AWARD LIST

SCREENING TEST (WRITTEN)

FOR THE POST OF TRAINED GRADUATE TEACHERS (TGT) (COTNRACT)

UNIVERSITY MODEL SCHOOL, UNIVERSITY OF PESHAWAR

Dated.20.01.2023

S#	Name of applicant with parentage	Subject	Marks	
1.	Faiza Hasin D/O Mr. Hasin Ullah	Mathematics	24	4.8
2.	Hina Iqbal DO Mr. Muhammad Iqbal	Mathematics	A	
3.	Muneeba Iltaf D/O Mr. Iltaf Ahmad	Mathematics	11	2.2
4.	Rayyan Begum D/O Mr. Mahmoodul Hassan	Mathematics	22	4.4
5.	Samrana Waheed D/O Mr. Waheed Ullah	Mathematics	11	2.2
6.	Sumaya Imran D/O Mr. Abdur Rahim	Mathematics	22	4.4

AWARD LIST

SCREENING TEST (WRITTEN)

FOR THE POST OF TRAINED GRADUATE TEACHERS (TGT) (COTNRACT)

UNIVERSITY PUBLIC SCHOOL, UNIVERSITY OF PESHAWAR

Dated.20.01.2023

S#	Name of applicant with parentage	Subject	Marks
1.	Adnan Khan S/O Mr. Ibrahim Khan	Mathematics	A
2.	Asad Ullah Sohail S/O Mr. Sohail Ahmad	Mathematics	42
3.	Imran Khan S/O Mr. Mian Gul	Mathematics	22
4.	Muhammad Farhan S/O Mr. Meher Zaman	Mathematics	45
5.	Muneeba Iltaf D/O Mr. Iltaf Ahmad	Mathematics	A
6.	Shah Khalid S/O Mr. Aziz ul Hakeem	Mathematics	A
7.	Tauseef Hassan S/O Mr. Lal Hassan	Mathematics	A
8.	Touseer Ahmad S/O Mr. Naseer Khan	Mathematics	19

Max. Marks: 50 **Date: Jan 20, 2023** **Time: 1 Hour**

Name:..... **Father's Name:**.....

Note: Make sure that you got 50 questions on your test. Each question carry equal marks.

1. The roots of the equation $x^2 - x - 6 = 0$ are

   (a) $2, 3$ (b) $-2, 3$ (c) $2, -3$ (d) $-2, -3$

2. The equation $2x + 3y = 0$ has

   (a) No solution (b) exactly one solution (c) exactly two solutions (d) infinite solutions

3. The roots of the equation $x^2 + 2x + 2 = 0$ are

   (a) $-1 - i, 1 - i$ (b) $-1 - i, 1 - i$ (c) $1 - i, 1 + i$ (d) $-1 - i, -1 + i$.

4. The determinant of the matrix $\begin{pmatrix} 2 & 4 & 6 \\ 2 & 4 & 6 \\ 3 & 5 & 7 \end{pmatrix}$ is

   (a) 0 (b) 15 (c) 48 (d) 105.

5. The determinant of the matrix $\begin{pmatrix} 2 & 2 & 2 \\ 0 & 2 & 2 \\ 0 & 0 & 2 \end{pmatrix}$ is

   (a) 0 (b) 8 (c) 16 (d) 32

6. An square matrix whose inverse does not exist is called

   (a) Non-singular (b) Singular (c) Symmetric (d) Skew-symmetric

7. $\log_{10} x^2 =$

   (a) $2 + \log_{10} x$ (b) $2 - \log_{10} x$ (c) $2 \log_{10} x$ (d) $(\log_{10} x)^2$

8. $\log_{10} x =$

   (a) $\ln 10 \ln x$ (b) $\frac{\ln 10}{\ln x}$ (c) $\frac{\ln x}{\ln 10}$ (d) $\frac{1}{\ln 10 \ln x}$.

9. The base of natural logarithm is

   (a) 0 (b) 10 (c) e (d) 2

10. The function $\sinh x$ is defined as

    (a) $\frac{e^x - e^{-x}}{e^x + e^{-x}}$ (b) $\frac{e^x + e^{-x}}{e^x - e^{-x}}$ (c) $\frac{e^x - e^{-x}}{2}$ (d) $\frac{e^x + e^{-x}}{2}$

11. The function $\sec x$ is not defined on the point

(a) $x = 0$ (b) $x = \pi/4$ (c) $\pi/2$ (d) π

12. The function $\tan x$ is defined as

(a) $\frac{e^{ix}-e^{-ix}}{i(e^{ix}+e^{-ix})}$ (b) $\frac{e^{ix}+e^{-ix}}{i(e^{ix}-e^{-ix})}$ (c) $\frac{e^{ix}-e^{-ix}}{2i}$ (d) $\frac{e^{ix}+e^{-ix}}{2i}$.

13. The binomial coefficient ${}^nC_k$ is defined as

(a) $\frac{n!}{(n-k)!k!}$ (b) $\frac{n!(n-k)!}{k!}$ (c) $\frac{n!k!}{(n-k)!}$ (d) $\frac{n!}{(n-k)!}$

14. The area of a circle is

(a) $2\pi r$ (b) πr (c) πr^2 (d) πr^3

15. One angle of a regular hexagon is equal to

(a) $60°$ (b) $90°$ (c) $120°$ (d) $150°$

16. The sum of cube roots of unity is equal to

(a) 1 (b) -1 (c) 0 (d) ∞

17. $\cos(x + y) =$

(a) $\cos x \cos y + \sin x \sin y$ (b) $\cos x \cos y - \sin x \sin y$

(c) $\cos x \cosh y - \sin x \sinh y$ (d) $\cos x \cosh y + \sin x \sinh y$

18. Let $z = x + iy$. Then $\cos z =$

(a) $\cos x \cos y - i \sin x \sin y$ (b) $\cos x \cos y + i \sin x \sin y$

(c) $\cos x \cosh y - i \sin x \sinh y$ (d) $\cos x \cosh y + i \sin x \sinh y$.

19. $\sin 2x =$

(a) $\sin x + \cos y$ (b) $\sin x - \cos x$ (c) $\sin^2 x + cos^2 x$ (d) $2 \sin x \cos x$

20. $\cos 2x =$

(a) $\cos^2 x - \sin^2 x$ (b) $2\cos^2 x - 1$ (c) $1 - 2\sin^2 x$ (d) All of above.

21. The number π is

(a) an integer (b) a rational number (c) an irrational number

(d) a natural number

22. The number $\frac{22}{7}$ is

(a) an integer (b) a rational number (c) an irrational number

(d) a natural number.

23. A number whose square is a negative number is

(a) a real number (b) a complex number (c) an integer (d) none of the above

24. The range of the function $\sin x$ is

(a) $[-\pi, \pi]$ (b) $(-\pi, \pi)$ (c) $[-1, 1]$ (d) $(-1, 1)$

25. The range of the function $\tan x$ is

(a) $[-\pi, \pi]$ (b) $(-\pi, \pi)$ (c) $[-1, 1]$ (d) $(-\infty, \infty)$.

26. The equation of straight line in given by

(a) $y^2 = mx + c$ (b) $y = mx + c$ (c) $y = mx^2 + c$ (d) $y^2 = mx^2 + c$

27. The equation of straight line passing through the points $(4, 2)$ and $(1, 3)$ is

(a) $3x - y = 10$ (b) $3x + y = 10$ (c) $x - 3y = 10$ (d) $x + 3y = 10$.

28. The radius of the circle $(x-1)^2 + (y-2)^2 = 16$ is

(a) 16 (b) 4 (c) 2 (d) 1

29. The radius of the circle $x^2 + y^2 + 2x + 2y + 1 = 0$ is

(a) 5 (b) 4 (c) 2 (d) 1.

30. The slope of tangent to the curve $y = x^2 + 3x + 6$ at $x = 2$ is

(a) 6 (b) 7 (c) 3 (d) 2

31. The equation $\frac{x^2}{4} + \frac{y^2}{9} = 1$ represents

(a) circle (b) parabola (c) ellipse (d) hyperbola

32. The equation $9x^2 - 4y^2 = 36$ represents

(a) circle (b) parabola (c) ellipse (d) hyperbola.

33. The derivative of $\tan x$ is

(a) $\cos x$ (b) $\sin x$ (c) $\sec x$ (d) $\sec^2 x$

34. The derivative of $\cos x \tan x$ is

(a) $\cos x$ (b) $\tan x$ (c) $\sin x$ (d) $-\sin x \sec^2 x$.

35. The integral of $\cot x$ is

(a) $\ln(\sin x)$ (b) $\ln(\cos x)$ (c) $\cos x$ (d) $\ln(\cos x) + \ln(\sin x)$

36. The integral of xe^{x^2} is

(a) $e^{x^2} + c$ (b) $\frac{e^{x^2}}{2} + c$ (c) $2e^{x^2} + c$ (d) $e^{x^2} + 2x^2 e^{x^2} + c$.

37. $\frac{d}{dx}(\log_a x) =$

(a) $\frac{1}{x}$ (b) $\frac{1}{x}\log_a x$ (c) $\frac{1}{x \ln a}$ (d) $\frac{1}{x}\ln a$

38. $\int_{-2}^{2} x^3 \mathrm{d}x =$

(a) 32 (b) -16 (c) 16 (d) 0.

39. The sum and product of roots of the equation $2x^2 + x + 1 = 0$ are

(a) $-1 - i\sqrt{7}, -1 + i\sqrt{7}$ (b) $-\frac{1}{2}, \frac{1}{2}$ (c) $-1, 1$ (d) $2, 1$

40. The multiplicative inverse of the matrix $\begin{pmatrix} 1 & 0 \\ 2 & 1 \end{pmatrix}$ is

(a) $\begin{pmatrix} -1 & 0 \\ -2 & -1 \end{pmatrix}$ (b) $\begin{pmatrix} -1 & 0 \\ 2 & 1 \end{pmatrix}$ (c) $\begin{pmatrix} 1 & 0 \\ 2 & 1 \end{pmatrix}$ (d) $\begin{pmatrix} 1 & 0 \\ -2 & 1 \end{pmatrix}$

41. The general solution of the differential equation $y''(x) - 5y'(x) + 6y(x) = 0$ is

(a) $c_1 \sin 2x + c_2 \sin 3x$ (b) $c_1 \cos 2x + c_2 \cos 3x$

(c) $c_1 \sin 2x + c_2 \cos 3x$ (d) $c_1 e^{2x} + c_2 e^{3x}$

42. The function $f(x) = x$ is

(a) a constant function (b) the identity function (c) an even function

(d) None of the above

43. If the dot product of two vectors is zero then the vectors are

(a) parallel (b) equal (c) perpendicular (d) None of the above

44. One degree is equal to

(a) π radians (b) $\pi/2$ radians (c) $\pi/4$ radians (d) $\pi/180$ radians

45. $\lim_{x \to 0} \frac{\sin x}{x}$

(a) 0 (b) 1 (c) ∞ (d) e

46. $\lim_{n \to \infty} \left(1 + \frac{1}{n}\right)^n$

(a) 0 (b) 1 (c) ∞ (d) e

47. The functions $\log_e x$ and e^x are

(a) same (b) reciprocals of each other (c) inverses of each other

(d) None of the above

48. Set of irrational numbers is a subset of

(a) Set of integers (b) Set of rational numbers (c) Set of real numbers

(d) set of algebraic numbers

49. The intervals $(0, 1)$ and (-1,0) are

(a) overlapping (b) disjoint (c) neither disjoint nor overlapping

(d) both disjoint and overlapping

50. The equation $y = (x - 1)^2 + 2$ represents

(a) a circle (b) a parabola (c) two parallel lines (d) two perpendicular lines

Max. Marks: 50 **Date: Jan 20, 2023** **Time: 1 Hour**

Name:...FAIZA...HASAN **Father's Name:**...HASAN...ULLAH

Note: Make sure that you got 50 questions on your test. Each question carry equal marks.

1. The roots of the equation $x^2 - x - 6 = 0$ are
   (a) $2, 3$ (b) $-2, 3$ (c) $2, -3$ (d) $-2, -3$

2. The equation $2x + 3y = 0$ has
   (a) No solution (b) exactly one solution (c) exactly two solutions
   (d) infinite solutions

3. The roots of the equation $x^2 + 2x + 2 = 0$ are
   (a) $-1 - i, 1 - i$ (b) $-1 - i, 1 - i$ (c) $1 - i, 1 + i$ (d) $-1 - i, -1 + i$.

