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UNIT # 01 Functions and Limits

Each question has four possible answer. Tick the correct answer.

1. **The function $I(x) = x$ is called :**
   (a) A linear function (b) ✔ An identity function (c) A quadratic function (d) A cubic function
2. **If y is expressed in terms of a variable x as $y = f(x)$, then y is called :**
   (a) ✔An explicit function (b) An implicit function (c) A linear function (d) An identity function
3. $Cosh^2x - Sinh^2x =$
   (a) -1 (b) 0 (c) ✔1 (d) None of these
4. $cosechx$ **is equal to**
   (a) $\frac{2}{e^x+e^{-x}}$ (b) $\frac{1}{e^x-e^{-x}}$ (c) ✔ $\frac{2}{e^x-e^{-x}}$ (d) $\frac{2}{e^{-x}+e^x}$
5. $\lim_{x\to a}\frac{x^3-a^3}{x-a} =$
   (a) Undefined (b) ✔ $3a^2$ (c) a^2 (d) 0
6. $\lim_{x\to 0}(1+x)^{\frac{1}{x}} =$
   (a) $\frac{1}{e}$ (b) ✔ e (c) e^2 (d) Undefined
7. **The notation $y = f(x)$ was invented by**
   (a) Lebnitz (b) ✔ Euler (c) Newton (d) Lagrange
8. **If $f(x) = x^2 - 2x + 1$, then $f(0) =$**
   (a) -1 (b) 0 (c) ✔ 1 (d) 2
9. **When we say that f is function from set X to set Y, then X is called**
   (a) ✔Domain of f (b) Range of f (c) Codomain of f (d) None of these
10. **The term "Function" was recognized by______ to describe the dependence of one quantity to another.**
    (a) ✔Lebnitz (b) Euler (c) Newton (d) Lagrange
11. **If $f(x) = x^2$ then the range of f is**
    (a) ✔ [0,∞) (b) (-∞, 0] (c) (0, ∞) (d) None of these
12. **If $f(x) = \frac{x}{x^2-4}$ then domain of f is**
    (a) R (b) $R - \{0\}$ (c) ✔ $R - \{\pm 2\}$ (d) Q
13. **If a graph express a function , then a vertical line must cut the graph at**
    (a) ✔One point only (b) Two points (c) More than one point (d) No point
14. **If $f(x) = \begin{cases} x, & when 0 \le x \le 1 \\ x-1, & when\ 1 < x \le 2 \end{cases}$, then domain of f**
    (a) ✔ [0,2] (b) (0,2) (c) [1,2] (d) all real numbers
15. **The graph of linear equation is always a**
    (a) ✔Straight line (b) parabola (c) circle (d) cube
16. **The domain and range of identity function , $I: X \to X$ is**
    (a) ✔X (b) +iv real numbers (c) –iv real numbers (d) integers
17. **The linear function $f(x) = ax + b$ is identity function if**
    (a) $a \ne 0, b = 1$ (b) $a = 1, b = 0$ (c) $a = 1, b = 1$ (d) $a = 0$
18. **The linear function $f(x) = ax + b$ is constant function if**
    $a \ne 0, b = 1$ (b) $a = 1, b = 0$ (c) $a = 1, b = 1$ (d) ✔ $a = 0$
19. **If $y = cosx$, $domain = R$ then range is**
    (a)]-1,1[(b) ✔ [-1,1] (c) R-[-1,1] (d) R −]-1,1[
20. **If $y = tanx, domain = \{x|x \in R, x \ne (2n+1)\frac{\pi}{2}, n\ interger\}$ then range is**
    (a)]-1,1[(b) [-1,1[(c) R-[-1,1] (d) ✔ all real numbers
21. **If $y = secx$, $domain = \{x|x \in R, x \ne (2n+1)\frac{\pi}{2}, n\ interger\}$ then range is**
    (a)]-1,1[(b) [-1,1[(c) R-[-1,1] (d) ✔ R −]-1,1[
22. **If $y = cotx$, $domain = \{x|x \in R, x = n\pi , n\ integer\}$ then range is**
    (a) $y \ge 1, y \le -1$ (b) $y \le 1, y \ge -1$ (c) $y < 1, y > -1$ (d) ✔ all real numbers
23. **If $y = cosecx$, $domain = \{x|x \in R, x = n\pi , n\ integer\}$ then range is**
    (a) ✔$y \ge 1, y \le -1$ (b) $y \le 1, y \ge -1$ (c) $y < 1, y > -1$ (d) all real numbers
24. **If $x = a^y$, then $y = loga^x$ is called logarithmic function if**
    (a) $a < 0$ (b) $a > 0$ (c) $a = 0$ (d) ✔$a > 0 , a \ne 1$
25. **If $coshx = \frac{e^x+e^{-x}}{2}$, then its domain is set of real numbers and range is**
    (a) Set of all real numbers (b) ✔ Set of +iv real numbers (c) [1,∞) (d) [-1,∞)

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26. **In logarithmic form $cosh^{-1}x$ can be written as**
(a) ✔$\ln(x+\sqrt{x^2+1})$ (b) $\ln(x+\sqrt{x^2-1})$ (c) $\ln(x-\sqrt{x^2+1})$ (d) $\ln(x-\sqrt{x^2-1})$

27. **In logarithmic function $sinh^{-1}x$ is written as**
(b) $\ln(x+\sqrt{x^2+1})$ (b) ✔ $\ln(x+\sqrt{x^2-1})$ (c) $\ln(x-\sqrt{x^2+1})$ (d) $\ln(x-\sqrt{x^2-1})$

28. **In logarithmic form, $tanh^{-1}x$ can be written as**
(a) ✔$\frac{1}{2}\ln\left(\frac{x+1}{x-1}\right), |x|<1$ (b) $\frac{1}{2}\ln\left(\frac{1+x}{1-x}\right), |x|<1$ (c) $\ln(\frac{1}{x}+\frac{\sqrt{1-x^2}}{x}), 0\le x\le 1$
(d) $\ln\left(\frac{1}{x}+\frac{\sqrt{1-x^2}}{|x|}\right), x\neq 0$

29. **In logarithmic form, $coth^{-1}$ can be written as**
(a) $\frac{1}{2}\ln\left(\frac{x+1}{x-1}\right), |x|<1$ (b) ✔ $\frac{1}{2}\ln\left(\frac{1+x}{1-x}\right), |x|<1$ (c) $\ln(\frac{1}{x}+\frac{\sqrt{1-x^2}}{x}), 0\le x\le 1$
(d) $\ln\left(\frac{1}{x}+\frac{\sqrt{1-x^2}}{|x|}\right), x\neq 0$

30. **In logarithmic form, $Sech^{-1}$ can be written as**
(b) $\frac{1}{2}\ln\left(\frac{x+1}{x-1}\right), |x|<1$ (b) $\frac{1}{2}\ln\left(\frac{1+x}{1-x}\right), |x|<1$ (c) ✔ $\ln(\frac{1}{x}+\frac{\sqrt{1-x^2}}{x}), 0\le x\le 1$
(d) $\ln\left(\frac{1}{x}+\frac{\sqrt{1-x^2}}{|x|}\right), x\neq 0$

31. **In logarithmic form, $Cosech^{-1}$ can be written as**
(c) $\frac{1}{2}\ln\left(\frac{x+1}{x-1}\right), |x|<1$ (b) $\frac{1}{2}\ln\left(\frac{1+x}{1-x}\right), |x|<1$ (c) $\ln(\frac{1}{x}+\frac{\sqrt{1-x^2}}{x}), 0\le x\le 1$
(d) ✔ $\ln\left(\frac{1}{x}+\frac{\sqrt{1-x^2}}{|x|}\right), x\neq 0$

32. $x^2+xy+y^2=2$ is an example of
(a) Linear function (b) quadratic function (c) explicit function (d) ✔ Implicit function

33. **$x=at^2, y=2at$ are the parametric equations of**
(a) Circle (b) ✔ Parabola (c) Ellipse (d) Hyperbola

34. **$x=aCos\theta, y=aSin\theta$ are parametric equations of**
(a) Circle (b) Parabola (c) ✔ Ellipse (d) Hyperbola

35. **$x=asec\theta, y=btan\theta$ are parametric equations of**
(b) Circle (b) Parabola (c) Ellipse (d) ✔Hyperbola

36. **The function, $f(x)=3x^4+7-3x^2$ is**
(a) ✔Even (b) Odd (c) Neither (d) None of these

