Seat No:_____ **Enrollment No:_____**

PARUL UNIVERSITY

COLLEGE OF AGRICULTURE

B.Sc.(Hons.) Agriculture Winter 2018 - 19 Examination

Semester: 1 **Date: 10/12/2018**
Subject Code: 20116101 **Time: 10.30 am to 1.00 pm**
Subject Name: Elementary Mathematics **Total Marks: 50**

Instructions
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 Do as Directed.

A. Fill in the blanks. (Each of 0.5 mark) **(05)**

1. Derivative of $constant$ is.....
2. Two matrices can be subtracted if and only if they have ..... order/dimension
3. A matrix with order 2×3 has _____ rows and _____ columns.
4. $\lim_{x \to 1} 5x =$ .....
5. If $y = -5x + 3$ is a straight line, then its slope is _____
6. The radius of the circle $x^2 + y^2 = 1$ is _____
7. $\frac{d}{dx}(4x^2) =$ _____
8. $\int \cos x \, dx =$ _____
9. Condition of a line $y = mx + c$ to be a tangent to the circle $x^2 + y^2 = a^2$ is _____
10. If $A = \begin{bmatrix} 2 & 1 \\ -1 & 5 \end{bmatrix}, then\ A^T =$ _____

B. Multiple choice type questions. (Each of 0.5 mark) **(10)**

1. The value of $\sin 90^0$ is
   a)0 c)1
   b)-1 d)None of the above
2. If $A = \begin{bmatrix} 2 & -4 \\ 3 & -8 \end{bmatrix}$, then trace of (A) will be
   a)6 c)-6
   b)2 d)10
3. Inverse of a matrix exists only if
   a)$|A| = 0$ c)$|A| \neq 0$
   b)$[A] = 0$ d)$[A] \neq 0$
4. $\frac{d}{dx}(x^5) =$ _____
   a)$5x$ c)$5x^4$
   b)$x5$ d)$5x^3$
5. Which of the following is not a property of distance function
   a) $d(A,B) = 0 \Leftrightarrow A = B$ c) $d(A,B) \geq 0$
   b)$d(A,B) = d(B,A)$ d) $d(A,B) \neq d(B,A)$
6. If $A = \begin{bmatrix} 2 & -4 \\ 3 & -8 \end{bmatrix}$, then A^T will be
   a)$\begin{bmatrix} 2 & 3 \\ -4 & -8 \end{bmatrix}$ c)$\begin{bmatrix} 2 & -4 \\ 3 & -8 \end{bmatrix}$
   b)$\begin{bmatrix} 2 & 4 \\ 3 & 8 \end{bmatrix}$ d)None of the above
7. The set of all points in a plane at a fixed distance from a fixed point in the plane is called
   a)line c)circle
   b)centre d)radius
8. Equation of tangent to the circle $x^2 + y^2 = r^2$at a point (x_1, y_1) on the circle
   a) $yx_1 - xy_1 = 0$ c) $xx_1 + yy_1 = r^2$
   b) $c = \pm a\sqrt{1 + m^2}$ d)$x^2 + y^2 = a^2$

9. The derivative of $\sin x$ is

a) $cos\ x$ c)$\sin x$

b)$-\sin x$ d)$-\cos x$

10. $\int x\ dx =$

a)x^2 c)$x^2/2$

b)1 d) None of the above

11. $x^2 + y^2 + 2gx + 2fy + c = 0$ is the equation of a circle whose centre is

a)$(-g,-f)$ c)$(g,-f)$

b)$(-g,f)$ d)(g,f)