4. The determinant of the matrix $\begin{pmatrix} 2 & 4 & 6 \\ 2 & 4 & 6 \\ 3 & 5 & 7 \end{pmatrix}$ is
   (a) 0 (b) 15 (c) 48 (d) 105.

5. The determinant of the matrix $\begin{pmatrix} 2 & 2 & 2 \\ 0 & 2 & 2 \\ 0 & 0 & 2 \end{pmatrix}$ is
   (a) 0 (b) 8 (c) 16 (d) 32

6. An square matrix whose inverse does not exist is called
   (a) Non-singular (b) Singular (c) Symmetric (d) Skew-symmetric

7. $\log_{10} x^2 =$
   (a) $2 + \log_{10} x$ (b) $2 - \log_{10} x$ (c) $2 \log_{10} x$ (d) $(\log_{10} x)^2$

8. $\log_{10} x =$
   (a) $\ln 10 \ln x$ (b) $\frac{\ln 10}{\ln x}$ (c) $\frac{\ln x}{\ln 10}$ (d) $\frac{1}{\ln 10 \ln x}$.

9. The base of natural logarithm is
   (a) 0 (b) 10 (c) e (d) 2

10. The function $\sinh x$ is defined as
    (a) $\frac{e^x - e^{-x}}{e^x + e^{-x}}$ (b) $\frac{e^x + e^{-x}}{e^x - e^{-x}}$ (c) $\frac{e^x - e^{-x}}{2}$ (d) $\frac{e^x + e^{-x}}{2}$

11. The function $\sec x$ is not defined on the point

(a) $x = 0$ (b) $x = \pi/4$ (c) $\pi/2$ (d) π

12. The function $\tan x$ is defined as

(a) $\frac{e^{ix}-e^{-ix}}{i(e^{ix}+e^{-ix})}$ (b) $\frac{e^{ix}+e^{-ix}}{i(e^{ix}-e^{-ix})}$ (c) $\frac{e^{ix}-e^{-ix}}{2i}$ (d) $\frac{e^{ix}+e^{-ix}}{2i}$.

13. The binomial coefficient ${}^nC_k$ is defined as

(a) $\frac{n!}{(n-k)!k!}$ (b) $\frac{n!(n-k)!}{k!}$ (c) $\frac{n!k!}{(n-k)!}$ (d) $\frac{n!}{(n-k)!}$

14. The area of a circle is

(a) $2\pi r$ (b) πr (c) πr^2 (d) πr^3

15. One angle of a regular hexagon is equal to

(a) $60°$ (b) $90°$ (c) $120°$ (d) $150°$

16. The sum of cube roots of unity is equal to

(a) 1 (b) -1 (c) 0 (d) ∞

17. $\cos(x+y) =$

(a) $\cos x \cos y + \sin x \sin y$ (b) $\cos x \cos y - \sin x \sin y$

(c) $\cos x \cosh y - \sin x \sinh y$ (d) $\cos x \cosh y + \sin x \sinh y$

18. Let $z = x + iy$. Then $\cos z =$

(a) $\cos x \cos y - i \sin x \sin y$ (b) $\cos x \cos y + i \sin x \sin y$

(c) $\cos x \cosh y - i \sin x \sinh y$ (d) $\cos x \cosh y + i \sin x \sinh y$.

19. $\sin 2x =$

(a) $\sin x + \cos y$ (b) $\sin x - \cos x$ (c) $\sin^2 x + cos^2 x$ (d) $2 \sin x \cos x$

20. $\cos 2x =$

(a) $\cos^2 x - \sin^2 x$ (b) $2\cos^2 x - 1$ (c) $1 - 2\sin^2 x$ (d) All of above.

21. The number π is

(a) an integer (b) a rational number (c) an irrational number

(d) a natural number

22. The number $\frac{22}{7}$ is

(a) an integer (b) a rational number (c) an irrational number

(d) a natural number.

23. A number whose square is a negative number is

(a) a real number (b) a complex number (c) an integer (d) none of the above

24. The range of the function $\sin x$ is

(a) $[-\pi, \pi]$ (b) $(-\pi, \pi)$ (c) $[-1, 1]$ (d) $(-1, 1)$

25. The range of the function $\tan x$ is

(a) $[-\pi, \pi]$ (b) $(-\pi, \pi)$ (c) $[-1, 1]$ (d) $(-\infty, \infty)$.

26. The equation of straight line in given by

(a) $y^2 = mx + c$ (b) $y = mx + c$ (c) $y = mx^2 + c$ (d) $y^2 = mx^2 + c$

27. The equation of straight line passing through the points $(4, 2)$ and $(1, 3)$ is

(a) $3x - y = 10$ (b) $3x + y = 10$ (c) $x - 3y = 10$ (d) $x + 3y = 10$.

28. The radius of the circle $(x-1)^2 + (y-2)^2 = 16$ is

(a) 16 (b) 4 (c) 2 (d) 1

29. The radius of the circle $x^2 + y^2 + 2x + 2y + 1 = 0$ is

(a) 5 (b) 4 (c) 2 (d) 1.

30. The slope of tangent to the curve $y = x^2 + 3x + 6$ at $x = 2$ is

(a) 6 (b) 7 (c) 3 (d) 2

31. The equation $\frac{x^2}{4} + \frac{y^2}{9} = 1$ represents

(a) circle (b) parabola (c) ellipse (d) hyperbola

32. The equation $9x^2 - 4y^2 = 36$ represents

(a) circle (b) parabola (c) ellipse (d) hyperbola.

33. The derivative of $\tan x$ is

(a) $\cos x$ (b) $\sin x$ (c) $\sec x$ (d) $\sec^2 x$

34. The derivative of $\cos x \tan x$ is

(a) $\cos x$ (b) $\tan x$ (c) $\sin x$ (d) $-\sin x \sec^2 x$.

35. The integral of $\cot x$ is

(a) $\ln(\sin x)$ (b) $\ln(\cos x)$ (c) $\cos x$ (d) $\ln(\cos x) + \ln(\sin x)$

36. The integral of xe^{x^2} is

(a) $e^{x^2} + c$ (b) $\frac{e^{x^2}}{2} + c$ (c) $2e^{x^2} + c$ (d) $e^{x^2} + 2x^2 e^{x^2} + c$.

37. $\frac{d}{dx}(\log_a x) =$

(a) $\frac{1}{x}$ (b) $\frac{1}{x}\log_a x$ (c) $\frac{1}{x \ln a}$ (d) $\frac{1}{x}\ln a$

38. $\int_{-2}^{2} x^3 dx =$

(a) 32 (b) -16 (c) 16 (d) 0.

39. The sum and product of roots of the equation $2x^2 + x + 1 = 0$ are

(a) $-1 - i\sqrt{7}, -1 + i\sqrt{7}$ (b) $-\frac{1}{2}, \frac{1}{2}$ (c) $-1, 1$ (d) $2, 1$

40. The multiplicative inverse of the matrix $\begin{pmatrix} 1 & 0 \\ 2 & 1 \end{pmatrix}$ is

(a) $\begin{pmatrix} -1 & 0 \\ -2 & -1 \end{pmatrix}$ (b) $\begin{pmatrix} -1 & 0 \\ 2 & 1 \end{pmatrix}$ (c) $\begin{pmatrix} 1 & 0 \\ 2 & 1 \end{pmatrix}$ (d) $\begin{pmatrix} 1 & 0 \\ -2 & 1 \end{pmatrix}$

41. The general solution of the differential equation $y''(x) - 5y'(x) + 6y(x) = 0$ is

(a) $c_1 \sin 2x + c_2 \sin 3x$ (b) $c_1 \cos 2x + c_2 \cos 3x$

(c) $c_1 \sin 2x + c_2 \cos 3x$ (d) $c_1 e^{2x} + c_2 e^{3x}$

42. The function $f(x) = x$ is

(a) a constant function (b) the identity function (c) an even function

(d) None of the above

43. If the dot product of two vectors is zero then the vectors are

(a) parallel (b) equal (c) perpendicular (d) None of the above

44. One degree is equal to

(a) π radians (b) $\pi/2$ radians (c) $\pi/4$ radians (d) $\pi/180$ radians

45. $\lim_{\theta \to 0} \frac{\sin x}{x}$

(a) 0 (b) 1 (c) ∞ (d) e

46. $\lim_{n \to \infty} \left(1 + \frac{1}{n}\right)^n$

(a) 0 (b) 1 (c) ∞ (d) e

47. The functions $\log_e x$ and e^x are

(a) same (b) reciprocals of each other (c) inverses of each other

(d) None of the above

48. Set of irrational numbers is a subset of

(a) Set of integers (b) Set of rational numbers (c) Set of real numbers

(d) set of algebraic numbers

49. The intervals $(0, 1)$ and (-1,0) are

(a) overlapping (b) disjoint (c) neither disjoint nor overlapping

(d) both disjoint and overlapping

50. The equation $y = (x - 1)^2 + 2$ represents

(a) a circle (b) a parabola (c) two parallel lines (d) two perpendicular lines

Max. Marks: 50 **Date: Jan 20, 2023** **Time: 1 Hour**

Name: Samrand ..... **Father's Name:** Jawhead Ullah

Note: Make sure that you got 50 questions on your test. Each question carry equal marks.

1. The roots of the equation $x^2 - x - 6 = 0$ are

   (a) $2, 3$ (b) $-2, 3$ (c) $2, -3$ (d) $-2, -3$

2. The equation $2x + 3y = 0$ has

   (a) No solution (b) exactly one solution (c) exactly two solutions

   (d) infinite solutions

3. The roots of the equation $x^2 + 2x + 2 = 0$ are

   (a) $-1 - i, 1 - i$ (b) $-1 - i, 1 - i$ (c) $1 - i, 1 + i$ (d) $-1 - i, -1 + i$.

4. The determinant of the matrix $\begin{pmatrix} 2 & 4 & 6 \\ 2 & 4 & 6 \\ 3 & 5 & 7 \end{pmatrix}$ is

   (a) 0 (b) 15 (c) 48 (d) 105.

5. The determinant of the matrix $\begin{pmatrix} 2 & 2 & 2 \\ 0 & 2 & 2 \\ 0 & 0 & 2 \end{pmatrix}$ is

   (a) 0 (b) 8 (c) 16 (d) 32

6. An square matrix whose inverse does not exist is called

   (a) Non-singular (b) Singular (c) Symmetric (d) Skew-symmetric

7. $\log_{10} x^2 =$

   (a) $2 + \log_{10} x$ (b) $2 - \log_{10} x$ (c) $2 \log_{10} x$ (d) $(\log_{10} x)^2$

8. $\log_{10} x =$

   (a) $\ln 10 \ln x$ (b) $\frac{\ln 10}{\ln x}$ (c) $\frac{\ln x}{\ln 10}$ (d) $\frac{1}{\ln 10 \ln x}$.

9. The base of natural logarithm is

   (a) 0 (b) 10 (c) e (d) 2

10. The function $\sinh x$ is defined as

    (a) $\frac{e^x - e^{-x}}{e^x + e^{-x}}$ (b) $\frac{e^x + e^{-x}}{e^x - e^{-x}}$ (c) $\frac{e^x - e^{-x}}{2}$ (d) $\frac{e^x + e^{-x}}{2}$

11. The function $\sec x$ is not defined on the point

(a) $x = 0$ (b) $x = \pi/4$ (c) $\pi/2$ (d) π

12. The function $\tan x$ is defined as

(a) $\frac{e^{ix}-e^{-ix}}{i(e^{ix}+e^{-ix})}$ (b) $\frac{e^{ix}+e^{-ix}}{i(e^{ix}-e^{-ix})}$ (c) $\frac{e^{ix}-e^{-ix}}{2i}$ (d) $\frac{e^{ix}+e^{-ix}}{2i}$.