37. **The function, $f(x)=Sinx+Cosx$ is**
(a) Even (b) Odd (c) ✔ Neither (d) None of these

38. **If $f(x)=2x+1, g(x)=x^2-1$, then $(fog)(x)=$**
(a) ✔$2x^2-1$ (b) $4x^2+4x$ (c) $4x+3$ (d) x^4-2x^2

39. **If $f(x)=2x+3, g(x)=x^2-1$, then $(gof)(x)=$**
(a) $2x^2-1$ (b) ✔ $4x^2+4x$ (c) $4x+3$ (d) x^4-2x^2

40. **If $f(x)=2x+3, g(x)=x^2-1$, then $(fof)(x)=$**
(b) $2x^2-1$ (b) $4x^2+4x$ (c) ✔ $4x+3$ (d) x^4-2x^2

41. **If $f(x)=2x+3, g(x)=x^2-1$, then $(gog)(x)=$**
(c) $2x^2-1$ (b) $4x^2+4x$ (c) $4x+3$ (d) ✔ x^4-2x^2

42. **The inverse of a function exists only if it is**
(a) an into function (b) an onto function (c) ✔ (1-1) and into function (d) None of these

43. **If $f(x)=2+\sqrt{x-1}$, then domain of $f^{-1}=$**
(a)]2,∞[(b) ✔ [2,∞[(c) [1,∞[(d)]1,∞[

44. **If $f(x)=2+\sqrt{x-1}$, then range of $f^{-1}=$**
(b)]2,∞[(b) [2,∞[(c) ✔ [1,∞[(d)]1,∞[

45. $\lim_{x\to 0}\frac{Sinx}{x}=1$ ***if and only if***
(a) x is Obtuse angle (b) x is right angle (c) $0<x<\frac{\pi}{2}$ (d) ✔$x\epsilon(-\frac{\pi}{2},\frac{\pi}{2})$

46. **A function is said to be continuous at $x=c$ if**
(a) $\lim_{x\to c}f(x)$ exists (b) $f(c)$is defined (c) $\lim_{x\to c}f(x)=f(c)$ (d) ✔ All of these

47. **$f(x)=ax+b$ *with* $a\neq 0$ is**
(a) ✔A linear function (b) A quadratic function (c) A constant function (d) An identity function

48. **If $f: X\to Y$ is a function then the subset of Y containing all the images is called :**
(a) Domain of f (b) ✔ range of f (c) Co domain of f (d) Subset of X

49. **The graph of $2x-10=0$ is a line**
(a) Parallel to $x-axis$ (b) ✔ Parallel to $y-axis$ (c) inclined at angle θ (d) None of these

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50. $\boldsymbol{Cosechx}$ **is equal to**

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

51. $\frac{e^{2x}+e^{-2x}}{e^{2x}-e^{-2x}}$ **equals to**

(a) $sinh2x$ (b) $cosh2x$ (c) $tanh2x$ (d) ✔ $coth2x$

52. The function $f(x)=\frac{1}{x+1}$ **is discontinuous at** x**=**

(a) 1 (b) ✔ 0 (c) -1 (d) all real numbers

53. If $f(x)=x^3-2x^2+4x-1$ **, then** $f(-1)=$

(a) 8 (b) ✔ -8 (c) 0 (d) -6

54. The quantity which is used as a variable as well as constant is called

(a) ✔Parameter (b) Constant (c) Real Number (d) None of these

55. If $f(x)=\frac{x-1}{x+4}$ **,** $x\neq-4$ **then range of** f **is**

(a) ✔$R-\{1\}$ (b) $R-\{-4\}$ (c) $R-\{0\}$ (d) all real numbers

56. $\lim_{x\to\infty} e^x =$

(a) 1 (b) ∞ (c) ✔ 0 (d) -1

57. $\lim_{x\to 0}\frac{\sin(x-3)}{x-3}=$

(a) ✔1 (b) ∞ (c) $\frac{sin3}{3}$ (d) -3

58. $\lim_{x\to 0}\frac{\sin(x-a)}{x-a}=$

(a) ✔1 (b) ∞ (c) $\frac{sina}{a}$ (d) -3

59. $f(x)=x^3+x$ **is :**

(a) Even (b) ✔ Odd (c) Neither even nor odd (d) None

60. $\lim_{x\to 0}(1+x)^{\frac{1}{x}}=$

(a) ✔e (b) e^{-1} (c) 0 (d) 1

61. If $f: X\to Y$ **is a function , then elements of** x **are called**

(a) Images (b) ✔ Pre-Images (c) Constants (d) Ranges

62. $\lim_{x\to 0}\left(\frac{x}{1+x}\right)=$

(a) e (b) ✔ e^{-1} (c) e^2 (d) $\sqrt{e}$

63. If the degree of a polynomial function is 1, then it is

(a) Identity function (b) Constant function (c) ✔ Linear function (d) Exponential function

64. $Cosh^2x+Sinh^2x=$

(a) 1 (b) ✔ $Cosh2x$ (c) $Sinh2x$ (d) 0

65. $\lim_{x\to 0}\frac{x}{Sinx}=$

(a) 0 (b) ✔ 1 (c) -1 (d) Undefined

66. The function of the form $x=acost$ **;** $y=bsint$

(a) Odd function (b) Explicit function (c) ✔Parametric function(d) Even function

67. If $f(x)=\sqrt{x+2}$ **then range of** f^{-1} **is :**

(a) ✔ [-2,∞) (b) [2,∞) (c) $(-\infty,+\infty)$ (d) [1,∞)

68. $\lim_{x\to-\infty}\frac{-5}{\sqrt{x}}=$

(a) ✔0 (b) $-\infty$ (c) $+\infty$ (d) Not exists

69. The volume V of a cube as a function of the area A of its base.

(a) $A^{\frac{5}{2}}$ (b) $\sqrt{A}$ (c) ✔ $A^{\frac{3}{2}}$ (d) $2\sqrt{A}$

70. $\lim_{x\to 0}\frac{a^x-1}{x}$ **is equal to**

(a) log_{e^x} (b)log_{a^x} (c) a (d) ✔ log_{e^a}

71. $\lim_{x\to 0}\frac{Sinx^\circ}{x}=$

(a) ✔$\frac{\pi}{180^\circ}$ (b) $\frac{180^\circ}{\pi}$ (c) $180\,\pi$ (d) 1

72. If $f(x)=xSecx$ **then** $f(\pi)=$

(a) -2π (b) ✔$-\pi$ (c) π (d) 2π

UNIT # 02 Differentiation

Each question has four possible answer. Tick the correct answer.

1. $\frac{d}{dx}tan3x=$

(a) ✔$3\sec^2 3x$ (b) $\frac{1}{3}\sec^2 3x$ (c) $cot3x$ (d) $\sec^2 x$

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2. $\frac{d}{dx}2^x =$
(a) $\frac{2^x}{ln2}$ (b) $\frac{ln2}{2^x}$ (c) ✔ $2^x ln2$ (d) 2^x
3. **If $y = e^{2x}$, then $y_2 =$**
(a) e^{2x} (b) $2e^{2x}$ (c) ✔ $4\,e^{2x}$ (d) $16\,e^{2x}$
4. $\frac{d}{dx}(ax+b)^n =$
(a) $n(a^{n-1}x+b)$ (b) $n(ax+b)^{n-1}$ (c) $n(a^{n-1}x)$ (d) ✔ $na(ax+b)^{n-1}$
5. **The change in variable x is called increment of x.It is denoted by δx which is**
(a) +iv only (b) –iv only (c) ✔ +iv or –iv (d) none of these
6. **The notation $\frac{dy}{dx}$ or $\frac{df}{dx}$ is used by**
(a) ✔Leibnitz (b) Newton (c)Lagrange (d) Cauchy
7. **The notation $\dot{f}(x)$ is used by**
(a) Leibnitz (b) ✔ Newton (c) Lagrange (d) Cauchy
8. **The notation $f'(x)$ or y' is used by**
(a) Leibnitz (b) Newton (c) ✔ Lagrange (d) Cauchy
9. **The notation $Df(x)$ or Dy is used by**
(a) Leibnitz (b) Newton (c) Lagrange (d) ✔ Cauchy

Note: −The symbol $\frac{dy}{dx}$ is used for derivative of y w.r.t x . Here it is not the quotient of dy

