\ 5 & 3 & 2 \end{bmatrix}$

PART C — (5 × 8 = 40 marks)

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

16. (a) Show that the triangle which has one of the angles as  $60^\circ$ , can not have all verticals with integral co-ordinates.

Or

- (b) Find the equation of the medians of triangle, the co-ordinates of whose verticals are  $(-1, 6)$ ,  $(-3, -9)$  and  $(5, -8)$ .

17. (a) Find the derivatives of the following :

(i)  $y = (x^2 + 5)(3x + 1)$

(ii)  $y = \frac{3x^2}{4x - 1}$

Or

- (b) Prove that  $\frac{dy}{dx} = \frac{dy}{du} \frac{du}{dx}$  where  $y$  is a function of  $u$  and  $u$  is a function of  $x$ .

18. (a) Investigate the maxima and minima of the function  $2x^3 + 3x^2 - 36x + 10$ .

Or

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

19. (a) If a certain principal amounts to Rs. 6,677.35 at the end of two years and to Rs. 8,295.25 at the end of three and half years when interest is compounded semi annually, find the rate of interest p.a. and the principal.

Or

- (b) A sum of money becomes Rs. 9,195.79 in 14 months and Rs. 10,259.46 in 25 months when interest is compounded monthly. Find the rate of interest p.a. and the principal.

20. (a) Find the (i) minor (ii) co-factor (iii) adjoint and (iv) determinant for the following matrix

$$A = \begin{pmatrix} 1 & 4 & 3 \\ 4 & 2 & 1 \\ 3 & 2 & 2 \end{pmatrix}.$$

Or

- (b) Find the inverse of

$$(i) \quad A = \begin{pmatrix} 4 & 0 & 2 \\ 2 & 10 & 2 \\ 3 & 9 & 1 \end{pmatrix} \quad (ii) \quad A = \begin{pmatrix} 5 & -6 & 4 \\ 7 & 4 & -3 \\ 2 & 1 & 6 \end{pmatrix}.$$

---