13. The binomial coefficient ${}^nC_k$ is defined as

(a) $\frac{n!}{(n-k)!k!}$ (b) $\frac{n!(n-k)!}{k!}$ (c) $\frac{n!k!}{(n-k)!}$ (d) $\frac{n!}{(n-k)!}$

14. The area of a circle is

(a) $2\pi r$ (b) πr (c) πr^2 (d) πr^3

15. One angle of a regular hexagon is equal to

(a) $60°$ (b) $90°$ (c) $120°$ (d) $150°$

16. The sum of cube roots of unity is equal to

(a) 1 (b) -1 (c) 0 (d) ∞

17. $\cos(x + y) =$

(a) $\cos x \cos y + \sin x \sin y$ (b) $\cos x \cos y - \sin x \sin y$

(c) $\cos x \cosh y - \sin x \sinh y$ (d) $\cos x \cosh y + \sin x \sinh y$

18. Let $z = x + iy$. Then $\cos z =$

(a) $\cos x \cos y - i \sin x \sin y$ (b) $\cos x \cos y + i \sin x \sin y$

(c) $\cos x \cosh y - i \sin x \sinh y$ (d) $\cos x \cosh y + i \sin x \sinh y$.

19. $\sin 2x =$

(a) $\sin x + \cos y$ (b) $\sin x - \cos x$ (c) $\sin^2 x + cos^2 x$ (d) $2 \sin x \cos x$

20. $\cos 2x =$

(a) $\cos^2 x - \sin^2 x$ (b) $2\cos^2 x - 1$ (c) $1 - 2\sin^2 x$ (d) All of above.

21. The number π is

(a) an integer (b) a rational number (c) an irrational number

(d) a natural number

22. The number $\frac{22}{7}$ is

(a) an integer (b) a rational number (c) an irrational number

(d) a natural number.

23. A number whose square is a negative number is

(a) a real number (b) a complex number (c) an integer (d) none of the above

24. The range of the function $\sin x$ is

(a) $[-\pi, \pi]$ (b) $(-\pi, \pi)$ (c) $[-1, 1]$ (d) $(-1, 1)$

25. The range of the function $\tan x$ is

(a) $[-\pi, \pi]$ (b) $(-\pi, \pi)$ (c) $[-1, 1]$ (d) $(-\infty, \infty)$.

26. The equation of straight line in given by

(a) $y^2 = mx + c$ (b) $y = mx + c$ (c) $y = mx^2 + c$ (d) $y^2 = mx^2 + c$

27. The equation of straight line passing through the points $(4, 2)$ and $(1, 3)$ is

(a) $3x - y = 10$ (b) $3x + y = 10$ (c) $x - 3y = 10$ (d) $x + 3y = 10$.

28. The radius of the circle $(x-1)^2 + (y-2)^2 = 16$ is

(a) 16 (b) 4 (c) 2 (d) 1

29. The radius of the circle $x^2 + y^2 + 2x + 2y + 1 = 0$ is

(a) 5 (b) 4 (c) 2 (d) 1.

30. The slope of tangent to the curve $y = x^2 + 3x + 6$ at $x = 2$ is

(a) 6 (b) 7 (c) 3 (d) 2

31. The equation $\frac{x^2}{4} + \frac{y^2}{9} = 1$ represents

(a) circle (b) parabola (c) ellipse (d) hyperbola

32. The equation $9x^2 - 4y^2 = 36$ represents

(a) circle (b) parabola (c) ellipse (d) hyperbola.

33. The derivative of $\tan x$ is

(a) $\cos x$ (b) $\sin x$ (c) $\sec x$ (d) $\sec^2 x$

34. The derivative of $\cos x \tan x$ is

(a) $\cos x$ (b) $\tan x$ (c) $\sin x$ (d) $-\sin x \sec^2 x$.

35. The integral of $\cot x$ is

(a) $\ln(\sin x)$ (b) $\ln(\cos x)$ (c) $\cos x$ (d) $\ln(\cos x) + \ln(\sin x)$

36. The integral of xe^{x^2} is

(a) $e^{x^2} + c$ (b) $\frac{e^{x^2}}{2} + c$ (c) $2e^{x^2} + c$ (d) $e^{x^2} + 2x^2 e^{x^2} + c$.

37. $\frac{d}{dx}(\log_a x) =$

(a) $\frac{1}{x}$ (b) $\frac{1}{x}\log_a x$ (c) $\frac{1}{x \ln a}$ (d) $\frac{1}{x}\ln a$

38. $\int_{-2}^{2} x^3 \mathrm{d}x =$

(a) 32 (b) -16 (c) 16 (d) 0.

39. The sum and product of roots of the equation $2x^2 + x + 1 = 0$ are

(a) $-1 - i\sqrt{7}, -1 + i\sqrt{7}$ (b) $-\frac{1}{2}, \frac{1}{2}$ (c) $-1, 1$ (d) $2, 1$

40. The multiplicative inverse of the matrix $\begin{pmatrix} 1 & 0 \\ 2 & 1 \end{pmatrix}$ is

(a) $\begin{pmatrix} -1 & 0 \\ -2 & -1 \end{pmatrix}$ (b) $\begin{pmatrix} -1 & 0 \\ 2 & 1 \end{pmatrix}$ (c) $\begin{pmatrix} 1 & 0 \\ 2 & 1 \end{pmatrix}$ (d) $\begin{pmatrix} 1 & 0 \\ -2 & 1 \end{pmatrix}$

41. The general solution of the differential equation $y''(x) - 5y'(x) + 6y(x) = 0$ is

(a) $c_1 \sin 2x + c_2 \sin 3x$ (b) $c_1 \cos 2x + c_2 \cos 3x$

(c) $c_1 \sin 2x + c_2 \cos 3x$ (d) $c_1 e^{2x} + c_2 e^{3x}$

42. The function $f(x) = x$ is

(a) a constant function (b) the identity function (c) an even function

(d) None of the above

43. If the dot product of two vectors is zero then the vectors are

(a) parallel (b) equal (c) perpendicular (d) None of the above

44. One degree is equal to

(a) π radians (b) $\pi/2$ radians (c) $\pi/4$ radians (d) $\pi/180$ radians

45. $\lim_{\theta \to 0} \frac{\sin x}{x}$

(a) 0 (b) 1 (c) ∞ (d) e

46. $\lim_{n \to \infty} \left(1 + \frac{1}{n}\right)^n$

(a) 0 (b) 1 (c) ∞ (d) e

47. The functions $\log_e x$ and e^x are

(a) same (b) reciprocals of each other (c) inverses of each other

(d) None of the above

48. Set of irrational numbers is a subset of

(a) Set of integers (b) Set of rational numbers (c) Set of real numbers

(d) set of algebraic numbers

49. The intervals $(0, 1)$ and (-1,0) are

(a) overlapping (b) disjoint (c) neither disjoint nor overlapping

(d) both disjoint and overlapping

50. The equation $y = (x - 1)^2 + 2$ represents

(a) a circle (b) a parabola (c) two parallel lines (d) two perpendicular lines

42

Max. Marks: 50 **Date: Jan 20, 2023** **Time: 1 Hour**

Name: Asadullah Sohail **Father's Name:** Sohail Ahmad

Note: Make sure that you got 50 questions on your test. Each question carry equal marks.

1. The roots of the equation $x^2 - x - 6 = 0$ are

   (a) $2, 3$ (b) $-2, 3$ (c) $2, -3$ (d) $-2, -3$

2. The equation $2x + 3y = 0$ has

   (a) No solution (b) exactly one solution (c) exactly two solutions (d) infinite solutions

3. The roots of the equation $x^2 + 2x + 2 = 0$ are

   (a) $-1 - i, 1 - i$ (b) $-1 - i, 1 - i$ (c) $1 - i, 1 + i$ (d) $-1 - i, -1 + i$.

4. The determinant of the matrix $\begin{pmatrix} 2 & 4 & 6 \\ 2 & 4 & 6 \\ 3 & 5 & 7 \end{pmatrix}$ is

   (a) 0 (b) 15 (c) 48 (d) 105.

5. The determinant of the matrix $\begin{pmatrix} 2 & 2 & 2 \\ 0 & 2 & 2 \\ 0 & 0 & 2 \end{pmatrix}$ is

   (a) 0 (b) 8 (c) 16 (d) 32

6. An square matrix whose inverse does not exist is called

   (a) Non-singular (b) Singular (c) Symmetric (d) Skew-symmetric

7. $\log_{10} x^2 =$

   (a) $2 + \log_{10} x$ (b) $2 - \log_{10} x$ (c) $2 \log_{10} x$ (d) $(\log_{10} x)^2$

8. $\log_{10} x =$

   (a) $\ln 10 \ln x$ (b) $\frac{\ln 10}{\ln x}$ (c) $\frac{\ln x}{\ln 10}$ (d) $\frac{1}{\ln 10 \ln x}$.

9. The base of natural logarithm is

   (a) 0 (b) 10 (c) e (d) 2

10. The function $\sinh x$ is defined as

    (a) $\frac{e^x - e^{-x}}{e^x + e^{-x}}$ (b) $\frac{e^x + e^{-x}}{e^x - e^{-x}}$ (c) $\frac{e^x - e^{-x}}{2}$ (d) $\frac{e^x + e^{-x}}{2}$

11. The function $\sec x$ is not defined on the point

(a) $x = 0$ (b) $x = \pi/4$ (c) $\pi/2$ (d) π

12. The function $\tan x$ is defined as

(a) $\frac{e^{ix}-e^{-ix}}{i(e^{ix}+e^{-ix})}$ (b) $\frac{e^{ix}+e^{-ix}}{i(e^{ix}-e^{-ix})}$ (c) $\frac{e^{ix}-e^{-ix}}{2i}$ (d) $\frac{e^{ix}+e^{-ix}}{2i}$.

13. The binomial coefficient ${}^nC_k$ is defined as

(a) $\frac{n!}{(n-k)!k!}$ (b) $\frac{n!(n-k)!}{k!}$ (c) $\frac{n!k!}{(n-k)!}$ (d) $\frac{n!}{(n-k)!}$

14. The area of a circle is

(a) $2\pi r$ (b) πr (c) πr^2 (d) πr^3

15. One angle of a regular hexagon is equal to

(a) $60°$ (b) $90°$ (c) $120°$ (d) $150°$

16. The sum of cube roots of unity is equal to

(a) 1 (b) -1 (c) 0 (d) ∞

17. $\cos(x + y) =$

(a) $\cos x \cos y + \sin x \sin y$ (b) $\cos x \cos y - \sin x \sin y$

(c) $\cos x \cosh y - \sin x \sinh y$ (d) $\cos x \cosh y + \sin x \sinh y$

18. Let $z = x + iy$. Then $\cos z =$

(a) $\cos x \cos y - i \sin x \sin y$ (b) $\cos x \cos y + i \sin x \sin y$

(c) $\cos x \cosh y - i \sin x \sinh y$ (d) $\cos x \cosh y + i \sin x \sinh y$.

19. $\sin 2x =$

(a) $\sin x + \cos y$ (b) $\sin x - \cos x$ (c) $\sin^2 x + cos^2 x$ (d) $2 \sin x \cos x$

20. $\cos 2x =$

(a) $\cos^2 x - \sin^2 x$ (b) $2\cos^2 x - 1$ (c) $1 - 2\sin^2 x$ (d) All of above.

21. The number π is

(a) an integer (b) a rational number (c) an irrational number

(d) a natural number

22. The number $\frac{22}{7}$ is

(a) an integer (b) a rational number (c) an irrational number

(d) a natural number.

23. A number whose square is a negative number is

(a) a real number (b) a complex number (c) an integer (d) none of the above

24. The range of the function $\sin x$ is

(a) $[-\pi, \pi]$ (b) $(-\pi, \pi)$ (c) $[-1, 1]$ (d) $(-1, 1)$

25. The range of the function $\tan x$ is

(a) $[-\pi, \pi]$ (b) $(-\pi, \pi)$ (c) $[-1, 1]$ (d) $(-\infty, \infty)$.

26. The equation of straight line in given by

(a) $y^2 = mx + c$ (b) $y = mx + c$ (c) $y = mx^2 + c$ (d) $y^2 = mx^2 + c$

In the given option line doesn't exist passes through the point $(1,3)$ and $(3,2)$

27. The equation of straight line passing through the points $(4, 2)$ and $(1, 3)$ is

(a) $3x - y = 10$ (b) $3x + y = 10$ (c) $x - 3y = 10$ (d) $x + 3y = 10$.