10. $\lim_{x\to a}\frac{f(x)-f(a)}{x-a} =$
(a) $f'(x)$ (b) ✔ $f'(a)$ (c) $f(0$ (d) $f(x-a)$
11. $\frac{d}{dx}(x^n) = nx^{n-1}$ **is called**
(a) ✔Power rule (b) Product rule (c) Quotient rule (d) Constant rule
12. $\frac{d}{dx}(ax+b)^n = na(ax+b)^{n-1}$ **is valid only when n must be:**
(a) real number (b) ✔ rational number (c) imaginary number (d) Irrational number
13. $\frac{d}{dx}(Sina) =$
(a) ✔$\cos a$ (b) $a\cos a$ (c) 0 (d) $-a\cos a$
14. $\frac{d}{dx}[f(x)+g(x)] =$
(a) ✔$f'(x)+g'(x)$ (b) $f'(x)-g'(x)$ (c) $f(x)g'(x)+g(x)f'(x)$ (d) $f(x)g'(x)-g(x)f'(x)$
15. $[f(x)g(x)]'$= **Remember that** $[f(x)g(x)]'=\frac{d}{dx}[f(x)g(x)]$
(a) $f'(x)+g'(x)$ (b) $f'(x)-g'(x)$ (c) ✔ $f(x)g'(x)+g(x)f'(x)$ (d) $f(x)g'(x)-g(x)f'(x)$
16. $\frac{d}{dx}\left(\frac{1}{g(x)}\right) =$
(a) $\frac{1}{[g(x)]^2}$ (b) $\frac{1}{g'(x)}$ (c) $\frac{g'(x)}{[g(x)]^2}$ (d) ✔ $\frac{-g'(x)}{[g(x)]^2}$
17. **If $f(x) = \frac{1}{x}$, then $f''(a) =$**
(a) $-\frac{2}{(a)^3}$ (b) $-\frac{1}{a^2}$ (c) $\frac{1}{a^2}$ (d) ✔ $\frac{2}{a^3}$
18. $(fog)'(x) =$
(a) $f'g'$ (b) $f'g(x)$ (c) ✔ $f'(g(x))g'(x)$ (d) cannot be calculated
19. $\frac{d}{dx}\left(g(x)\right)^n =$
(a) $n[g(x)]^{n-1}$ (b) $n[(g(x)]^{n-1}g(x)$ (c) ✔ $n[(g(x)]^{n-1}g'(x)$ (d) $[g(x)]^{n-1}g'(x)$
20. $\frac{d}{dx}sec^{-1}x =$
(a) ✔$\frac{1}{|x|\sqrt{x^2-1}}$ (b) $\frac{-1}{|x|\sqrt{x^2-1}}$ (c) $\frac{1}{|x|\sqrt{1+x^2}}$ (d) $\frac{-1}{|x|\sqrt{1+x^2}}$
21. $\frac{d}{dx}cosec^{-1}x =$
(a) $\frac{1}{|x|\sqrt{x^2-1}}$ (b) ✔ $\frac{-1}{|x|\sqrt{x^2-1}}$ (c) $\frac{1}{|x|\sqrt{1+x^2}}$ (d) $\frac{-1}{|x|\sqrt{1+x^2}}$

22. **The function $f(x) = a^x, a > 0, a \neq 0$, and x is any real number is called**
(a) ✔Exponential function (b) logarithmic function (c) algebraic function (d) composite function
23. **If $a > 0$, $a \neq 1$, and $x = a^y$ then the function defined by $y = loga^x$ $(x > 0)$ is called a logarithmic function with base**
(a) 10 (b) e (c) ✔ a (d) x

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24. $\boldsymbol{log_{a^a}} =$

(a) ✔1 (b) e (c) a^2 (d) not defined

25. $\frac{d}{dx}\boldsymbol{log_{10^x}} =$

(a) $\frac{1}{x}\log 10$ (b) ✔ $\frac{1}{xlog10}$ (c) $\frac{lnx}{xlnx}$ (d) $\frac{ln10}{xlnx}$

26. $\frac{d}{dx}\boldsymbol{ln[f(x)]} =$

(a) $f'(x)$ (b) $lnf'(x)$ (c) ✔ $\frac{f'(x)}{f(x)}$ (d) $f(x).f'(x)$

27. $\boldsymbol{y = sinh^{-1}x}$ **if and only if** $\boldsymbol{x = sinhy}$ **is valid when**

(a) $x > 0, y > 0$ (b) $x < 0, y < 0$ (c) $x \in R, y > 0$ (d) ✔$x \in R, x > 0$

28. $\boldsymbol{y = cosh^{-1}x}$ **if and only if** $\boldsymbol{x = coshy}$ **is valid when**

(a) ✔ $x \in [1,\infty), y \in [0,\infty)$ (b) $x \in [1,\infty), y \in (0,\infty]$ (c) $x < 0, y < 0$ (d) $x \in R, y \in R$

29. $\boldsymbol{y = tanh^{-1}x}$ **if and only if** $\boldsymbol{x = tanhy}$ **is valid when**

(a) $x \in R, y \in R$ (b) ✔ $x \in]-1,1[, y \in R$ (c) $x \in R[-1,1], y \in R$ (d) $x > 0, y > 0$

30. $\boldsymbol{y = coth^{-1}x}$ **if and only if** $\boldsymbol{x = cothy}$ **is valid when**

(a) $x \in R, y \in R$ (b) $x \in]-1,1[, y \in R$ (c) ✔ $x \in [-1,1], y \in R - \{0\}$ (d) $x > 0, y > 0$

31. $\boldsymbol{y = sech^{-1}x}$ **if and only if** $\boldsymbol{x = sechy}$ **is valid when**

(a) $x \in R, y \in R$ (b) $x \in]-1,1[, y \in R$ (c) $x \in [-1,1], y \in R - \{0\}$(d) ✔ $x \in (0,1], y \in [0,\infty)$

32. $\boldsymbol{y = cosech^{-1}x}$ **if and only if** $\boldsymbol{x = cosechy}$ **is valid when**

(a) $x \in R, y \in R$ (b) $x \in]-1,1[, y \in R$ (c) ✔ $x \in R - \{0\}, y \in R - \{0\}$(d) $x \in (0,1], y \in [0,\infty)$

33. If $\boldsymbol{y = sinh^{-1}(ax+b)}$**, then** $\frac{dy}{dx} =$

(a) $\cos^{-1}(ax+b)$ (b) $\frac{1}{\sqrt{1+(ax+b)^2}}$ (c) ✔ $\frac{a}{\sqrt{1+(ax+b)^2}}$ (d) $a\cosh^{-1}(ax+b)$

34. If $\boldsymbol{cosh^{-1}(secx), then}\frac{dy}{dx} =$

(a) $cosx$ (b) ✔$secx$ (c) $-\sin(secx)$ (d) $-\sinh^{-1}(secx).tanx$

35. If $\boldsymbol{y = e^{-ax}, then\ y_2 =}$

(a) $-ae^{ax}$ (b) $-a^2e^{ax}$ (c) ✔ a^2e^{-2ax} (d) $-a^2e^{-2ax}$

36. If $\boldsymbol{y = e^{-ax}, then y}\frac{dy}{dx} =$

(a) ✔$-ae^{-2ax}$ (b) $-a^2e^{ax}$ (c) a^2e^{-2ax} (d) $-a^2e^{-2ax}$

37. If $\boldsymbol{cos(ax+b), then\ y_2 =}$

(a) $a^2\sin(ax+b)$ (b) $-a^2\sin(ax+b)$ (c) ✔$-a^2\cos(ax+b)$ (d) $a^2\cos(ax+b)$

38. $\boldsymbol{f(x) = f(0) + xf'(x) + \frac{x^2}{2!}f''(x) + \frac{x^3}{3!}f'''(x) + \cdots \ldots + \frac{x^n}{n!}f^n(x) \ldots}$ **is called_____ series.**

(a) ✔Machlaurin's (b) Taylor's (c) Convergent (d) Divergent

39. $\boldsymbol{1 - x + x^2 - x^3 + x^4 - \cdots =}$

(a) ✔$\frac{1}{1+x}$ (b) $\frac{1}{1-x}$ (c) $-\frac{1}{1+x}$ (d) $\frac{1}{x-1}$

