PARUL UNIVERSITY
COLLEGE OF AGRICULTURE
B.Sc.(Hons.) Agriculture Summer 2018 - 19 Examination

Semester:1   Date: 16/04/2019
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 $sin\ x$ is............
2. Two matrices can be added if and only if they have .... order/dimension
3. A matrix with order 3×4 has _____ rows and _____ columns.
4. $\lim_{x \to 1} 7x = ...$
5. Every square matrix is associated to an expression or a number known as _____
6. The radius of the circle $x^2 + y^2 = 1$ is _____
7. $\frac{d}{dx}(4x^2) = $ _____
8. $\int \cos x\ dx = $ _____
9. Equation of a circle having centre (a, b) and radius r is given by _____.
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 $\cos 90^0$ is
    a)0   c)1
    b)-1 d)None of the above
2. If $A = \begin{bmatrix} 2 & -4 \\ 3 & -8 \end{bmatrix}$, then order of A is
    a)2×2 c)2×3
    b)3×2 d)3×3
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. Equation of normal 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) $x^2 + y^2 = a^2$
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 constant is
    a) 0   c)1
    b) does not exist   d)none of the above

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.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 y-axis at a distance of 5 units on the right of the y-axis.
   a)$x = 5$ c)$x = -5$
   b)$y = 5$ d)$y = -5$

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 $points$ $A(2,2)$ and $B(1,1)$ is
   a)$\sqrt{2}$ c)9
   b)1   d)-9

20. $\lim\limits_{x \to -1}(2x^2 + 2)$
   a)2   c)1
   b)4   d) -2

Q.2 Do as Directed.

A. Short Questions. (Any five out of seven)   **(05)**
   1.Does a circle have unique radius? Yes or No
   2. Write the equation of circle with centre (0,0) and radius 1.
   3. Write the point slope form of equation of line.
   4.What is the derivative of $\cos x$
   5.Define Transpose of a matrix.
   6. If $A = \begin{bmatrix} 3 & 0 \\ 2 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 2 \\ 0 & 4 \end{bmatrix}$ find AB.
   7.Can we find value of a Matrix?
     Yes or No

B. Answer the following. (Any five out of seven)   **05**
   1. Evaluate $\int x^4\, dx$.
   2. Find the equation of circle whose diameter is line joining the points $(1,3)$ and $(2, -1)$.
   3. Find $\frac{d}{dx}(\cos^{-1} x)$
   4. If $d\big((x, -1), (3,2)\big) = 5$, find x.
   5.. If $y = sin2x$, find $\frac{dy}{dx}$
   6.Find the value of the determinant $A = \begin{vmatrix} 2 & 1 \\ 0 & 1 \end{vmatrix}$

7. What is the transpose of the matrix $A = \begin{bmatrix} 1 & 0 \\ -2 & 3 \\ 4 & 8 \end{bmatrix}$

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

1. Write the equation of the line in slope-intercept form with a **slope of 7** and a **y-intercept of –4.**

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 $\lim_{x \to 4}\left(\frac{x^2 - 4}{2x}\right)$

4. If $x^2 + y^2 - 3x + 3y + 10 = 0$ 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 $y = \cos x + x^3 + \log x + 2e^x$, 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 co-ordinates of the point which divides AB, where A and B have the co-ordinates (2,4) and (4,6) respectively in the ratio 1:3 (i) internally (ii) externally.

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.