28. The radius of the circle $(x-1)^2 + (y-2)^2 = 16$ is

(a) 16 (b) 4 (c) 2 (d) 1

$\sqrt{f^2+g^2-c}$ $2f=2$ $f=1$ $g=1$ $\sqrt{1+4-16}$

29. The radius of the circle $x^2 + y^2 + 2x + 2y + 1 = 0$ is

(a) 5 (b) 4 (c) 2 (d) 1.

$2n+3|_{n=2} = 4+3=7$

30. The slope of tangent to the curve $y = x^2 + 3x + 6$ at $x = 2$ is

(a) 6 (b) 7 (c) 3 (d) 2

31. The equation $\frac{x^2}{4} + \frac{y^2}{9} = 1$ represents

(a) circle (b) parabola (c) ellipse (d) hyperbola

32. The equation $9x^2 - 4y^2 = 36$ represents

$\frac{x^2}{4} - \frac{y^2}{9}$

(a) circle (b) parabola (c) ellipse (d) hyperbola.

33. The derivative of $\tan x$ is

(a) $\cos x$ (b) $\sin x$ (c) $\sec x$ (d) $\sec^2 x$

34. The derivative of $\cos x \tan x$ is

(a) $\cos x$ (b) $\tan x$ (c) $\sin x$ (d) $-\sin x \sec^2 x$.

35. The integral of $\cot x$ is

$\int \frac{\cos u}{\sin u} du$ $\ln|\sin u| + c$

(a) $\ln(\sin x)$ (b) $\ln(\cos x)$ (c) $\cos x$ (d) $\ln(\cos x) + \ln(\sin x)$

36. The integral of xe^{x^2} is

(a) $e^{x^2} + c$ (b) $\frac{e^{x^2}}{2} + c$ (c) $2e^{x^2} + c$ (d) $e^{x^2} + 2x^2 e^{x^2} + c$.

$\frac{e^{x^2} \cdot 2x}{2} = x e^{x^2}$

37. $\frac{d}{dx}(\log_a x) =$

(a) $\frac{1}{x}$ (b) $\frac{1}{x}\log_a x$ (c) $\frac{1}{x \ln a}$ (d) $\frac{1}{x}\ln a$

38. $\int_{-2}^{2} x^3 dx =$

(a) 32 (b) -16 (c) 16 (d) 0.

39. The sum and product of roots of the equation $2x^2 + x + 1 = 0$ are

(a) $-1 - i\sqrt{7}, -1 + i\sqrt{7}$ (b) $-\frac{1}{2}, \frac{1}{2}$ (c) $-1, 1$ (d) $2, 1$

40. The multiplicative inverse of the matrix $\begin{pmatrix} 1 & 0 \\ 2 & 1 \end{pmatrix}$ is

(a) $\begin{pmatrix} -1 & 0 \\ -2 & -1 \end{pmatrix}$ (b) $\begin{pmatrix} -1 & 0 \\ 2 & 1 \end{pmatrix}$ (c) $\begin{pmatrix} 1 & 0 \\ 2 & 1 \end{pmatrix}$ (d) $\begin{pmatrix} 1 & 0 \\ -2 & 1 \end{pmatrix}$

41. The general solution of the differential equation $y''(x) - 5y'(x) + 6y(x) = 0$ is

(a) $c_1 \sin 2x + c_2 \sin 3x$ (b) $c_1 \cos 2x + c_2 \cos 3x$

(c) $c_1 \sin 2x + c_2 \cos 3x$ (d) $c_1 e^{2x} + c_2 e^{3x}$

42. The function $f(x) = x$ is

(a) a constant function (b) the identity function (c) an even function

(d) None of the above

43. If the dot product of two vectors is zero then the vectors are

(a) parallel (b) equal (c) perpendicular (d) None of the above

44. One degree is equal to

(a) π radians (b) $\pi/2$ radians (c) $\pi/4$ radians (d) $\pi/180$ radians

45. $\lim_{x \to 0} \frac{\sin x}{x}$

(a) 0 (b) 1 (c) ∞ (d) e

46. $\lim_{n \to \infty} \left(1 + \frac{1}{n}\right)^n$

(a) 0 (b) 1 (c) ∞ (d) e

47. The functions $\log_e x$ and e^x are

(a) same (b) reciprocals of each other (c) inverses of each other

(d) None of the above

48. Set of irrational numbers is a subset of

(a) Set of integers (b) Set of rational numbers (c) Set of real numbers

(d) set of algebraic numbers

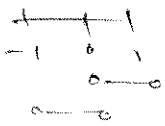
49. The intervals $(0, 1)$ and (-1,0) are

(a) overlapping (b) disjoint (c) neither disjoint nor overlapping

(d) both disjoint and overlapping

50. The equation $y = (x - 1)^2 + 2$ represents

(a) a circle (b) a parabola (c) two parallel lines (d) two perpendicular lines



$$\frac{-b \pm \sqrt{b^2-4ac}}{2a} = \qquad a=1,\ b=2,\ c=2.$$

$$\frac{-2 \pm \sqrt{4-4(1)(2)}}{2a} = \frac{-2 \pm \sqrt{-4}}{2}, \quad \frac{-2 \pm i2}{2}, \quad -1 \pm i$$

$$ax^2+bx+c=0$$

$$x^2+\frac{b}{a}x+\frac{c}{a}=0$$

$$S=-b/a$$

$$P=c/a$$

$$2x^2+x+1=0$$

$$S=-\frac{1}{2}$$

$$P=1/2$$

$$\begin{vmatrix} 1 & 0 \\ 2 & 1 \end{vmatrix} = (1)\neq 0$$

$$\begin{bmatrix} 1 & 0 \\ 2 & 1 \end{bmatrix} =$$

$$1$$

$$y''-5y'+6y=0$$

$$S=6/1$$

$$P=6/1$$

$$c_1e^{2x}+c_2e^{3x}$$

$$y'=c_1e^{2x}\cdot 2+c_2e^{3x}\cdot 3$$

$$y''=4c_1e^{2x}+9c_2e^{3x}$$

$$4c_1e^{2x}+9c_2e^{3x}+c_1e^{2x}+c_2e^{3x}$$

$$-10c_1e^{2x}-15c_2e^{3x}$$

45

Max. Marks: 50 **Date: Jan 20, 2023** **Time: 1 Hour**

Name: M. Farhan **Father's Name:** Meher Zaman

Note: Make sure that you got 50 questions on your test. Each question carry equal marks.

1. The roots of the equation $x^2 - x - 6 = 0$ are

   (a) $2, 3$ (b) $-2, 3$ (c) $2, -3$ (d) $-2, -3$

2. The equation $2x + 3y = 0$ has

   (a) No solution (b) exactly one solution (c) exactly two solutions

   (d) infinite solutions

3. The roots of the equation $x^2 + 2x + 2 = 0$ are

   (a) $-1 - i, 1 - i$ (b) $-1 - i, 1 - i$ (c) $1 - i, 1 + i$ (d) $-1 - i, -1 + i$.

4. The determinant of the matrix $\begin{pmatrix} 2 & 4 & 6 \\ 2 & 4 & 6 \\ 3 & 5 & 7 \end{pmatrix}$ is

   (a) 0 (b) 15 (c) 48 (d) 105.

5. The determinant of the matrix $\begin{pmatrix} 2 & 2 & 2 \\ 0 & 2 & 2 \\ 0 & 0 & 2 \end{pmatrix}$ is

   (a) 0 (b) 8 (c) 16 (d) 32

6. An square matrix whose inverse does not exist is called

   (a) Non-singular (b) Singular (c) Symmetric (d) Skew-symmetric

7. $\log_{10} x^2 =$

   (a) $2 + \log_{10} x$ (b) $2 - \log_{10} x$ (c) $2 \log_{10} x$ (d) $(\log_{10} x)^2$

8. $\log_{10} x =$

   (a) $\ln 10 \ln x$ (b) $\frac{\ln 10}{\ln x}$ (c) $\frac{\ln x}{\ln 10}$ (d) $\frac{1}{\ln 10 \ln x}$.

9. The base of natural logarithm is

   (a) 0 (b) 10 (c) e (d) 2

10. The function $\sinh x$ is defined as

    (a) $\frac{e^x - e^{-x}}{e^x + e^{-x}}$ (b) $\frac{e^x + e^{-x}}{e^x - e^{-x}}$ (c) $\frac{e^x - e^{-x}}{2}$ (d) $\frac{e^x + e^{-x}}{2}$

11. The function $\sec x$ is not defined on the point

(a) $x = 0$ (b) $x = \pi/4$ (c) $\pi/2$ (d) π

12. The function $\tan x$ is defined as

(a) $\frac{e^{ix}-e^{-ix}}{i(e^{ix}+e^{-ix})}$ (b) $\frac{e^{ix}+e^{-ix}}{i(e^{ix}-e^{-ix})}$ (c) $\frac{e^{ix}-e^{-ix}}{2i}$ (d) $\frac{e^{ix}+e^{-ix}}{2i}$.

13. The binomial coefficient ${}^nC_k$ is defined as

(a) $\frac{n!}{(n-k)!k!}$ (b) $\frac{n!(n-k)!}{k!}$ (c) $\frac{n!k!}{(n-k)!}$ (d) $\frac{n!}{(n-k)!}$

14. The area of a circle is

(a) $2\pi r$ (b) πr (c) πr^2 (d) πr^3

15. One angle of a regular hexagon is equal to

(a) $60°$ (b) $90°$ (c) $120°$ (d) $150°$

16. The sum of cube roots of unity is equal to

(a) 1 (b) -1 (c) 0 (d) ∞

17. $\cos(x + y) =$

(a) $\cos x \cos y + \sin x \sin y$ (b) $\cos x \cos y - \sin x \sin y$

(c) $\cos x \cosh y - \sin x \sinh y$ (d) $\cos x \cosh y + \sin x \sinh y$

18. Let $z = x + iy$. Then $\cos z =$

(a) $\cos x \cos y - i \sin x \sin y$ (b) $\cos x \cos y + i \sin x \sin y$

(c) $\cos x \cosh y - i \sin x \sinh y$ (d) $\cos x \cosh y + i \sin x \sinh y$.

19. $\sin 2x =$

(a) $\sin x + \cos y$ (b) $\sin x - \cos x$ (c) $\sin^2 x + cos^2 x$ (d) $2 \sin x \cos x$

20. $\cos 2x =$

(a) $\cos^2 x - \sin^2 x$ (b) $2\cos^2 x - 1$ (c) $1 - 2\sin^2 x$ (d) All of above.

21. The number π is

(a) an integer (b) a rational number (c) an irrational number

(d) a natural number

22. The number $\frac{22}{7}$ is

(a) an integer (b) a rational number (c) an irrational number

(d) a natural number.

23. A number whose square is a negative number is

(a) a real number (b) a complex number (c) an integer (d) none of the above

24. The range of the function $\sin x$ is

(a) $[-\pi, \pi]$ (b) $(-\pi, \pi)$ (c) $[-1, 1]$ (d) $(-1, 1)$

25. The range of the function $\tan x$ is

(a) $[-\pi, \pi]$ (b) $(-\pi, \pi)$ (c) $[-1, 1]$ (d) $(-\infty, \infty)$.

26. The equation of straight line in given by

(a) $y^2 = mx + c$ (b) $y = mx + c$ (c) $y = mx^2 + c$ (d) $y^2 = mx^2 + c$

27. The equation of straight line passing through the points $(4, 2)$ and $(1, 3)$ is

(a) $3x - y = 10$ (b) $3x + y = 10$ (c) $x - 3y = 10$ (d) $x + 3y = 10$.

28. The radius of the circle $(x-1)^2 + (y-2)^2 = 16$ is

(a) 16 (b) 4 (c) 2 (d) 1

29. The radius of the circle $x^2 + y^2 + 2x + 2y + 1 = 0$ is

(a) 5 (b) 4 (c) 2 (d) 1

30. The slope of tangent to the curve $y = x^2 + 3x + 6$ at $x = 2$ is

(a) 6 (b) 7 (c) 3 (d) 2

31. The equation $\frac{x^2}{4} + \frac{y^2}{9} = 1$ represents

(a) circle (b) parabola (c) ellipse (d) hyperbola

32. The equation $9x^2 - 4y^2 = 36$ represents

(a) circle (b) parabola (c) ellipse (d) hyperbola.