$[\boldsymbol{Hint: Use\ S_\infty = \frac{a}{1-r}, with\ a = 1, r = -x}]$

40. $\frac{dy}{dx}|_{(x_1,y_1)}$ **represents**

(a) Increments of x_1 and $y_1$at (x_1, y_1) (b) ✔ slope of tangent at (x_1, y_1)
(c) slope of normal at (x_1, y_1) (d) slope of horizontal line at (x_1, y_1)

41. $\boldsymbol{f}$ **is said to be increasing on** $]\boldsymbol{a,b}[$ **if for** $\boldsymbol{x_1, x_2 \in]a,b[}$

(a) ✔$f(x_2) > f(x_1)$ whenever $x_2 > x_1$ (b) $f(x_2) > f(x_1)$ whenever $x_2 < x_1$
(c) $f(x_2) < f(x_1)$ whenever $x_2 > x_1$ (d) $f(x_2) < f(x_1)$ whenever $x_2 < x_1$

42. $\boldsymbol{f}$ **is said to be decreasing on** $]\boldsymbol{a,b}[$ **if for** $\boldsymbol{x_1, x_2 \in]a,b[}$

(b) $f(x_2) > f(x_1)$ whenever $x_2 > x_1$ (b) $f(x_2) > f(x_1)$ whenever $x_2 < x_1$
(c) ✔ $f(x_2) < f(x_1)$ whenever $x_2 > x_1$ (d) $f(x_2) < f(x_1)$ whenever $x_2 < x_1$

43. If a function $\boldsymbol{f}$ **is increasing within** $]\boldsymbol{a,b}[$ **,then slope of tangent to its graph within** $]\boldsymbol{a,b}[$**remains**

(a) ✔Positive (b) Negative (c) Zero (d) Undefined

44. If a function $\boldsymbol{f}$ **is decreasing within** $]\boldsymbol{a,b}[$ **,then slope of tangent to its graph within** $]\boldsymbol{a,b}[$**remains**

(b) Positive (b) ✔ Negative (c) Zero (d) Undefined

45. A point where 1st derivative of function is zero , is called

(a) ✔Stationary point (b) corner point (c) point of concurrency (d) common point

46. $\boldsymbol{f(x) = sinx}$ **is**

(a) Linear function (b) ✔ odd function (c) even function (d) identity function

47. The maximum value of the function $\boldsymbol{f(x) = x^2 - x - 2}$ **is**

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(a) $-\frac{9}{2}$ (b) ✔ $-\frac{9}{4}$ (c) -1 (d) 0

48. $\frac{d}{dx}(cosx)-\frac{d^2}{dx^2}(sinx)=$

(a) $2sinx$ (b) $2cosx$ (c) ✔ 0 (d) $-2sinx$

49. If $f(x)=x^3+2x+9$ then $f''(x)=$

(a) $3x^2+2$ (b) $3x^2$ (c) ✔ $6x$ (d) $2x$

50. If $f(x)=sinx$ then $f'(cos^{-1}3x)=$

(a) $cosx$ (b) $\frac{-3}{\sqrt{1-9x^2}}$ (c) $\frac{3}{\sqrt{1-9x^2}}$ (d) ✔ $3x$

51. $\frac{d}{dx}(10^{sinx})=$

(a) 10^{cosx} (b) ✔ $10^{sinx}.cosx.ln10$ (c) $10^{sinx}.ln10$ (d) $10^{cosx}.ln10$

52. $\frac{d}{dx}\left(\sqrt{x}-\frac{1}{\sqrt{x}}\right)^2=$

(a) $1-\frac{1}{2x}$ (b) ✔ $1-\frac{1}{x^2}$ (c) $1+\frac{1}{x^2}$ (d) 0

53. At $x=0$, the function $f(x)=1-x^3$ has

(a) Maximum value (b) minimum value (c) ✔point of inflexion (d) no conclusion

54. If $Sin\sqrt{x}$, then $\frac{dy}{dx}$ is equal to

(a) ✔$\frac{cos\sqrt{x}}{2\sqrt{x}}$ (b) $\frac{cos\sqrt{x}}{\sqrt{x}}$ (c) $cos\sqrt{x}$ (d) $\frac{cosx}{\sqrt{x}}$

55. Let f be differentiable function in neighborhood of c and $f'(c)=0$ then $f(x)$ has relative maxima at c if

(a) $f''(c)>0$ (b) ✔ $f''(c)<0$ (c) $f''(c)=0$ (d) $f''(c)\neq 0$

56. $y=x^x$ has the value

(a) Minimum at $x=e$ (b) Maximum at $x=e$ (c) ✔ Minimum at $x=\frac{1}{e}$ (d) Maximum at $x=\frac{1}{e}$

57. $\frac{d}{dx}\left(\frac{1}{cotx}\right)=$

(a) $-cosec^2x$ (b) ✔ $\sec^2 x$ (c) tan^2x (d) $-\sec^2 x$

58. If $f(x)=e^{2x}$, then $f'''(x)=$

(a) $6e^{2x}$ (b) $\frac{1}{6}e^{2x}$ (c) ✔ $8e^{2x}$ (d) $\frac{1}{8}e^{2x}$

59. $\frac{d}{dx}e^{tanx}$ **is equal to**

(a) ✔$e^{tanx}\sec^2 x$ (b) e^{tanx} (c) $e^{tanx}\, lnsec^2x$ (d) $e^{tanx}\ln tanx$

60. $x^3\frac{d}{dx}(ln2x)=$

(a) x^2 (b)✔$2x^2$ (c) $3x^2$ (d) $6x^2$

61. $\frac{d}{dx}(5^x)$ **equal**

(a) $\frac{5^x}{ln5}$ (b) $\frac{ln5}{5^x}$ (c) ✔ $5^x ln5$ (d) 5^x

62. If $y=e^{2x}$, then $y_4=$

(a) ✔$16e^{2x}$ (b) $8e^{2x}$ (c) $4e^{2x}$ (d) $2e^{2x}$

63. If $f'(c)=0$, then f has relative maximum value at $x=c$, if

(a) $f'(c)>0$ (b) ✔ $f''(c)<0$ (c) $f''(c)=0$ (d) None

64. $\frac{d}{dx}(Cosecx)$ **is equal to**

(a) $cosecxtanx$ (b) $cosecx.cotx$ (c) ✔ $-cosecxcotx$ (d) $tanx$

65. A function f is neither increasing nor decreasing at a point , provided that $f'(x)=0$ at that point , then it is called:

(a) Critical point (b) ✔ stationary point (c) maximum point (d) minimum point

66. $\frac{d}{dx}(x^{-2})=$

(a) $-2x^3$ (b) $-2x^2$ (c) ✔ $-2x^{-3}$ (d) $-2x$

67. $\frac{d}{dx}(cos^{-1}x)=$

(a) $\frac{1}{\sqrt{1-x^2}}$ (b) $\frac{-1}{\sqrt{x^2-1}}$ (c) $\frac{1}{\sqrt{x^2-1}}$ (d) $\frac{1}{\sqrt{1-x^2}}$

68. The function $f(x)=ax^2+bx+c$ has minimum value if:

(a) $a>0$ (b) $a<0$ (c) $a=0$ (d) $a=-1$

69. $\lim_{\delta_x\to -0^-}\frac{|\delta_x|}{\delta_x}$ **is equal to**

(a) 1 (b) not exist (c) ✔ -1 (d) zero

70. $1-x+x^2-x^3+x^4+\cdots.+(-1)^n x^n+\cdots$ is the expansion of

(a) $\frac{1}{1-x}$ (b) ✔$\frac{1}{1+x}$ (c) $\frac{1}{\sqrt{1-x}}$ (d) $\frac{1}{\sqrt{1+x}}$

71. Derivative of $y=\frac{3}{4}x^4+\frac{2}{3}x^3$ is

(a) $\frac{3}{4}(4x^4)$ (b) ✔ $3x^3+2x^2$ (c) $3x^3$ (d) None of these

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72. If $f'(x) = 0, f''(x) \leq 0$ at a point P, then P is called
(a) Relative maxima (b) relative minima (c) point of inflexion (d) ✔ None of these

73. If f be a real valued function , continuous in interval $]x, x_1[\in D_f$ and if $\lim_{x_1 \to x} \frac{f(x_1)-f(x)}{x_1-x}$ exists, then the quotient is called
(a) Derivative of f (b) Differential of f (c) ✔ Average rate of change of f (d) Actual change of f

