$\qquad$
PARUL UNIVERSITY

## COLLEGE OF AGRICULTURE

## B.Sc.(Hons.)Agriculture Winter 2019-20 Examination

Semester: 1
Date: 05/12/2019
Subject Code: 20116101
Time: 10.30 am To 1.00 pm
Subject Name: Elementary Mathematics

## 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)

1. The transpose of matrix $A=\left[\begin{array}{cc}7 & -8 \\ 2 & 4 \\ 0 & 5\end{array}\right]$ is
2. $\frac{d}{d x}\left(x^{2}+2\right)=$
3. Circle is a set of all points in a plane at a fixed distance from a fixed point in the plane. The fixed distance is called the $\qquad$ of the circle.
4. For a line $y=m x+c$ to be a tangent to the circle $x^{2}+y^{2}=a^{2}$, the value of c should be
5. $\overline{\int e^{x}} d x=$
6. If $A=\left[\begin{array}{ccc}1 & 4 & -9 \\ 2 & 4 & 6 \\ 3 & 0 & 5\end{array}\right]$, then $A \times A^{T}=$ $\qquad$ .
7. The adjoint of matrix $\left[\begin{array}{ll}-1 & 2 \\ -7 & 6\end{array}\right]$ is $\qquad$
8. The area under the curve $y=x^{2}$ between the lines $x=0$ and $x=1$.
9. If $x^{2}+y^{2}-2 x+4 y-8=0$ is equation of a circle, then the centre is $\qquad$ .
10. The equation of the line in slope-intercept form with a slope of -5 and a $y$-intercept of 3is
B. Multiple choice type questions. (Each of $\mathbf{0 . 5}$ mark)
11. The pair of points $(A, B) \in R^{1} \times R^{1}$ and the distance $d(A, B)=0$, then $\qquad$
a) $A=B$
c) $\mathrm{A}>\mathrm{B}$
b) $A<B$
d) none of these
12. The order of the matrix $\left[\begin{array}{ccc}2 & 0 & 1 \\ 12 & -9 & 4\end{array}\right]$ is $\qquad$
a) $2 \times 3$
b) $2 \times 2$
c) $3 \times 2$
d) $3 \times 3$
13. For two matrices of same order A and $\mathrm{B},(A B)^{T}=$ $\qquad$
a) $A^{T} B^{T}$
c) $A^{T}$
b) $B^{T} A^{T}$
d) none of these
14. $\int \sin x d x=$
a) $\cos x+c$
b) $-\cos x+c$
c) $\sin x+c$
d) $-\sin x+c$
15. The line $y=2$ is parallel to $\qquad$
a) $y$-axis
c) line $x=2$
b) $x$-axis
d) none of these
16. The slope of the line $y=2 x+3$ is $\qquad$
a) 3
b) 1
c) 2
d) 0
17. The centre of the circle $(x-2)^{2}+(y-3)^{2}=16$ is $\qquad$
a) $(3,2)$
b) $(-2,-3)$
c) $(0,0)$
d) $(2,3)$
18. Determinant of the matrix $\left[\begin{array}{ll}1 & 0 \\ 0 & 1\end{array}\right]$ is
a) 0
b) 2
c) 0.5
d) 1
19. If $y=e^{2 x}$ then $\frac{d y}{d x}=$ $\qquad$
a) $2 e^{2 x}$
b) $e^{2 x}$
c) $2 e^{x}$
d) $e^{x}$
20. For the circle $x^{2}+y^{2}+2 g x+2 f y+c=0$, the radius $r=$ $\qquad$
a) $\sqrt{g^{2}+f^{2}+c}$
b) $\sqrt{g^{2} f^{2}-c}$
c) $\sqrt{g^{2}+f^{2}}$
d) $\sqrt{g^{2}+f^{2}-c}$
21. The x -intercept of the line $\frac{x}{2}+\frac{y}{3}=1$ is $\qquad$
a) 2
b) 1
c) 3
d) 4
22. $\frac{d}{d x} k=\_, k$ is real constant.
a) k
c) 0
b) 1
d) none of these
23. $\lim _{x \rightarrow 2} x^{2}-1=$ $\qquad$
a) 1
b) 0
c) 2
d) 3
24. $\left[\begin{array}{ll}2 & 5 \\ 4 & 3\end{array}\right]+\left[\begin{array}{cc}1 & -2 \\ 8 & 1\end{array}\right]=$
a) $\left[\begin{array}{ll}1 & 3 \\ 4 & 2\end{array}\right]$
c) $\left[\begin{array}{ll}1 & 0 \\ 0 & 1\end{array}\right]$
b) $\left[\begin{array}{cc}3 & 3 \\ 12 & 4\end{array}\right]$
d) none of these
25. $\left|\begin{array}{ccc}1 & 4 & -8 \\ 2 & 10 & 6\end{array}\right|=$
a) 0
c) cannot be determined
b) 1
d) none of these
26. The $y$-intercept of the line $y=3 x+4$ is $\qquad$
a) 1
b) 2
c) 3
d) 4
27. Which of the following is false?
a) $d(P, Q) \geq 0$
c) $d(P, Q)=0 \Leftrightarrow P=Q$
b) $d(P, Q)=d(Q, P)$
d) all are correct
28. $\int_{1}^{2} 2 x d x=$
a) 1
b) 2
c) 4
d) 3
29. If A is a square matrix of order $3 \times 3$ and I is an identity matrix of same order then $\mathrm{AI}=$ $\qquad$
a) A
c) O
b) I
d) none of these
30. Equation of a straight line parallel to $x$-axis at a distance of 5 units above the $x$-axis is $\qquad$
a) $x=5$
b) $x=-5$
c) $y=5$
d) $y=-5$