33. The derivative of $\tan x$ is

(a) $\cos x$ (b) $\sin x$ (c) $\sec x$ (d) $\sec^2 x$

34. The derivative of $\cos x \tan x$ is

(a) $\cos x$ (b) $\tan x$ (c) $\sin x$ (d) $-\sin x \sec^2 x$.

35. The integral of $\cot x$ is

(a) $\ln(\sin x)$ (b) $\ln(\cos x)$ (c) $\cos x$ (d) $\ln(\cos x) + \ln(\sin x)$

36. The integral of xe^{x^2} is

(a) $e^{x^2} + c$ (b) $\frac{e^{x^2}}{2} + c$ (c) $2e^{x^2} + c$ (d) $e^{x^2} + 2x^2 e^{x^2} + c$.

37. $\frac{d}{dx}(\log_a x) =$

(a) $\frac{1}{x}$ (b) $\frac{1}{x}\log_a x$ (c) $\frac{1}{x \ln a}$ (d) $\frac{1}{x}\ln a$

38. $\int_{-2}^{2} x^3 dx =$

(a) 32 (b) -16 (c) 16 (d) 0

39. The sum and product of roots of the equation $2x^2 + x + 1 = 0$ are

(a) $-1 - i\sqrt{7}, -1 + i\sqrt{7}$ (b) $-\frac{1}{2}, \frac{1}{2}$ (c) $-1, 1$ (d) $2, 1$

40. The multiplicative inverse of the matrix $\begin{pmatrix} 1 & 0 \\ 2 & 1 \end{pmatrix}$ is

(a) $\begin{pmatrix} -1 & 0 \\ -2 & -1 \end{pmatrix}$ (b) $\begin{pmatrix} -1 & 0 \\ 2 & 1 \end{pmatrix}$ (c) $\begin{pmatrix} 1 & 0 \\ 2 & 1 \end{pmatrix}$ (d) $\begin{pmatrix} 1 & 0 \\ -2 & 1 \end{pmatrix}$

41. The general solution of the differential equation $y''(x) - 5y'(x) + 6y(x) = 0$ is

(a) $c_1 \sin 2x + c_2 \sin 3x$ (b) $c_1 \cos 2x + c_2 \cos 3x$

(c) $c_1 \sin 2x + c_2 \cos 3x$ (d) $c_1 e^{2x} + c_2 e^{3x}$

42. The function $f(x) = x$ is

(a) a constant function (b) the identity function (c) an even function

(d) None of the above

43. If the dot product of two vectors is zero then the vectors are

(a) parallel (b) equal (c) perpendicular (d) None of the above

44. One degree is equal to

(a) π radians (b) $\pi/2$ radians (c) $\pi/4$ radians (d) $\pi/180$ radians

45. $\lim_{\theta \to 0} \frac{\sin x}{x}$

(a) 0 (b) 1 (c) ∞ (d) e

46. $\lim_{n \to \infty} \left(1 + \frac{1}{n}\right)^n$

(a) 0 (b) 1 (c) ∞ (d) e

47. The functions $\log_e x$ and e^x are

(a) same (b) reciprocals of each other (c) inverses of each other

(d) None of the above

48. Set of irrational numbers is a subset of

(a) Set of integers (b) Set of rational numbers (c) Set of real numbers

(d) set of algebraic numbers

49. The intervals $(0, 1)$ and (-1,0) are

(a) overlapping (b) disjoint (c) neither disjoint nor overlapping

(d) both disjoint and overlapping

50. The equation $y = (x - 1)^2 + 2$ represents

(a) a circle (b) a parabola (c) two parallel lines (d) two perpendicular lines

Max. Marks: 50 **Date: Jan 20, 2023** **Time: 1 Hour**

Name: Imran Khan **Father's Name:** Mian Gul

Note: Make sure that you got 50 questions on your test. Each question carry equal marks.

1. The roots of the equation $x^2 - x - 6 = 0$ are
   (a) $2, 3$ (b) $-2, 3$ (c) $2, -3$ (d) $-2, -3$

2. The equation $2x + 3y = 0$ has
   (a) No solution (b) exactly one solution (c) exactly two solutions
   (d) infinite solutions

3. The roots of the equation $x^2 + 2x + 2 = 0$ are
   (a) $-1 - i, 1 - i$ (b) $-1 - i, 1 - i$ (c) $1 - i, 1 + i$ (d) $-1 - i, -1 + i$.

4. The determinant of the matrix $\begin{pmatrix} 2 & 4 & 6 \\ 2 & 4 & 6 \\ 3 & 5 & 7 \end{pmatrix}$ is
   (a) 0 (b) 15 (c) 48 (d) 105.

5. The determinant of the matrix $\begin{pmatrix} 2 & 2 & 2 \\ 0 & 2 & 2 \\ 0 & 0 & 2 \end{pmatrix}$ is
   (a) 0 (b) 8 (c) 16 (d) 32

6. An square matrix whose inverse does not exist is called
   (a) Non-singular (b) Singular (c) Symmetric (d) Skew-symmetric

7. $\log_{10} x^2 =$
   (a) $2 + \log_{10} x$ (b) $2 - \log_{10} x$ (c) $2 \log_{10} x$ (d) $(\log_{10} x)^2$

8. $\log_{10} x =$
   (a) $\ln 10 \ln x$ (b) $\frac{\ln 10}{\ln x}$ (c) $\frac{\ln x}{\ln 10}$ (d) $\frac{1}{\ln 10 \ln x}$.

9. The base of natural logarithm is
   (a) 0 (b) 10 (c) e (d) 2

10. The function $\sinh x$ is defined as
    (a) $\frac{e^x - e^{-x}}{e^x + e^{-x}}$ (b) $\frac{e^x + e^{-x}}{e^x - e^{-x}}$ (c) $\frac{e^x - e^{-x}}{2}$ (d) $\frac{e^x + e^{-x}}{2}$

11. The function $\sec x$ is not defined on the point

(a) $x = 0$ (b) $x = \pi/4$ (c) $\pi/2$ (d) π

12. The function $\tan x$ is defined as

(a) $\frac{e^{ix}-e^{-ix}}{i(e^{ix}+e^{-ix})}$ (b) $\frac{e^{ix}+e^{-ix}}{i(e^{ix}-e^{-ix})}$ (c) $\frac{e^{ix}-e^{-ix}}{2i}$ (d) $\frac{e^{ix}+e^{-ix}}{2i}$.

13. The binomial coefficient ${}^nC_k$ is defined as

(a) $\frac{n!}{(n-k)!k!}$ (b) $\frac{n!(n-k)!}{k!}$ (c) $\frac{n!k!}{(n-k)!}$ (d) $\frac{n!}{(n-k)!}$

14. The area of a circle is

(a) $2\pi r$ (b) πr (c) πr^2 (d) πr^3

15. One angle of a regular hexagon is equal to

(a) $60°$ (b) $90°$ (c) $120°$ (d) $150°$

16. The sum of cube roots of unity is equal to

(a) 1 (b) -1 (c) 0 (d) ∞

17. $\cos(x + y) =$

(a) $\cos x \cos y + \sin x \sin y$ (b) $\cos x \cos y - \sin x \sin y$

(c) $\cos x \cosh y - \sin x \sinh y$ (d) $\cos x \cosh y + \sin x \sinh y$

18. Let $z = x + iy$. Then $\cos z =$

(a) $\cos x \cos y - i \sin x \sin y$ (b) $\cos x \cos y + i \sin x \sin y$

(c) $\cos x \cosh y - i \sin x \sinh y$ (d) $\cos x \cosh y + i \sin x \sinh y$.

19. $\sin 2x =$

(a) $\sin x + \cos y$ (b) $\sin x - \cos x$ (c) $\sin^2 x + cos^2 x$ (d) $2 \sin x \cos x$

20. $\cos 2x =$

(a) $\cos^2 x - \sin^2 x$ (b) $2\cos^2 x - 1$ (c) $1 - 2\sin^2 x$ (d) All of above.

21. The number π is

(a) an integer (b) a rational number (c) an irrational number

(d) a natural number

22. The number $\frac{22}{7}$ is

(a) an integer (b) a rational number (c) an irrational number

(d) a natural number.

23. A number whose square is a negative number is

(a) a real number (b) a complex number (c) an integer (d) none of the above

24. The range of the function $\sin x$ is

(a) $[-\pi, \pi]$ (b) $(-\pi, \pi)$ (c) $[-1, 1]$ (d) $(-1, 1)$

25. The range of the function $\tan x$ is

(a) $[-\pi, \pi]$ (b) $(-\pi, \pi)$ (c) $[-1, 1]$ (d) $(-\infty, \infty)$.

26. The equation of straight line in given by

(a) $y^2 = mx + c$ (b) $y = mx + c$ (c) $y = mx^2 + c$ (d) $y^2 = mx^2 + c$

27. The equation of straight line passing through the points $(4, 2)$ and $(1, 3)$ is

(a) $3x - y = 10$ (b) $3x + y = 10$ (c) $x - 3y = 10$ (d) $x + 3y = 10$.

28. The radius of the circle $(x-1)^2 + (y-2)^2 = 16$ is

(a) 16 (b) 4 (c) 2 (d) 1

29. The radius of the circle $x^2 + y^2 + 2x + 2y + 1 = 0$ is

(a) 5 (b) 4 (c) 2 (d) 1.

30. The slope of tangent to the curve $y = x^2 + 3x + 6$ at $x = 2$ is

(a) 6 (b) 7 (c) 3 (d) 2

31. The equation $\frac{x^2}{4} + \frac{y^2}{9} = 1$ represents

(a) circle (b) parabola (c) ellipse (d) hyperbola

32. The equation $9x^2 - 4y^2 = 36$ represents

(a) circle (b) parabola (c) ellipse (d) hyperbola.

33. The derivative of $\tan x$ is

(a) $\cos x$ (b) $\sin x$ (c) $\sec x$ (d) $\sec^2 x$

34. The derivative of $\cos x \tan x$ is

(a) $\cos x$ (b) $\tan x$ (c) $\sin x$ (d) $-\sin x \sec^2 x$.

35. The integral of $\cot x$ is

(a) $\ln(\sin x)$ (b) $\ln(\cos x)$ (c) $\cos x$ (d) $\ln(\cos x) + \ln(\sin x)$

36. The integral of xe^{x^2} is

(a) $e^{x^2} + c$ (b) $\frac{e^{x^2}}{2} + c$ (c) $2e^{x^2} + c$ (d) $e^{x^2} + 2x^2 e^{x^2} + c$.

$$\alpha+\beta = \frac{-b}{a}, \qquad \alpha\beta = \frac{c}{a}$$

$$= \frac{-1}{2} \qquad = \frac{1}{2}$$

$$\begin{vmatrix} 1 & 0 \\ 2 & 1 \end{vmatrix}$$

$$\frac{1}{-1}\begin{vmatrix} & \\ & \end{vmatrix}$$

$$-1\begin{vmatrix} 1 & 0 \\ -2 & 1 \end{vmatrix}$$

$$\begin{vmatrix} -1 & 0 \\ 2 & 1 \end{vmatrix}$$

37. $\frac{d}{dx}(\log_a x) =$

(a) $\frac{1}{x}$ (b) $\frac{1}{x}\log_a x$ (c) $\frac{1}{x \ln a}$ (d) $\frac{1}{x}\ln a$

38. $\int_{-2}^{2} x^3 dx =$

(a) 32 (b) -16 (c) 16 (d) 0.