74. If $f(x) = x^4 + 2x^3 + x^2$ then $f'(0) =$
(a) 4 (b) ✔ 0 (c) -4 (d) 1

75. If g is differentiable function at the point x and f is differentiable at point $g(x)$, then $(fog)'(x)$ or $\frac{d}{dx}(fog)(x) =$
(a) $f'(x)g'(x)$ (b) $(fog)'(x)$ (c) ✔ $f'(g(x))g'(x)$ (d) $f'(g'(x))$

76. If $y = sinh^{-1}(x^3)$ then $\frac{dy}{dx} =$
(a) $\frac{1}{\sqrt{1+x^2}}$ (b) $\frac{3x^2}{\sqrt{1+x^2}}$ (c) $\frac{1}{\sqrt{1+x^6}}$ (d) ✔ $\frac{3x^2}{\sqrt{1+x^6}}$

77. A function $f(x)$ is such that , at a point $x = c$, $f'(x) > 0$ at $x = c$, then f is said to be
(a) ✔Increasing (b) decreasing (c) constant (d) 1-1 function

78. A function $f(x)$ is such that , at a point $x = c$, $f'(x) < 0$ at $x = c$, then f is said to be
(a) Increasing (b) ✔ decreasing (c) constant (d) 1-1 function

(b) **A function $f(x)$ is such that , at a point $x = c$, $f'(x) = 0$ at $x = c$, then f is said to be**
(a) Increasing (b) decreasing (c) ✔ constant (d) 1-1 function

79. A stationary point is called ______ if it is either a maximum point or a minimum point
(a) Stationary point (b) ✔ turning point (c) critical point (d) point of inflexion

80. If $f'(c) = 0$ or $f'(c)$ is undefined , then the number c is called critical value and the corresponding point is called_______
(a) Stationary point (b) turning point (c) ✔ critical point (d) point of inflexion

81. If $f'(c)$ does not change before and after $x = c$, then this point is called_______
(a) Stationary point (b) turning point (c) critical point (d) ✔ point of inflexion

Note:- Every stationary point is also called critical point but then converse may or may not be true.

82. Let f be a differentiable function such that $f'(c) = 0$ then if $f'(x)$ changes sign from +iv to –iv i.e., before and after $x = c$, then it occurs relative ______ at $x = c$
(a) ✔Maximum (b) minimum (c) point of inflexion (d) none

83. Let f be a differentiable function such that $f'(c) = 0$ then if $f'(x)$ changes sign from -iv to +iv i.e., before and after $x = c$, then it occurs relative ______ at $x = c$
(b) Maximum (b) ✔ minimum (c) point of inflexion (d) none

84. Let f be a differentiable function such that $f'(c) = 0$ then if $f'(x)$ does not change sign i.e., before and after $x = c$, then it occurs ______ at $x = c$
(c) Maximum (b) minimum (c) ✔point of inflexion (d) none

85. If $f(x) = e^{\sqrt{x}-1}$ then $f'(0) =$
(a) e^{-1} (b) e (c) ✔∞ (d) $\frac{1}{2}$

86. $\frac{d}{dx}(tan^{-1}x - cot^{-1}x) =$
(a) $\frac{2}{\sqrt{1+x^2}}$ (b) ✔ $\frac{2}{1+x^2}$ (c) 0 (d) $\frac{-2}{1+x^2}$

87. If $f\left(\frac{1}{x}\right) = tanx$, then $f'\left(\frac{1}{\pi}\right) =$
(a) π^2 (b) ✔ $-\pi^2$ (c) 1 (d) $\frac{-1}{\pi^2}$

88. $\lim_{h \to 0} \frac{f(a+h)-f(a)}{h} =$
(a) 0 (b) $f(a)$ (c) $f(h)$ (d) ✔ $f'(a)$

89. If $f(x) = \frac{1}{x}$, then a critical point of f is
(a) ✔0 (b) 1 (c) -1 (d) no point

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UNIT # 03 Integration

Each question has four possible answer.Tick the correct answer.

1. If $y = f(x)$, then differential of y is
(a) $dy = f'(x)$ (b) ✔ $dy = f'(x)dx$ (c) $dy = f(x)dx$ (d) $\frac{dy}{dx}$

2. If $\int f(x)dx = \varphi(x) + c$,then $f(x)$ is called
(a) Integral (b) differential (c) derivative (d) ✔ integrand

3. If $n \neq 1$, then $\int (ax+b)^n dx =$
(a) $\frac{n(ax+b)^{n-1}}{a} + c$ (b) $\frac{n(ax+b)^{n+1}}{n} + c$ (c) $\frac{(ax+b)^{n-1}}{n+1} + c$ (d) ✔ $\frac{(ax+b)^{n+1}}{a(n+1)} + c$

4. $\int \sin(ax+b)\, dx$=
(a) ✔$\frac{-1}{a}\cos(ax+b) + c$ (b) $\frac{1}{a}\cos(ax+b) + c$ (c) $a\cos(ax+b) + c$ (d)$-a\cos(ax+b) + c$

5. $\int e^{-\lambda x} dx =$
(a) $\lambda e^{-\lambda x} + c$ (b) $-\lambda e^{-\lambda x} + c$ (c) $\frac{e^{-\lambda x}}{\lambda} + c$ (d) ✔ $\frac{e^{-\lambda x}}{-\lambda} + c$

6. $\int a^{\lambda x} dx =$
(a) $\frac{a^{\lambda x}}{\lambda}$ (b) $\frac{a^{\lambda x}}{lna}$ (c) ✔ $\frac{a^{\lambda x}}{alna}$ (d) $a^{\lambda x}\lambda.lna$

7. $\int [f(x)]^n f'(x)dx =$
(a) $\frac{f^n(x)}{n} + c$ (b) $f(x) + c$ (c) ✔ $\frac{f^{n+1}(x)}{n+1} + c$ (d) $nf^{n+1}(x) + c$

8. $\int \frac{f'(x)}{f(x)} dx =$
(a) $f(x) + c$ (b) $f'(x) + c$ (c) ✔$\ln|x| + c$ (nd) $\ln|f'(x)| + c$

9. $\int \frac{dx}{\sqrt{x+a}+\sqrt{x}}$ can be evaluated if
(a) ✔$x > 0, a > 0$ (b) $x < 0, a > 0$ (c) $x < 0, a < 0$ (d) $x > 0, a < 0$

10. $\int \frac{x}{\sqrt{x^2+3}} dx =$
(a) ✔$\sqrt{x^2+3} + c$ (b) $-\sqrt{x^2+3} + c$ (c) $\frac{\sqrt{x^2+3}}{2} + c$ (d) $-\frac{1}{2}\sqrt{x^2+3} + c$

11. $\int e^{x^2}.xdx =$
(a) $\frac{a^{x^2}}{lna} + c$ (b) ✔ $\frac{a^{x^2}}{2lna} + c$ (c) $a^{x^2}lna + c$ (d) $\frac{a^{x^2}}{2} + c$

12. $\int e^{ax}[af(x) + f'(x)]dx =$
(a) ✔$e^{ax}f(x) + c$ (b) $e^{ax}f'(x) + c$ (c) $ae^{ax}f(x) + c$ (d) $ae^{ax}f'(x) + c$

13. $\int e^x[sinx + cos]dx =$
(a) ✔$e^x sinx + c$ (b) $e^x cos + c$ (c) $-e^x sinx + c$ (d) $-e^x cosx + c$

14. To determine the area under the curve by the use of integration , the idea was given by
(a) Newton (b) ✔ Archimedes (c) Leibnitz (d) Taylor

15. The order of the differential equation : $x\frac{d^2y}{dx^2} + \frac{dy}{dx} - 2 = 0$
(a) 0 (b) 1 (c) ✔ 2 (d) more than 2

16. The equation $y = x^2 - 2x + c$ represents (c being a parameter)
(a) One parabola (b) family of parabolas (c) family of line (d) two parabolas

17. $\int e^{sinx}.cosxdx =$
(a) ✔$e^{sinx} + c$ (b) $e^{cosx} + c$ (c) $\frac{e^{sinx}}{cosx}$ (d) $\frac{e^{cosx}}{sinx}$

18. $\int (2x+3)^{\frac{1}{2}} dx =$
(a) $\frac{1}{3}(2x+3)^{\frac{3}{2}}$ (b) $\frac{1}{3}(2x+3)^{-\frac{1}{2}}$ (c) $\frac{1}{3}(2x+3)$ (d) None