12. Find the value of the determinant $A = \begin{vmatrix} 2 & 1 \\ 0 & 1 \end{vmatrix}$

a)2 c)1

b)0 d)-2

13.Slope intercept form of equation of line is _____

a) $y - y_0 = m(x - x_0)$ c))$\frac{x}{a} + \frac{y}{b} = 1$

b) $y = mx + b$ d)none of the above

14. Distance between two points $A(x_1, y_1)$and $B(x_2, y_2)$ is given by _____

a)$\sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$ c)$\sqrt{(x_1 + x_2)^2 + (y_1 + y_2)^2}$

b)$\sqrt{(x_1 - x_2)^2 - (y_1 - y_2)^2}$ d)None of the above

15. Find the equation of a straight line parallel to x-axis at a distance of 10 units above the x-axis.

a)$x = 10$ c)$x = -10$

b)$y = 10$ d)$y = -10$

16. $\frac{d}{dx}(\tan^{-1} x) =$ _____

a)$\frac{1}{1+x^2}$ c)$\frac{1}{1-x^2}$

b)$1/\sqrt{1 - x^2}$ d)$-1/\sqrt{1 - x^2}$

17. If A is having dimension 2×4 and B is having dimension 4×3 then dimension of AB will be

a)4× 4 c)3× 2

b)2× 3 d) not defined

18. If the equation of circle is $(x - 2)^2 + (y + 4)^2 = 9$,then

a) $center\ =\ (-2,-4\ )\ and\ radius =\ 9$ c) $center\ =\ (2,-4) and\ radius =\ 9$

b) $center = (4,-2\ )\ and\ radius =\ 3$ d) $center\ =\ (2,-4\ )\ and\ radius =\ 3$

19. The distance between $points\ \ A(2,4)$ and $B(2,8)$ is

a)2 c)9

b)4 d)-9

20. $\lim_{x \to -1}(2x^2 + 2)$

a)2 c)1

b)4 d) -2

Q.2 Do as Directed.

A. Short Questions. (Any five out of seven) **(05)**

1. Find the equation of the circle with centre (3, -2) and radius 2.
2. Write the general equation of circle.
3. Define Determinant.
4. What is the derivative of $\tan x$
5. Define Transpose of a matrix.
6. Write the intercept form of equation of a line.
7. Can we find value of a Matrix?
   Yes or No

B. Answer the following. (Any five out of seven) **05**

1. Evaluate $\int x^3\ dx$.
2. Find the equation of circle whose diameter is line joining the points $(1,3)$ and $(2,-1)$.
3. Find $\frac{d}{dx}(\sin^{-1} x)$
4. If $d\big((x,-1),(3,2)\big) = 5$, find x.

5.Find $\frac{d}{dx}(\cos 4x)$

6.Find the value of the determinant $A = \begin{vmatrix} 2 & 1 \\ 0 & 1 \end{vmatrix}$

7.What is the transpose of the matrix $A = \begin{bmatrix} 1 & 0 & 3 \\ -1 & 2 & 5 \end{bmatrix}$

Q.3 Answer the following: (Any five out of six) **(10)**

1. Find the equation of the line through (1,5) with slope -2.
2. $If\ A = \begin{bmatrix} 2 & 4 \\ 3 & 2 \end{bmatrix},\ B = \begin{bmatrix} 1 & 3 \\ -2 & 5 \end{bmatrix}$ find $(i)\ A + B\ (ii)\ A - B$
3. Estimate the value of the following limit $\lim_{x\to 4}(\frac{x^2-4}{2x})$
4. If $x^2 + y^2 - 2x + 4y - 8 = 0$ is equation of a circle, find its centre and radius.
5. Examine the continuity of f(x) at $x = 1$:

$$f(x) = \begin{cases} 3x - 5, & if\ x \neq 1 \\ 2, & if\ x = 1 \end{cases}$$

6. Evaluate $\int x \cos x\ dx$

Q.4 Long Questions/Example (Attempt any three out of four) **(15)**

1. If $y = sinx + 2e^x + 2x^3 + logx$, then find $\frac{dy}{dx}$.
2. If $A = \begin{bmatrix} 2 & -1 \\ 4 & -4 \end{bmatrix}$ then find the value of the determinant, trace and find A^{-1}.
3. Find the equation of the tangent and normal to the circle $x^2 + y^2 = 169$ at the point $A(12, -5)$. Also, write the normal form of equation of a line having normal distance p from the origin and angle ω which the normal makes with the positive direction of x-axis
4. Find the equation of the circle passes through three points (1, 0), (-1, 0) and (0, 1). Also, write the centre and radius of the equation of the circle obtained.