(7 pages) **Reg. No. :** .....

**Code No. : 12938** **Sub. Code : JMBA 22**

B.B.A. (CBCS) DEGREE EXAMINATION,
APRIL 2017.

Second Semester

Business Administration — Main

BUSINESS MATHEMATICS

(For those who joined in July 2016 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. $P(1,1), Q(-1,-1)$ the distance $PQ$ = ————.

   (a) 8 (b) $\sqrt{2}$

   (c) $2\sqrt{2}$ (d) 4

2. The change in total cost when one more unit is produced is called the ————.

   (a) Average cost (b) Marginal cost

   (c) Variable cost (d) Slope

3. $\lim_{x \to 0} x^2 + 2x + 5$ = ————.

   (a) 0 (b) 2

   (c) 5 (d) 1

4. If $y = 2x + 3$, $dy$ = ————.

   (a) 0 (b) $2yx$

   (c) $3yx$ (d) none of these

5. The necessary condition for maximum is ————.

   (a) $\frac{dy}{dx} = 0$ (b) $\frac{dy}{dx} > 0$

   (c) $\frac{dy}{dx} < 0$ (d) none of these

6. At ———— tangents are parallel to the x-axis.

   (a) stationary points

   (b) turning points

   (c) extreme points

   (d) all of these

7. ———— is the mainly borrowed or lent.

   (a) principal (b) interest

   (c) amount (d) annuity

8. If the payment is made at the beginning of each period then the annuity is called _____.

(a) annuity certain

(b) annuity due

(c) contingent annuity

(d) deferred annuity

9. If the rectangular arrangement has m rows and n columns then it contains _____ elements.

(a) m +n (b) mn

(c) $m^2$ (d) $n^2$

10. In a skew-symmetric matrix all the diagonal entries are _____.

(a) equal (b) 1

(c) 0 (d) none of these

PART B — (5 × 5 = 25 marks)

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

Each answer should not exceed 250 words.

11. (a) Find the product of the intercepts of the line $4x + 5y - y = 0$ made with the axes.

Or

(b) 15 radios are sold when the price is Rs. 400 and radios are sold when the price is Rs. 350. What is the equation of the demand curve assuming it to be linear?



12. (a) Find $\frac{d}{dx}\left(\frac{x^4 - 9}{x^2 + 3}\right)$.

Or

(b) Find $\frac{d}{dx}\{(x^2 + 2)e^{3x}\}$.

13. (a) Find $\frac{d^2y}{dx^2}$ and $\frac{d^3y}{dx^3}$, if $y = xe^{x^2}$.

Or

(b) Determine whether the curve $y = 2x^2 - 6x + 12$ at (i) $x = 2$ (ii) $x = 1$ rise or fall.

14. (a) If the present value of an immediate annuing at 6% compounded annually is Rs. 700, find the number of annual payments (approx) of Rs. 50, the annuity could provide.

Or

(b) Calculate the compound interest for Rs. 2,500 for 4 years at 8% per annum.

15. (a) $A = \begin{pmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{pmatrix}$, $B = \begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{pmatrix}$. show that $AB \neq BA$.

Or

(b) State the crammer's rule.

PART C — (5 × 8 = 40 marks)

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

Each answer should not exceed 600 words.

16. (a) Find the equation of the straight line through the intersection of $2x - 3y + 4 = 0$ and $3x + 4y - 5 = 0$ and parallel to $6x - 7y + 8 = 0$.

Or

(b) A company expects fixed costs of Rs. 37,500 and variable cost of Rs. 50,000 on sales of Rs. 80,000.

(i) Write down the equation relating the cost and sales.

(ii) Find the break-even point

(iii) What will be the profit for a sales of Rs. 90,000.

17. (a) If (i) $y = e^{x^2+5x+7}$ (ii) $y = \log\sqrt{2x+3}$ find $\frac{dy}{dx}$.

Or

(b) The total cost c, of making x units of a product is $c = 0.00003x^3 - 0.04x^2 + 8x + 25{,}000$. Find the marginal cost at 1000 units output.



18. (a) If the total cost function $e$ is $c = \frac{1}{3}\theta^3 - 3\theta^2 + 9\theta$, find at what level of output 'AC' be minimum and value will it $b$?

Or

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

19. (a) A item is purchased for Rs. 10,000. (i) If the depreciation is 9% per annum find the value of the machine after 10 years. (ii) If the depreciation is 6% per annum for the first 4 years and 9% per annum for the next 6 years. What is the value of the machine?

Or

(b) A person has two daughters A and B aged 13 and 16 years. He has Rs. 40,000 with him now but wants that both of them should set the equal amount when they are 20 years old. How he should divide the money if it were B be deposited in a bank giving 9% compound interest per annum?

20. (a) Find the inverse of $A = \begin{pmatrix} 4 & 0 & 2 \\ 2 & 10 & 2 \\ 3 & 9 & 1 \end{pmatrix}$.

Or

(b) Consider an economy of two industries P and Q where the data, in millions of rupees is given below:

| User | | Final demand | Total output |
|---|---|---|---|
| | P Q | | |
| P | 14 6 | 8 | 28 |
| Producers | | | |
| Q | 7, 8 | 11 | 36 |

Determine the output if the final demand changes to 20 for P and 30 for Q.

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