19. $\int x^n dx = \frac{x^{+1}}{n+1} + c$ is true for all values of n except
(a) $n = 0$ (b) $n = 1$ (c) ✔$n \neq -1$ (d) $n = any\ fractional\ value$

20. $\int_1^2 a^x dx =$
(a) $(a^2 - a)lna$ (b) ✔ $\frac{(a^2-a)}{lna}$ (c) $\frac{(a^2-a)}{\log a}$ (d) $(a^2 - a)lna$

21. $\int \frac{e^{Tan^{-1}x}}{1+x^2} dx =$
(a) $e^{Tanx} + c$ (b) $\frac{1}{2}e^{Tan^{-1}x} + c$ (c) $x\, e^{Tan^{-1}x} + c$ (d) ✔ $e^{Tan^{-1}x} + c$

22. $\int \frac{dx}{x\sqrt{x^2-1}} =$
(a) ✔$Sec^{-1}x + c$ (b) $Tan^{-1}x + c$ (c) $Cot^{-1}x + c$ (d) $Sin^{-1}x + c$

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23. $\int \boldsymbol{sin3xdx}$ **is equal to**

(a) $\frac{cos3x}{3}+c$ (b) ✔ $-\frac{cos3x}{3}+c$ (c) $3cos3x+c$ (d) $-3\ cos3x+c$

24. **If** $\int_2^1 f(x)dx = 5, \int_2^1 g(x)dx = 4\ then\ \int_{-2}^1 3f(x)dx - \int_{-2}^1 2g(x)dx =$

(a) ✔7 (b) 9 (c) 12 (d) 8

25. $\int e^{f(x)}.f'(x)dx =$

(a) $lnf(x)+c$ (b) ✔ $e^{f(x)}+c$ (c) $lnf'(x)+c$ (d) $e^{f(x)}+c$

26. $\int \boldsymbol{cosxdx} =$

(a) ✔$-sinx+c$ (b) $sinx+c$ (c) $-cosx+c$ (d) $cosx+c$

27. $\boldsymbol{If\ a} > 0\ and\ a \neq 1\ then, \int \boldsymbol{a^x dx} =$

(a) a^x+c (b) $a^x lna+c$ (c) ✔ $\frac{a^x}{lna}+c$ (d) $\frac{a^{x+1}}{x+1}+c$

28. $\int \frac{dx}{1+x^2} =$

(a) $tanx+c$ (b) ✔ $\tan^{-1}+c$ (c) $cotx+c$ (d) $\cot^{-1}x$

29. $\int \frac{f'(x)}{f(x)}dx =$

(a) $lnx+c$ (b) ✔ $lnf(x)+c$ (c) $lnf'(x)+c$ (d) $f'(x)lnf(x)+c$

30. $\int \frac{dx}{xlnx} =$

(a) ✔ $lnx+c$ (b) $x+c$ (c) $lnf'(x)+c$ (d) $f'(x)lnf(x)$

31. $\int \boldsymbol{secxdx}$ **equal to**

(a) ✔$\ln|secx+tanx|+c$ (b) $\ln|cosecx-cotx|+c$ (c) $-\ln|secx+tanx|+c$ (d) $-\ln|cosecx-cotx|+c$

32. $\int \frac{cosx}{sinx\ lnsinx}dx =$

(a) $\ln(\ln(cosx))+c$ (b) ✔$\ln\ln(sinx)+c$ (c) $\ln sinx+c$ (d) $\ln cosx+c$

33. **The solution of differential equation** $\frac{dy}{dx} = sec^2x$ **is**

(a) $y=cosx+c$ (b) ✔$y=tanx+c$ (c) $y=sinx+c$ (d) $y=cotx+c$

34. $\int_0^2 2xdx$ **is equal to**

(a) 9 (b) 7 (c) ✔ 4 (d) 0

35. $\int e^{ax} sinbx$ **is equal to**

(a) ✔$\frac{e^x}{a^2+b^2}(asinbx-bcosbx)+c$ (b) $\frac{e^x}{a^2+b^2}(bsinbx+acosbx)+c$
(c) $\frac{e^x}{a^2+b^2}(asinbx+bcosbx)+c$ (d) $\frac{e^x}{a^2+b^2}(bsinbx-acosbx)+c$

36. $\int_a^a f(x) =$

(a) ✔0 (b) $\int_b^a f(x)dx$ (c) $\int_b^a f(x)dx$ (d) $\int_a^a f(x)dx$

37. $\int \frac{1}{ax+b}dx\ equal:$

(a) ✔$\frac{1}{a}\ln|ax+b|+c$ (b) $\ln|ax+b|+c$ (c) $\frac{(ax+)^2}{2}+c$ (d) $\ln|x+b|+c$

38. **In** $\int (x^2-a^2)^{\frac{1}{2}}dx$ **, the substitution is**

(a) $x=atan\theta$ (b) ✔ $x=asec\theta$ (c) $x=asin\theta$ (d) $x=2asin\theta$

39. $\int \boldsymbol{xcosxdx} =$

(a) $sinx+cosx+c$ (b) $cosx-sinx+c$ (c) ✔$xsinx+cosx+c$ (d) None

40. $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} costdt =$

(a) ✔$\frac{\sqrt{3}}{2}-\frac{1}{2}$ (b) $\frac{\sqrt{3}}{2}+\frac{1}{2}$ (c) $\frac{1}{2}-\frac{\sqrt{3}}{2}$ (d) None

41. **Solution of differential equation** $\frac{dv}{dt} = 2t-7$ **is :**

(a) $v=t^2-7t^3+c$ (b) $v=t^2+7t+c$ (c) $v=t-\frac{7t^2}{2}+c$ (d) ✔ $v=t^2-7t+c$

42. **Inverse of** $\int \ldots.dx$ **is:**

(a) ✔$\frac{d}{dx}$ (b) $\frac{dy}{dx}$ (c) $\frac{d}{dy}$ (d) $\frac{dx}{dy}$

43. **The suitable substitution for** $\int \sqrt{2ax-x^2}dx$ **is:**

(a) $x-a=acos\theta$ (b) ✔ $x-a=asin\theta$ (c) $x+a=acos\theta$ (d) $x+a=asin\theta$

44. $\int udv$ **equals:**

(a) $udu-\int vu$ (b) $uv+\int vdu$ (c) ✔ $uv-\int vdu$ (d) $udu+\int vdu$

45. $\int_0^{-\pi} sinxdx$ **equals to:**

(a) -2 (b) 0 (c) ✔ 2 (d) 1

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46. The general solution of differential equation $\frac{dy}{dx} = -\frac{y}{x}$ is
(a) $\frac{x}{y} = c$ (b) $\frac{y}{x} = c$ (c) ✔ $xy = c$ (d) $x^2y^2 = c$

47. $\int \frac{x+2}{x+1} dx =$
(a) $\ln(x+1) + c$ (b) $\ln(x+1) - x + c$ (c) ✔ $x + \ln(x+1) + c$ (d) None

48. $\int sin^3 x cosx dx =$
(a) $\sin^3 \frac{x}{3} + c$ (b) ✔ $\frac{1}{4}\sin^4 x + c$ (c) $-\frac{1}{4}\sin^4 x + c$ (d) $\sin^4 \frac{x}{4} + c$

49. $\int x\, e^x dx =$
(a) $x\, e^x + x + c$ (b) ✔ $x\, e^x - x + c$ (c) $e^x - x$ (d) None of these

50. $\int_0^3 \frac{dx}{x^2+9} =$
(a) $\frac{\pi}{4}$ (b) ✔ $\frac{\pi}{12}$ (c) $\frac{\pi}{2}$ (d) None of these

51. $\int e^x \left[\frac{1}{x} + lnx\right] =$
(a) $e^x \frac{1}{x} + c$ (b) $-e^x \frac{1}{x} + c$ (c) ✔ $e^x lnx + c$ (d) $-e^x lnx + c$

52. $\int_{\pi}^{-\pi} sinx dx =$
(a) ✔2 (b) -2 (c) 0 (d) -1

53. $\int_{-1}^{2} |x| dx =$
(a) $\frac{1}{2}$ (b) $-\frac{1}{2}$ (c) $\frac{5}{2}$ (d) ✔ $\frac{3}{2}$

54. $\int_0^1 (4x + k) dx = 2\ then\ k =$
(a) 8 (b) -4 (c) ✔ 0 (d) -2

55. $\int e^x \left[\frac{1}{x} - \frac{1}{x^2}\right] =$
(a) ✔ $e^x \frac{1}{x} + c$ (b) $-e^x \frac{1}{x} + c$ (c) $e^x lnx + c$ (d) $-e^x \frac{1}{x^2} + c$

56. Solution of the differential equation : $\frac{dy}{dx} = \frac{1}{\sqrt{1-x^2}}$
(a) ✔ $y = \sin^{-1} x + c$ (b) $y = \cos^{-1} x + c$ (c) $y = \tan^{-1} x + c$ (d) None

UNIT # 04 Introduction to Analytic Geometry

Each question has four possible answer. Tick the correct answer.