39. The sum and product of roots of the equation $2x^2 + x + 1 = 0$ are

(a) $-1 - i\sqrt{7}, -1 + i\sqrt{7}$ (b) $-\frac{1}{2}, \frac{1}{2}$ (c) $-1, 1$ (d) $2, 1$

40. The multiplicative inverse of the matrix $\begin{pmatrix} 1 & 0 \\ 2 & 1 \end{pmatrix}$ is

(a) $\begin{pmatrix} -1 & 0 \\ -2 & -1 \end{pmatrix}$ (b) $\begin{pmatrix} -1 & 0 \\ 2 & 1 \end{pmatrix}$ (c) $\begin{pmatrix} 1 & 0 \\ 2 & 1 \end{pmatrix}$ (d) $\begin{pmatrix} 1 & 0 \\ -2 & 1 \end{pmatrix}$

41. The general solution of the differential equation $y''(x) - 5y'(x) + 6y(x) = 0$ is

(a) $c_1 \sin 2x + c_2 \sin 3x$ (b) $c_1 \cos 2x + c_2 \cos 3x$

(c) $c_1 \sin 2x + c_2 \cos 3x$ (d) $c_1 e^{2x} + c_2 e^{3x}$

42. The function $f(x) = x$ is

(a) a constant function (b) the identity function (c) an even function

(d) None of the above

43. If the dot product of two vectors is zero then the vectors are

(a) parallel (b) equal (c) perpendicular (d) None of the above

44. One degree is equal to

(a) π radians (b) $\pi/2$ radians (c) $\pi/4$ radians (d) $\pi/180$ radians

45. $\lim_{\theta \to 0} \frac{\sin x}{x}$

(a) 0 (b) 1 (c) ∞ (d) e

46. $\lim_{n \to \infty} \left(1 + \frac{1}{n}\right)^n$

(a) 0 (b) 1 (c) ∞ (d) e

47. The functions $\log_e x$ and e^x are

(a) same (b) reciprocals of each other (c) inverses of each other

(d) None of the above

48. Set of irrational numbers is a subset of

(a) Set of integers (b) Set of rational numbers (c) Set of real numbers

(d) set of algebraic numbers

$$\int_{-2}^{2} x^3 \, dx$$

$$\frac{x^4}{4} + C$$

$$\frac{x^4}{4} \Big|_{-2}^{2}$$

$$\frac{2^4}{4} - \frac{(-2)^4}{4}$$

$$\frac{16}{4} - \frac{16}{4}$$

$$\frac{0}{4} = 0$$

49. The intervals (0, 1) and (-1,0) are

(a) overlapping (b) disjoint (c) neither disjoint nor overlapping

(d) both disjoint and overlapping

50. The equation $y = (x-1)^2 + 2$ represents

(a) a circle (b) a parabola (c) two parallel lines (d) two perpendicular lines

$x^2 + 3x + 2 = 0$

$x = \frac{-3 \pm \sqrt{4-8}}{2}$

$x^2 + 3x + 2x + 6$

$x(x+3) + 2(x+3)$

$(x+3)(x+2)$

$x = -3, -2$

$(x-1)^2 + (y-2)^2 = 16$

$(x^2 + 1 - 2x) + (y^2 + 4 - 4y) = 16$

$x^2 + 1 - 2x + y^2 + 4 - 4y = 16$

$x^2 + y^2 - 2x - 4y + 5 = 16$

$x^2 + y^2 - 2x - 4y = 11$

$\frac{-3 \pm \sqrt{-4}}{3}$

$= \frac{-3 \pm i3}{3}$

$= \frac{3(-1 \pm i)}{3}$

$(-1+i)(-1-i)$

3 4 6

3 4 6

3 5 7

$3\begin{vmatrix} 4 & 6 \\ 5 & 7 \end{vmatrix} - 4\begin{vmatrix} 2 & 6 \\ 3 & 7 \end{vmatrix} + 6\begin{vmatrix} 2 & 4 \\ 3 & 5 \end{vmatrix}$

$3(28-30) - 4(14-18) + 6(10-12)$

$3(-2) - 4(-4) + 6(-2)$

$-6 + 16 - 12$

$-4 + 4 = 0$

$3\begin{vmatrix} 2 & 2 \\ 0 & 2 \end{vmatrix} - 2\begin{vmatrix} 0 & 2 \\ 0 & 2 \end{vmatrix} + 2\begin{vmatrix} 0 & 2 \\ 0 & 0 \end{vmatrix}$

$3(4-0) - 2(0-0) + 2(0-0)$

12

Sin = Cos

Cos = Sec

Csc = Cot

Sin

Cos

$\log_{10} x =$

Max. Marks: 50 **Date: Jan 20, 2023** **Time: 1 Hour**

Name: Sumayya Imran **Father's Name:** Abdur Rahim

Note: Make sure that you got 50 questions on your test. Each question carry equal marks.

1. The roots of the equation $x^2 - x - 6 = 0$ are

   (a) $2, 3$ (b) $-2, 3$ (c) $2, -3$ (d) $-2, -3$

2. The equation $2x + 3y = 0$ has

   (a) No solution (b) exactly one solution (c) exactly two solutions

   (d) infinite solutions

3. The roots of the equation $x^2 + 2x + 2 = 0$ are

   (a) $-1 - i, 1 - i$ (b) $-1 - i, 1 - i$ (c) $1 - i, 1 + i$ (d) $-1 - i, -1 + i$.

4. The determinant of the matrix $\begin{pmatrix} 2 & 4 & 6 \\ 2 & 4 & 6 \\ 3 & 5 & 7 \end{pmatrix}$ is

   (a) 0 (b) 15 (c) 48 (d) 105.

5. The determinant of the matrix $\begin{pmatrix} 2 & 2 & 2 \\ 0 & 2 & 2 \\ 0 & 0 & 2 \end{pmatrix}$ is

   (a) 0 (b) 8 (c) 16 (d) 32

6. An square matrix whose inverse does not exist is called

   (a) Non-singular (b) Singular (c) Symmetric (d) Skew-symmetric

7. $\log_{10} x^2 =$

   (a) $2 + \log_{10} x$ (b) $2 - \log_{10} x$ (c) $2 \log_{10} x$ (d) $(\log_{10} x)^2$

8. $\log_{10} x =$

   (a) $\ln 10 \ln x$ (b) $\frac{\ln 10}{\ln x}$ (c) $\frac{\ln x}{\ln 10}$ (d) $\frac{1}{\ln 10 \ln x}$.

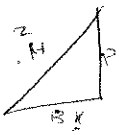
9. The base of natural logarithm is

   (a) 0 (b) 10 (c) e (d) 2

10. The function $\sinh x$ is defined as

    (a) $\frac{e^x - e^{-x}}{e^x + e^{-x}}$ (b) $\frac{e^x + e^{-x}}{e^x - e^{-x}}$ (c) $\frac{e^x - e^{-x}}{2}$ (d) $\frac{e^x + e^{-x}}{2}$

$z = x + iy$



$\cos\theta = \frac{B}{H} = \frac{x}{z}$

11. The function $\sec x$ is not defined on the point

(a) $x = 0$ (b) $x = \pi/4$ (c) $\pi/2$ (d) π

12. The function $\tan x$ is defined as

(a) $\frac{e^{ix}-e^{-ix}}{i(e^{ix}+e^{-ix})}$ (b) $\frac{e^{ix}+e^{-ix}}{i(e^{ix}-e^{-ix})}$ (c) $\frac{e^{ix}-e^{-ix}}{2i}$ (d) $\frac{e^{ix}+e^{-ix}}{2i}$.

13. The binomial coefficient ${}^nC_k$ is defined as

(a) $\frac{n!}{(n-k)!k!}$ (b) $\frac{n!(n-k)!}{k!}$ (c) $\frac{n!k!}{(n-k)!}$ (d) $\frac{n!}{(n-k)!}$

14. The area of a circle is

(a) $2\pi r$ (b) πr (c) πr^2 (d) πr^3

15. One angle of a regular hexagon is equal to

(a) $60°$ (b) $90°$ (c) $120°$ (d) $150°$

16. The sum of cube roots of unity is equal to

(a) 1 (b) -1 (c) 0 (d) ∞

17. $\cos(x + y) =$

(a) $\cos x \cos y + \sin x \sin y$ (b) $\cos x \cos y - \sin x \sin y$

(c) $\cos x \cosh y - \sin x \sinh y$ (d) $\cos x \cosh y + \sin x \sinh y$

18. Let $z = x + iy$. Then $\cos z =$

(a) $\cos x \cos y - i \sin x \sin y$ (b) $\cos x \cos y + i \sin x \sin y$

(c) $\cos x \cosh y - i \sin x \sinh y$ (d) $\cos x \cosh y + i \sin x \sinh y$.

19. $\sin 2x =$

(a) $\sin x + \cos y$ (b) $\sin x - \cos x$ (c) $\sin^2 x + cos^2 x$ (d) $2 \sin x \cos x$

20. $\cos 2x =$

(a) $\cos^2 x - \sin^2 x$ (b) $2\cos^2 x - 1$ (c) $1 - 2\sin^2 x$ (d) All of above.

21. The number π is

(a) an integer (b) a rational number (c) an irrational number

(d) a natural number

22. The number $\frac{22}{7}$ is

(a) an integer (b) a rational number (c) an irrational number

(d) a natural number.

$r = \frac{d}{2} = \quad d = 2r$

$\sin\theta = \frac{P}{h} = \quad \sin\theta h = P$

$\cos\theta = \frac{B}{h} \quad \cos\theta h = B$

$\tan = \frac{P}{b} \quad \tan\theta b = P$

Cosx ~~tanx~~

$\frac{B}{h} \cdot \frac{P}{\cancel{b}} = \frac{P}{h}$

$(x-1)^2 + (y-2)^2 = 16 \quad \therefore x = 4$

$(4-1)^2 + (y-2)^2 = 16$

$(3)^2 + (y-2)^2 = 16$

$9 + y^2 - 4 = 16$

$y^2 = 16 - 9 + 4$

$y^2 =$

23. A number whose square is a negative number is

(a) a real number (b) a complex number (c) an integer (d) none of the above

24. The range of the function $\sin x$ is

(a) $[-\pi, \pi]$ (b) $(-\pi, \pi)$ (c) $[-1, 1]$ (d) $(-1, 1)$

25. The range of the function $\tan x$ is

(a) $[-\pi, \pi]$ (b) $(-\pi, \pi)$ (c) $[-1, 1]$ (d) $(-\infty, \infty)$.

26. The equation of straight line in given by

(a) $y^2 = mx + c$ (b) $y = mx + c$ (c) $y = mx^2 + c$ (d) $y^2 = mx^2 + c$

27. The equation of straight line passing through the points $(4, 2)$ and $(1, 3)$ is

(a) $3x - y = 10$ (b) $3x + y = 10$ (c) $x - 3y = 10$ (d) $x + 3y = 10$.

28. The radius of the circle $(x - 1)^2 + (y - 2)^2 = 16$ is

(a) 16 (b) 4 (c) 2 (d) 1

29. The radius of the circle $x^2 + y^2 + 2x + 2y + 1 = 0$ is

(a) 5 (b) 4 (c) 2 (d) 1.

30. The slope of tangent to the curve $y = x^2 + 3x + 6$ at $x = 2$ is

(a) 6 (b) 7 (c) 3 (d) 2

31. The equation $\frac{x^2}{4} + \frac{y^2}{9} = 1$ represents

(a) circle (b) parabola (c) ellipse (d) hyperbola

32. The equation $9x^2 - 4y^2 = 36$ represents

(a) circle (b) parabola (c) ellipse (d) hyperbola.

33. The derivative of $\tan x$ is

(a) $\cos x$ (b) $\sin x$ (c) $\sec x$ (d) $\sec^2 x$

34. The derivative of $\cos x \tan x$ is

(a) $\cos x$ (b) $\tan x$ (c) $\sin x$ (d) $-\sin x \sec^2 x$.

35. The integral of $\cot x$ is

(a) $\ln(\sin x)$ (b) $\ln(\cos x)$ (c) $\cos x$ (d) $\ln(\cos x) + \ln(\sin x)$

36. The integral of xe^{x^2} is

(a) $e^{x^2} + c$ (b) $\frac{e^{x^2}}{2} + c$ (c) $2e^{x^2} + c$ (d) $e^{x^2} + 2x^2 e^{x^2} + c$.

37. $\frac{d}{dx}(\log_a x) =$

(a) $\frac{1}{x}$ (b) $\frac{1}{x}\log_a x$ (c) $\frac{1}{x \ln a}$ (d) $\frac{1}{x}\ln a$

38. $\int_{-2}^{2} x^3 \mathrm{d}x =$

(a) 32 (b) -16 (c) 16 (d) 0.