## Q. 2 Do as Directed.

A. Answer the following. (Any five out of seven)

1. Define circle.
2. Define zero matrix.
3. Define determinant.
4. Obtain the equation of the circle with centre $(2,-3)$ and radius 3 .
5.Find the equation of normal to the circle $x^{2}+y^{2}=40$ at the point $(6,2)$
5. Write the equation of the line for which $\tan \theta=\frac{1}{2}$, where $\theta$ is the inclination of the line and $y$ intercept is $-\frac{3}{2}$.
6. State true or false: "Two matrices can be added if they are of same orders."
B. Answer the following. (Any five out of seven)
7. Find the values for c for which $y=2 x+c$ is a tangent to the circle $x^{2}+y^{2}=1$.
8. Find the new co-ordinates of the point when the origin is shifted to the point $(1,3)$.
9. If $A=\left[\begin{array}{ccc}9 & 4 & 5 \\ 8 & 10 & 6\end{array}\right]$ and $B=\left[\begin{array}{ccc}1 & 5 & -2 \\ 18 & 6 & 7\end{array}\right]$, then find $A-B$.
10. Evaluate: $\frac{d}{d x}\left(2 x^{3}+x\right)$
11. Find the equation of a straight line parallel to $y$-axis at a distance of 3 units on the left hand side
of $y$-axis.
12. Find the limit : $\lim _{x \rightarrow 3} x^{3}-6$
13. Find the area under the curve $2 x+x^{3}$ between th the lines $x=1$ and $x=2$.

## Q. 3 Solve the following. (Any five out of six)

1. Find the inverse of the matrix $A=\left[\begin{array}{ll}3 & 1 \\ 4 & 2\end{array}\right]$.
2. Differentiate the function $f(x)=x^{4}+\cos x-e^{2 x}$ with respect to $x$.
3. If $y=x^{2}+2$ and $x=t$, then find $\frac{d y}{d t}$.
4. Find the minima of the function $f(x)=x^{2}-2 x$
5. Find the distance between the two points $(1,6)$ and $(4,2)$.
6.Determine the equation of straight line passing through the points $(3,-4)$ and $(2,5)$.
Q. 4 Solve the following. (Attempt any three out of four)
6. Solve the following system by substitution.

$$
\begin{align*}
& 2 x-3 y=-2  \tag{15}\\
& 4 x+y=24
\end{align*}
$$

2. Find the equations of the bisectors of the angles between the straight lines $4 x-3 y+4=0$ and $6 x$

$$
+8 y-9=0 .
$$

3.Evaluate: (a) $\int x e^{x} d x$ and
(b) $\frac{d y}{d x}$ where $y=x^{2}+\cos x+e^{3 x}$
4.Find the determinant of the matrix $A=\left[\begin{array}{ccc}1 & 3 & 3 \\ -2 & 4 & 1 \\ 3 & 1 & 2\end{array}\right]$