1. **$If\ x < 0, y < 0$ then the point $P(x, y)$ lies in the quadrant**
(a) I (b) II (c) ✔ III (d) IV

2. **The point P in the plane that corresponds to the ordered pair (x, y) is called:**
(a) ✔ $graph\ of\ (x, y)$ (b) mid-point of x, y (c) $abscissa\ of\ x, y$ (d) ordinate of x, y

3. **If $x < 0$, $y > 0$ then the point $P(-x, -y)$ lies in the quadrant**
(a) I (b) II (c) III (d) ✔ IV

4. **The straight line which passes through one vertex and though the mid-point of the opposite side is called:**
(a) ✔Median (b) altitude (c) perpendicular bisector (d) normal

5. **The straight line which passes through one vertex and perpendicular to opposite side is called:**
(a) Median (b) ✔ altitude (c) perpendicular bisector (d) normal

6. **The point where the medians of a triangle intersect is called_________ of the triangle.**
(a) ✔Centroid (b) centre (c) orthocenter (d) circumference

7. **The point where the altitudes of a triangle intersect is called_________ of the triangle.**
(a) Centroid (b) centre (c) ✔ orthocenter (d) circumference

8. **The centroid of a triangle divides each median in the ration of**
(a) ✔2:1 (b) 1:2 (c) 1:1 (d) None of these

9. **The point where the angle bisectors of a triangle intersect is called_________ of the triangle.**
(a) Centroid (b) ✔in centre (c) orthocenter (d) circumference

10. **If x and y have opposite signs then the point $P(x, y)$ lies the quadrants**
(a) I & II (b) I & III (c) ✔ II & IV (d) I & IV

11. **A line bisecting 2^{nd} and 4^{th} quadrants has inclination:**
(a) $0°$ (b) $45°$ (c) ✔ $135°$ (d) ∞

12. **$y = x$ is the straight line**
(a) ✔Bisecting I & III (b) parallel to $x - axix$ (c) bisecting II & IV (d) parallel to $y - axis$

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13. If all the sides of four sided polygon are equal but the four angles are not equal to $90°$ each then it is a
(a) Kite (b) ✔ rhombus (c) ||gram (d) trapezoid

14. If α is the inclination of a line l then it must be true that
(a) $0 \le \alpha \le \frac{\pi}{2}$ (b) $\frac{\pi}{2} \le \alpha \le \pi$ (c) ✔$0 \le \alpha \le \pi$ (d) $0 \le \alpha \le 2\pi$

15. The slope-intercept form of the equation of the straight line is
(a) ✔$y = mx + c$ (b) $y - y_1 = m(x - x_1)$ (c) $\frac{x}{a} + \frac{y}{b} = 1$ (d) $xcos\alpha + ycos\alpha = p$

16. The two intercepts form of the equation of the straight line is
(a) $y = mx + c$ (b) $y - y_1 = m(x - x_1)$ (c) ✔ $\frac{x}{a} + \frac{y}{b} = 1$ (d) $xcos\alpha + ycos\alpha = p$

17. The Normal form of the equation of the straight line is
(a) $y = mx + c$ (b) $y - y_1 = m(x - x_1)$ (c) $\frac{x}{a} + \frac{y}{b} = 1$ (d) ✔$xcos\alpha + ycos\alpha = p$

18. In the normal form $xcos\alpha + ycos\alpha = p$ the value of p is
(a) ✔Positive (b) Negative (c) positive or negative (d) Zero

19. If α is the inclination of the line l then $\frac{x-x_1}{cos\alpha} = \frac{y-y_1}{sin\alpha} = r(say)$
(a) Point-slope form (b) normal form (c) ✔symmetric form (d) none of these

20. The slope of the line $ax + by + c = 0$ is
(a) $\frac{a}{b}$ (b) ✔ $-\frac{a}{b}$ (c) $\frac{b}{a}$ (d) $-\frac{b}{a}$

21. The slope of the line perpendicular to $ax + by + c = 0$
(a) $\frac{a}{b}$ (b) $-\frac{a}{b}$ (c) ✔ $\frac{b}{a}$ (d) $-\frac{b}{a}$

22. The general equation of the straight line in two variables x and y is
(a) ✔$ax + by + c = 0$ (b) $ax^2 + by + c = 0$ (c) $ax + by^2 + c = 0$ (d) $ax^2 + by^2 + c = 0$

23. The $x - intercept$ $4x + 6y = 12$ is
(a) 4 (b) 6 (c) ✔ 3 (d) 2

24. The lines $2x + y + 2 = 0$ and $6x + 3y - 8 = 0$ are
(a) ✔Parallel (b) perpendicular (c) neither (d) non coplanar

25. The point $(-2, 4)$ lies ____ the line $2x + 5y - 3 = 0$
(a) ✔Above (b) below (c) on (d) none of these

26. If three lines pass through one common point then the lines are called
(a) Parallel (b) coincident (c) ✔ concurrent (d) congruent

27. $2x + y + k$ (k being a parameter) represents
(a) One line (b) two lines (c) ✔ family of lines (d) intersection lines

28. If the equations of the sides of a triangle are given then the intersection of any two lines in pairs gives ________ the triangles.
(a) ✔Vertices (b) centre (c) mid-points of sides (d) centriod

29. A four sided polygon (quadrilateral) having two parallel and non-parallel sides is called
(a) Square (b) rhombus (c) ✔ trapezium (d) ||gram

30. Equation of vertical line through $(-5, 3)$ is
(a) $x - 5 = 0$ (b) ✔ $x + 5 = 0$ (c) $y - 3 = 0$ (d) $y + 3 = 0$

31. Equation of horizontal line through $(-5, 3)$ is
(a) $x - 5 = 0$ (b) $x + 5 = 0$ (c) ✔ $y - 3 = 0$ (d) $y + 3 = 0$

32. Equation of line through $(-8, 5)$ and having slope undefined is
(a) ✔$x + 8 = 0$ (b) $x + 5 = 0$ (c) $y - 5 = 0$ (d) $y + 5 = 0$

33. If φ be an angle between two lines l_1 and l_2 when slopes m_1 and m_2, then angle from l_1 to l_2
(a) $tan\varphi = \frac{m_1 - m_2}{1 + m_{1\,m_2}}$ (b) ✔ $tan\varphi = \frac{m_2 - m_1}{1 + m_{2\,m_1}}$ (c) $tan\varphi = \frac{m_1 + m_2}{1 + m_{1\,m_2}}$ (d) $tan\varphi = \frac{m_2 + m_1}{1 + m_{1\,m_2}}$

34. If φ be an acute angle between two lines l_1 and l_2 when slopes m_1 and m_2, then acute angle from l_1 to l_2
(a) $|tan\varphi = \frac{m_1 - m_2}{1 + m_{1\,m_2}}|$ (b) ✔$|\,tan\varphi = \frac{m_2 - m_1}{1 + m_{2\,m_1}}|$ (c) $|tan\varphi = \frac{m_1 + m_2}{1 + m_{1\,m_2}}|$ (d)$|\,tan\varphi = \frac{m_2 + m_1}{1 + m_{1\,m_2}}|$

35. Two lines l_1 and l_2 with slopes m_1 and m_2 are parallel if
(a) ✔$m_1 - m_2 = 0$ (b) $m_1 + m_2 = 0$ (c) $m_1 m_2 = 0$ (d) $m_1 m_2 = -1$

36. Two lines l_1 and l_2 with slopes m_1 and m_2 are perpendicular if
(b) $m_1 - m_2 = 0$ (b) $m_1 + m_2 = 0$ (c) $m_1 m_2 = 0$ (d) ✔ $m_1 m_2 = -1$

37. For a homogenous equation of degree n, n must be
(a) an integer (b) ✔ positive number (c) rational number (d) real number