39. The sum and product of roots of the equation $2x^2 + x + 1 = 0$ are

(a) $-1 - i\sqrt{7}, -1 + i\sqrt{7}$ (b) $-\frac{1}{2}, \frac{1}{2}$ (c) $-1, 1$ (d) $2, 1$

40. The multiplicative inverse of the matrix $\begin{pmatrix} 1 & 0 \\ 2 & 1 \end{pmatrix}$ is

(a) $\begin{pmatrix} -1 & 0 \\ -2 & -1 \end{pmatrix}$ (b) $\begin{pmatrix} -1 & 0 \\ 2 & 1 \end{pmatrix}$ (c) $\begin{pmatrix} 1 & 0 \\ 2 & 1 \end{pmatrix}$ (d) $\begin{pmatrix} 1 & 0 \\ -2 & 1 \end{pmatrix}$

41. The general solution of the differential equation $y''(x) - 5y'(x) + 6y(x) = 0$ is

(a) $c_1 \sin 2x + c_2 \sin 3x$ (b) $c_1 \cos 2x + c_2 \cos 3x$

(c) $c_1 \sin 2x + c_2 \cos 3x$ (d) $c_1 e^{2x} + c_2 e^{3x}$

42. The function $f(x) = x$ is

(a) a constant function (b) the identity function (c) an even function

(d) None of the above

43. If the dot product of two vectors is zero then the vectors are

(a) parallel (b) equal (c) perpendicular (d) None of the above

44. One degree is equal to

(a) π radians (b) $\pi/2$ radians (c) $\pi/4$ radians (d) $\pi/180$ radians

45. $\lim_{\theta \to 0} \frac{\sin x}{x}$

(a) 0 (b) 1 (c) ∞ (d) e

46. $\lim_{n \to \infty} \left(1 + \frac{1}{n}\right)^n$

(a) 0 (b) 1 (c) ∞ (d) e

47. The functions $\log_e x$ and e^x are

(a) same (b) reciprocals of each other (c) inverses of each other

(d) None of the above

48. Set of irrational numbers is a subset of

(a) Set of integers (b) Set of rational numbers (c) Set of real numbers

(d) set of algebraic numbers

49. The intervals $(0, 1)$ and (-1,0) are

(a) overlapping (b) disjoint (c) neither disjoint nor overlapping

(d) both disjoint and overlapping

50. The equation $y = (x - 1)^2 + 2$ represents

(a) a circle (b) a parabola (c) two parallel lines (d) two perpendicular lines

$$\begin{bmatrix} 2 & 4 & 6 \\ 2 & 4 & 6 \\ 3 & 5 & 7 \end{bmatrix}$$

$2\times2 + 2\times4 + 2\times6$

$2\times2 + 2\times4 + 2\times6$

$3\times3 + 3\times5 + 3\times7$

$$\begin{pmatrix} 4 + 8 + 12 \\ 4 + 8 + 12 \\ 9 + 15 + 21 \end{pmatrix}$$

24

24

45

$x^2 - x - 6 = 0$

$$\begin{bmatrix} 1 & 1 \end{bmatrix} \begin{bmatrix} x^2 \\ x \end{bmatrix} = \begin{bmatrix} -6 \\ 0 \end{bmatrix}$$

$x^2 = x + 6$

$x^2 - x - 6 = 0$

$x + 6 - x - 6 = 0$

$0 = 0$

$1x^2 = -6$

$-6 - x - 6 = 0$

$-12 - x = 0$

$-12 = x$

Max. Marks: 50 **Date: Jan 20, 2023** **Time: 1 Hour**

Name: Muneeba ..... **Father's Name:** Altaf Ahmad

Note: Make sure that you got 50 questions on your test. Each question carry equal marks.

1. The roots of the equation $x^2 - x - 6 = 0$ are

   (a) $2, 3$ (b) $-2, 3$ (c) $2, -3$ (d) $-2, -3$

2. The equation $2x + 3y = 0$ has

   (a) No solution (b) exactly one solution (c) exactly two solutions

   (d) infinite solutions

3. The roots of the equation $x^2 + 2x + 2 = 0$ are

   (a) $-1 - i, 1 - i$ (b) $-1 - i, 1 - i$ (c) $1 - i, 1 + i$ (d) $-1 - i, -1 + i$.

4. The determinant of the matrix $\begin{pmatrix} 2 & 4 & 6 \\ 2 & 4 & 6 \\ 3 & 5 & 7 \end{pmatrix}$ is

   (a) 0 (b) 15 (c) 48 (d) 105.

5. The determinant of the matrix $\begin{pmatrix} 2 & 2 & 2 \\ 0 & 2 & 2 \\ 0 & 0 & 2 \end{pmatrix}$ is

   (a) 0 (b) 8 (c) 16 (d) 32

6. An square matrix whose inverse does not exist is called

   (a) Non-singular (b) Singular (c) Symmetric (d) Skew-symmetric

7. $\log_{10} x^2 =$

   (a) $2 + \log_{10} x$ (b) $2 - \log_{10} x$ (c) $2 \log_{10} x$ (d) $(\log_{10} x)^2$

8. $\log_{10} x =$

   (a) $\ln 10 \ln x$ (b) $\frac{\ln 10}{\ln x}$ (c) $\frac{\ln x}{\ln 10}$ (d) $\frac{1}{\ln 10 \ln x}$.

9. The base of natural logarithm is

   (a) 0 (b) 10 (c) e (d) 2

10. The function $\sinh x$ is defined as

    (a) $\frac{e^x - e^{-x}}{e^x + e^{-x}}$ (b) $\frac{e^x + e^{-x}}{e^x - e^{-x}}$ (c) $\frac{e^x - e^{-x}}{2}$ (d) $\frac{e^x + e^{-x}}{2}$

11. The function $\sec x$ is not defined on the point

(a) $x = 0$ (b) $x = \pi/4$ (c) $\pi/2$ (d) π

12. The function $\tan x$ is defined as

(a) $\frac{e^{ix}-e^{-ix}}{i(e^{ix}+e^{-ix})}$ (b) $\frac{e^{ix}+e^{-ix}}{i(e^{ix}-e^{-ix})}$ (c) $\frac{e^{ix}-e^{-ix}}{2i}$ (d) $\frac{e^{ix}+e^{-ix}}{2i}$.

13. The binomial coefficient ${}^nC_k$ is defined as

(a) $\frac{n!}{(n-k)!k!}$ (b) $\frac{n!(n-k)!}{k!}$ (c) $\frac{n!k!}{(n-k)!}$ (d) $\frac{n!}{(n-k)!}$

14. The area of a circle is

(a) $2\pi r$ (b) πr (c) πr^2 (d) πr^3

15. One angle of a regular hexagon is equal to

(a) $60°$ (b) $90°$ (c) $120°$ (d) $150°$

16. The sum of cube roots of unity is equal to

(a) 1 (b) -1 (c) 0 (d) ∞

17. $\cos(x+y) =$

(a) $\cos x \cos y + \sin x \sin y$ (b) $\cos x \cos y - \sin x \sin y$

(c) $\cos x \cosh y - \sin x \sinh y$ (d) $\cos x \cosh y + \sin x \sinh y$

18. Let $z = x + iy$. Then $\cos z =$

(a) $\cos x \cos y - i \sin x \sin y$ (b) $\cos x \cos y + i \sin x \sin y$

(c) $\cos x \cosh y - i \sin x \sinh y$ (d) $\cos x \cosh y + i \sin x \sinh y$.

19. $\sin 2x =$

(a) $\sin x + \cos y$ (b) $\sin x - \cos x$ (c) $\sin^2 x + cos^2 x$ (d) $2 \sin x \cos x$

20. $\cos 2x =$

(a) $\cos^2 x - \sin^2 x$ (b) $2\cos^2 x - 1$ (c) $1 - 2\sin^2 x$ (d) All of above.

21. The number π is

(a) an integer (b) a rational number (c) an irrational number

(d) a natural number

22. The number $\frac{22}{7}$ is

(a) an integer (b) a rational number (c) an irrational number

(d) a natural number.

23. A number whose square is a negative number is

(a) a real number (b) a complex number (c) an integer (d) none of the above

24. The range of the function $\sin x$ is

(a) $[-\pi, \pi]$ (b) $(-\pi, \pi)$ (c) $[-1, 1]$ (d) $(-1, 1)$

25. The range of the function $\tan x$ is

(a) $[-\pi, \pi]$ (b) $(-\pi, \pi)$ (c) $[-1, 1]$ (d) $(-\infty, \infty)$.

26. The equation of straight line in given by

(a) $y^2 = mx + c$ (b) $y = mx + c$ (c) $y = mx^2 + c$ (d) $y^2 = mx^2 + c$

27. The equation of straight line passing through the points $(4, 2)$ and $(1, 3)$ is

(a) $3x - y = 10$ (b) $3x + y = 10$ (c) $x - 3y = 10$ (d) $x + 3y = 10$.

28. The radius of the circle $(x-1)^2 + (y-2)^2 = 16$ is

(a) 16 (b) 4 (c) 2 (d) 1

29. The radius of the circle $x^2 + y^2 + 2x + 2y + 1 = 0$ is

(a) 5 (b) 4 (c) 2 (d) 1.

30. The slope of tangent to the curve $y = x^2 + 3x + 6$ at $x = 2$ is

(a) 6 (b) 7 (c) 3 (d) 2

31. The equation $\frac{x^2}{4} + \frac{y^2}{9} = 1$ represents

(a) circle (b) parabola (c) ellipse (d) hyperbola

32. The equation $9x^2 - 4y^2 = 36$ represents

(a) circle (b) parabola (c) ellipse (d) hyperbola.

33. The derivative of $\tan x$ is

(a) $\cos x$ (b) $\sin x$ (c) $\sec x$ (d) $\sec^2 x$

34. The derivative of $\cos x \tan x$ is

(a) $\cos x$ (b) $\tan x$ (c) $\sin x$ (d) $-\sin x \sec^2 x$.

35. The integral of $\cot x$ is

(a) $\ln(\sin x)$ (b) $\ln(\cos x)$ (c) $\cos x$ (d) $\ln(\cos x) + \ln(\sin x)$

36. The integral of xe^{x^2} is

(a) $e^{x^2} + c$ (b) $\frac{e^{x^2}}{2} + c$ (c) $2e^{x^2} + c$ (d) $e^{x^2} + 2x^2 e^{x^2} + c$.

37. $\frac{d}{dx}(\log_a x) =$

(a) $\frac{1}{x}$ (b) $\frac{1}{x}\log_a x$ (c) $\frac{1}{x \ln a}$ (d) $\frac{1}{x}\ln a$

38. $\int_{-2}^{2} x^3 dx =$

(a) 32 (b) -16 (c) 16 (d) 0.

39. The sum and product of roots of the equation $2x^2 + x + 1 = 0$ are

(a) $-1 - i\sqrt{7}, -1 + i\sqrt{7}$ (b) $-\frac{1}{2}, \frac{1}{2}$ (c) $-1, 1$ (d) $2, 1$

40. The multiplicative inverse of the matrix $\begin{pmatrix} 1 & 0 \\ 2 & 1 \end{pmatrix}$ is

(a) $\begin{pmatrix} -1 & 0 \\ -2 & -1 \end{pmatrix}$ (b) $\begin{pmatrix} -1 & 0 \\ 2 & 1 \end{pmatrix}$ (c) $\begin{pmatrix} 1 & 0 \\ 2 & 1 \end{pmatrix}$ (d) $\begin{pmatrix} 1 & 0 \\ -2 & 1 \end{pmatrix}$

41. The general solution of the differential equation $y''(x) - 5y'(x) + 6y(x) = 0$ is

(a) $c_1 \sin 2x + c_2 \sin 3x$ (b) $c_1 \cos 2x + c_2 \cos 3x$

(c) $c_1 \sin 2x + c_2 \cos 3x$ (d) $c_1 e^{2x} + c_2 e^{3x}$

42. The function $f(x) = x$ is

(a) a constant function (b) the identity function (c) an even function

(d) None of the above

43. If the dot product of two vectors is zero then the vectors are

(a) parallel (b) equal (c) perpendicular (d) None of the above

44. One degree is equal to

(a) π radians (b) $\pi/2$ radians (c) $\pi/4$ radians (d) $\pi/180$ radians

45. $\lim_{\theta \to 0} \frac{\sin x}{x}$

(a) 0 (b) 1 (c) ∞ (d) e

46. $\lim_{n \to \infty} \left(1 + \frac{1}{n}\right)^n$

(a) 0 (b) 1 (c) ∞ (d) e

47. The functions $\log_e x$ and e^x are

(a) same (b) reciprocals of each other (c) inverses of each other

(d) None of the above

48. Set of irrational numbers is a subset of

(a) Set of integers (b) Set of rational numbers (c) Set of real numbers

(d) set of algebraic numbers

49. The intervals $(0, 1)$ and (-1,0) are

(a) overlapping (b) disjoint (c) neither disjoint nor overlapping

(d) both disjoint and overlapping

50. The equation $y = (x - 1)^2 + 2$ represents

(a) a circle (b) a parabola (c) two parallel lines (d) two perpendicular lines

19

Max. Marks: 50 **Date: Jan 20, 2023** **Time: 1 Hour**

Name:...Tauseef Ahmad.. **Father's Name:**...Naseer Khan...

Note: Make sure that you got 50 questions on your test. Each question carry equal marks.

1. The roots of the equation $x^2 - x - 6 = 0$ are

   (a) $2, 3$ (b) $-2, 3$ (c) $2, -3$ (d) $-2, -3$

2. The equation $2x + 3y = 0$ has

   (a) No solution (b) exactly one solution (c) exactly two solutions

   (d) infinite solutions

3. The roots of the equation $x^2 + 2x + 2 = 0$ are

   (a) $-1 - i, 1 - i$ (b) $-1 - i, 1 - i$ (c) $1 - i, 1 + i$ (d) $-1 - i, -1 + i$.

4. The determinant of the matrix $\begin{pmatrix} 2 & 4 & 6 \\ 2 & 4 & 6 \\ 3 & 5 & 7 \end{pmatrix}$ is

   (a) 0 (b) 15 (c) 48 (d) 105.

5. The determinant of the matrix $\begin{pmatrix} 2 & 2 & 2 \\ 0 & 2 & 2 \\ 0 & 0 & 2 \end{pmatrix}$ is

   (a) 0 (b) 8 (c) 16 (d) 32

6. An square matrix whose inverse does not exist is called

   (a) Non-singular (b) Singular (c) Symmetric (d) Skew-symmetric

7. $\log_{10} x^2 =$

   (a) $2 + \log_{10} x$ (b) $2 - \log_{10} x$ (c) $2 \log_{10} x$ (d) $(\log_{10} x)^2$

8. $\log_{10} x =$

   (a) $\ln 10 \ln x$ (b) $\frac{\ln 10}{\ln x}$ (c) $\frac{\ln x}{\ln 10}$ (d) $\frac{1}{\ln 10 \ln x}$.

9. The base of natural logarithm is

   (a) 0 (b) 10 (c) e (d) 2

10. The function $\sinh x$ is defined as

    (a) $\frac{e^x - e^{-x}}{e^x + e^{-x}}$ (b) $\frac{e^x + e^{-x}}{e^x - e^{-x}}$ (c) $\frac{e^x - e^{-x}}{2}$ (d) $\frac{e^x + e^{-x}}{2}$

11. The function $\sec x$ is not defined on the point

(a) $x = 0$ (b) $x = \pi/4$ (c) $\pi/2$ (d) π

12. The function $\tan x$ is defined as

(a) $\frac{e^{ix}-e^{-ix}}{i(e^{ix}+e^{-ix})}$ (b) $\frac{e^{ix}+e^{-ix}}{i(e^{ix}-e^{-ix})}$ (c) $\frac{e^{ix}-e^{-ix}}{2i}$ (d) $\frac{e^{ix}+e^{-ix}}{2i}$.

13. The binomial coefficient ${}^nC_k$ is defined as

(a) $\frac{n!}{(n-k)!k!}$ (b) $\frac{n!(n-k)!}{k!}$ (c) $\frac{n!k!}{(n-k)!}$ (d) $\frac{n!}{(n-k)!}$

14. The area of a circle is

(a) $2\pi r$ (b) πr (c) πr^2 (d) πr^3

15. One angle of a regular hexagon is equal to

(a) $60°$ (b) $90°$ (c) $120°$ (d) $150°$

16. The sum of cube roots of unity is equal to

(a) 1 (b) -1 (c) 0 (d) ∞

17. $\cos(x + y) =$

(a) $\cos x \cos y + \sin x \sin y$ (b) $\cos x \cos y - \sin x \sin y$

(c) $\cos x \cosh y - \sin x \sinh y$ (d) $\cos x \cosh y + \sin x \sinh y$

18. Let $z = x + iy$. Then $\cos z =$

(a) $\cos x \cos y - i \sin x \sin y$ (b) $\cos x \cos y + i \sin x \sin y$

(c) $\cos x \cosh y - i \sin x \sinh y$ (d) $\cos x \cosh y + i \sin x \sinh y$.

19. $\sin 2x =$

(a) $\sin x + \cos y$ (b) $\sin x - \cos x$ (c) $\sin^2 x + cos^2 x$ (d) $2 \sin x \cos x$

20. $\cos 2x =$

(a) $\cos^2 x - \sin^2 x$ (b) $2\cos^2 x - 1$ (c) $1 - 2\sin^2 x$ (d) All of above.

21. The number π is

(a) an integer (b) a rational number (c) an irrational number

(d) a natural number

22. The number $\frac{22}{7}$ is

(a) an integer (b) a rational number (c) an irrational number

(d) a natural number.

23. A number whose square is a negative number is

(a) a real number (b) a complex number (c) an integer (d) none of the above

24. The range of the function $\sin x$ is

(a) $[-\pi, \pi]$ (b) $(-\pi, \pi)$ (c) $[-1, 1]$ (d) $(-1, 1)$

25. The range of the function $\tan x$ is

(a) $[-\pi, \pi]$ (b) $(-\pi, \pi)$ (c) $[-1, 1]$ (d) $(-\infty, \infty)$.

26. The equation of straight line in given by

(a) $y^2 = mx + c$ (b) $y = mx + c$ (c) $y = mx^2 + c$ (d) $y^2 = mx^2 + c$

27. The equation of straight line passing through the points $(4, 2)$ and $(1, 3)$ is

(a) $3x - y = 10$ (b) $3x + y = 10$ (c) $x - 3y = 10$ (d) $x + 3y = 10$.

28. The radius of the circle $(x-1)^2 + (y-2)^2 = 16$ is

(a) 16 (b) 4 (c) 2 (d) 1

29. The radius of the circle $x^2 + y^2 + 2x + 2y + 1 = 0$ is

(a) 5 (b) 4 (c) 2 (d) 1.

30. The slope of tangent to the curve $y = x^2 + 3x + 6$ at $x = 2$ is

(a) 6 (b) 7 (c) 3 (d) 2

31. The equation $\frac{x^2}{4} + \frac{y^2}{9} = 1$ represents

(a) circle (b) parabola (c) ellipse (d) hyperbola

32. The equation $9x^2 - 4y^2 = 36$ represents

(a) circle (b) parabola (c) ellipse (d) hyperbola.

33. The derivative of $\tan x$ is

(a) $\cos x$ (b) $\sin x$ (c) $\sec x$ (d) $\sec^2 x$

34. The derivative of $\cos x \tan x$ is

(a) $\cos x$ (b) $\tan x$ (c) $\sin x$ (d) $-\sin x \sec^2 x$.

35. The integral of $\cot x$ is

(a) $\ln(\sin x)$ (b) $\ln(\cos x)$ (c) $\cos x$ (d) $\ln(\cos x) + \ln(\sin x)$

36. The integral of xe^{x^2} is

(a) $e^{x^2} + c$ (b) $\frac{e^{x^2}}{2} + c$ (c) $2e^{x^2} + c$ (d) $e^{x^2} + 2x^2 e^{x^2} + c$.

37. $\frac{d}{dx}(\log_a x) =$

(a) $\frac{1}{x}$ (b) $\frac{1}{x}\log_a x$ (c) $\frac{1}{x \ln a}$ (d) $\frac{1}{x}\ln a$

38. $\int_{-2}^{2} x^3 dx =$

(a) 32 (b) -16 (c) 16 (d) 0.

39. The sum and product of roots of the equation $2x^2 + x + 1 = 0$ are

(a) $-1 - i\sqrt{7}, -1 + i\sqrt{7}$ (b) $-\frac{1}{2}, \frac{1}{2}$ (c) $-1, 1$ (d) $2, 1$

40. The multiplicative inverse of the matrix $\begin{pmatrix} 1 & 0 \\ 2 & 1 \end{pmatrix}$ is

(a) $\begin{pmatrix} -1 & 0 \\ -2 & -1 \end{pmatrix}$ (b) $\begin{pmatrix} -1 & 0 \\ 2 & 1 \end{pmatrix}$ (c) $\begin{pmatrix} 1 & 0 \\ 2 & 1 \end{pmatrix}$ (d) $\begin{pmatrix} 1 & 0 \\ -2 & 1 \end{pmatrix}$

41. The general solution of the differential equation $y''(x) - 5y'(x) + 6y(x) = 0$ is

(a) $c_1 \sin 2x + c_2 \sin 3x$ (b) $c_1 \cos 2x + c_2 \cos 3x$

(c) $c_1 \sin 2x + c_2 \cos 3x$ (d) $c_1 e^{2x} + c_2 e^{3x}$

42. The function $f(x) = x$ is

(a) a constant function (b) the identity function (c) an even function

(d) None of the above

43. If the dot product of two vectors is zero then the vectors are

(a) parallel (b) equal (c) perpendicular (d) None of the above

44. One degree is equal to

(a) π radians (b) $\pi/2$ radians (c) $\pi/4$ radians (d) $\pi/180$ radians

45. $\lim_{x \to 0} \frac{\sin x}{x}$

(a) 0 (b) 1 (c) ∞ (d) e

46. $\lim_{n \to \infty} \left(1 + \frac{1}{n}\right)^n$

(a) 0 (b) 1 (c) ∞ (d) e

47. The functions $\log_e x$ and e^x are

(a) same (b) reciprocals of each other (c) inverses of each other

(d) None of the above

48. Set of irrational numbers is a subset of

(a) Set of integers (b) Set of rational numbers (c) Set of real numbers

(d) set of algebraic numbers

49. The intervals $(0, 1)$ and (-1,0) are

(a) overlapping (b) disjoint (c) neither disjoint nor overlapping

(d) both disjoint and overlapping

50. The equation $y = (x - 1)^2 + 2$ represents

(a) a circle (b) a parabola (c) two parallel lines (d) two perpendicular lines

$$\begin{vmatrix} 2 & 4 & 6 \\ 2 & 4 & 6 \\ 3 & 5 & 7 \end{vmatrix} = 2\begin{bmatrix} 4 & 6 \\ 5 & 7 \end{bmatrix} - 4\begin{bmatrix} 2 & 6 \\ 3 & 7 \end{bmatrix} + 6\begin{bmatrix} 2 & 4 \\ 3 & 5 \end{bmatrix}$$

$$= 2(4\times7 - 5\times6) - 4(2\times7 - 6\times3) + 6(2\times5 - 3\times4)$$

$$= 2(28-30) - 4(14-18) + 6(10-12)$$

$$= 2(-2) - 4(-4) + 6(-2)$$

$$= -4 + 16 - 12 \quad = 12 - 12$$

$$\begin{vmatrix} 2 & 2 & 2 \\ 0 & 2 & 2 \\ 0 & 0 & 2 \end{vmatrix} = 2\begin{bmatrix} 2 & 2 \\ 0 & 2 \end{bmatrix} - 2\begin{bmatrix} 0 & 2 \\ 0 & 2 \end{bmatrix} + 2\begin{bmatrix} 0 & 2 \\ 0 & 0 \end{bmatrix}$$

$$= 2(4-0) - 2(0) + 2(0)$$

$$= 8 - 0 + 0$$

$2x+3y=0$

$(x-1)^2 + (y-2)^2$

Q4 $(3)^2 + (2)^2$

$9+4 = (13)^2$

$$\int_{-1}^{2} x^3\,dx$$

$$3\cdot\left(\frac{x^4}{4}\right) =$$

$$3\cdot\left[\left(\frac{(-2)^4}{4}\right) - \left(\frac{(2)^4}{4}\right)\right]$$

$$3\cdot\left(\frac{16}{4} - \frac{16}{4}\right)$$

$$3\cdot[2]$$

$$(6)$$

$2^2 + 3(2) + 6$

$4 + 6 + 6$

$4 + 12$

(16)

$\frac{x^4}{3+1} = \frac{x^4}{4} = \frac{(-2)^4}{4} = \frac{16}{4} = 4$ (6)