38. The equation $10x^2 - 23xy - 5y^2 = 0$ is homogeneous of degree
(a) 1 (b) ✔ 2 (c) 3 (d) more than 2

39. Every homogeneous equation of 2nd degree in two variables represents
(a) A line (b) two lines (c) ✔two line through origin (d) family of lines

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40. The point $P(x, y)$ in the 2nd quadrant if
(a) $x > 0, y < 0$ (b) $x < 0, y < 0$ (c) ✔ $x < 0, y > 0$ (d) $x > 0, y > 0$

41. The slope of $y - axis$ is
(a) 0 (b) ✔ undefined (c) $\tan 180°$ (d) $\tan 45°$

42. The equation $y^2 - 16 = 0$ represents two lines.
(a) ✔Parallel to $x - axis$ (b) Parallel $y - axis$ (c) not || to $x - axis$ (d) not || to $y - axis$

43. The perpendicular distance of the line $3x + 4y + 10 = 0$ from the origin is
(a) 0 (b) 1 (c) ✔2 (d) 3

44. The lines represented by $ax^2 + 2hxy + by^2 = 0$ are orthogonal if
(a) $a - b = 0$ (b) ✔ $a + b = 0$ (c) $a + b > 0$ (d) $a - b < 0$

45. The lines lying in the same plane are called
(a) Collinear (b) ✔ coplanar (c) non-collinear (d) non-coplanar

46. The distance of the point $(3, 7)$ from the $x - axis$ is
(a) ✔7 (b) -7 (c) 3 (d) -3

47. Two lines $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ are parallel if
(a) ✔$\frac{a_1}{a_2} = \frac{b_1}{b_2}$ (b) $\frac{a_1}{b_1} = -\frac{a_2}{b_2}$ (c) $\frac{a_1}{c_1} = \frac{a_2}{c_2}$ (d) $\frac{b_1}{c_1} = \frac{b_2}{c_2}$

48. Every homogenous equation of second degree $ax^2 + bxy + by^2 = 0$ represents two straight lines
(a) ✔Through the origin (b) not through the origin (c) two || line (d) two ⊥ar lines

49. The distance of the point $(3, 7)$ from the $y - axis$ is
(a) 7 (b) -7 (c) ✔ 3 (d) -3

50. The point-slope form of the equation of straight line is
(a) ✔$y = mx + c$ (b) $y - y_1 = m(x - x_1)$ (c) $\frac{x}{a} + \frac{y}{b} = 1$ (d) $xcos\alpha + ysin\alpha = p$

51. Let $P(x_1, y_1)$ not lying on the line l: $ax + by + c = 0$ then point P lies above if
(a) $a_1x + b_1y + c_1 = 0$ (b) $a_1x + b_1y + c_1 \neq 0$ (c) $a_1x + b_1y + c_1 < 0$ (d) ✔$a_1x + b_1y + c_1 > 0$

52. If m_1 and m_2 are the slopes of tow orthogonal lines then:
(a) $m_1.m_2 = 1$ (b) ✔ $m_1.m_2 = -1$ (c) $m_1.m_2 = 0$ (d) $m_1. = m_2$

53. The lines represented by the equation $ax^2 + 2hxy + by^2 = 0$ are coincident if
(a) $a + b = 0$ (b) ✔ $h^2 - ab = 0$ (c) $h^2 + ab = 0$ (d) None

54. Equation of $x - axis$ is
(a) $x = 0$ (b) ✔ $y = 0$ (c) $x = 1$ (d) $y = 1$

55. Equation of $y - axis$ is
(b) ✔$x = 0$ (b) $y = 0$ (c) $x = 1$ (d) $y = 1$

56. If line l intersects $x - axis$ at a point $(3, 0)$, then the $x - intercept$ of the line l is:
(a) -3 (b) 0 (c) ✔ 3 (d) $\frac{1}{3}$

57. Altitudes of a triangle are:
(a) Parallel (b) Perpendicular (c) ✔ Concurrent (d) Non Concurrent

58. If a straight line is parallel to $x - axis$ its slope is
(a) -1 (b) ✔ 0 (c) 1 (d) Undefined

59. The perpendicular distance of a line $12x + 5y = 7$ from $(0, 0)$ is:
(a) $\frac{1}{13}$ (b) $\frac{13}{7}$ (c) ✔ $\frac{7}{13}$ (d) 13

60. Line passes through the point of intersection of two line l_1 and l_2 is
(a) $k_1l_1 = k_2l_2$ (b) ✔ $l_1 + kl_2 = 0$ (c) $l_1 + kl_2 = 1$ (d) None

61. The coordinate $axes$ divide the whole plane into ________ equal parts.
(a) 2 (b) ✔ 4 (c) 8 (d) infinity many

62. If $2x + 5y + k$ and $kx + 10y + 3 = 0$ are parallel lines then k
(a) ✔25 (b) -25 (c) 2 (d) 3

UNIT # 05 Linear Inequalities and Linear Programming

Each question has four possible answer. Tick the correct answer.

1. The solution of $ax + b < c$ is
(a) Closed half plane (b) ✔ open half plane (c) circle (d) parabola

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2. A function which is to be maximized or minimized is called______ function

(a) Subjective (b) ✔ objective (c) qualitative (d) quantitative

3. The number of variables in $\boldsymbol{ax+by \le c}$ are

(a) 1 (b) ✔ 2 (c) 3 (d) 4

4. (0,0) is the solution of the inequality

(a) $7x+2y>0$ (b) $2x-y>0$ (c) ✔ $x+y\ge 0$ (d) $3x+5y<0$

5. (0,0) is satisfied by

(a) $x-y<10$ (b) $2x+5y>10$ (c) ✔ $x-y\ge 13$ (d) None

6. The point where two boundary lines of a shaded region intersect is called _____ point.

(a) Boundary (b) ✔ corner (c) stationary (d) feasible

7. If $\boldsymbol{x}>b$ then

(a) $-x>-b$ (b) $-x<b$ (c) $x<b$ (d) ✔ $-x<-b$

8. The symbols used for inequality are

(a) 1 (b) 2 (c) 3 (d) ✔4

9. A linear inequality contains at least _________ variables.

(a) ✔One (b) two (c) three (d) more than three

10. An inequality with one or two variables has ________ solutions.

(a) One (b) two (c) three (d) ✔infinitely many

11. $\boldsymbol{ax+by}<c$ is not a linear inequality if

(a) ✔$a=0, b=0$ (b) $a\ne 0, b\ne 0$ (c) $a=0, b\ne 0$ (d) $a\ne 0, b=0, c=0$

12. The graph of corresponding linear equation of the linear inequality is a line called________

(a) ✔Boundary line (b) horizontal line (c) vertical line (d) inclined line

13. The graph of a linear equation of the form $\boldsymbol{ax+by=c}$ is a line which divides the whole plane into ______ disjoints parts.

(a) ✔Two (b) four (c) more than four (d) infinitely many

14. The graph of the inequality $\boldsymbol{x\le b}$ is

(a) Upper half plane (b) lower half plane (c) ✔ left half plane (d) right half plane

15. The graph of the inequality $\boldsymbol{y\le b}$ is

(b) Upper half plane (b) ✔ lower half plane (c) left half plane (d) right half plane

16. The graph of the inequality $\boldsymbol{ax+by\le c}$ is _____ side of line $\boldsymbol{ax+by=c}$

(a) ✔Origin side (b) non-origin side (c) upper (d) lower

17. The graph of the inequality $\boldsymbol{ax+by\ge c}$ is _____ side of line $\boldsymbol{ax+by=c}$

(b) Origin side (b) ✔ non-origin side (c) upper (d) left

18. The feasible solution which maximizes or minimizes the objective function is called

(a) Exact solution (b) ✔ optimal solution (c) final solution (d) objective function

19. Solution space consisting of all feasible solutions of system of linear in inequalities is called

(a) Feasible solution (b) Optimal solution (c) ✔ Feasible region (d) General solution

20. Corner point is also called

(a) Origin (b) Focus (c) ✔ Vertex (d) Test point

21. For feasible region:

(a) ✔$x\ge 0, y\ge 0$ (b) $x\ge 0, y\le 0$ (c) $x\le 0, y\ge 0$ (d) $x\le 0, y\le 0$

22. $\boldsymbol{x=0}$ is in the solution of the inequality

(a) $x<0$ (b) $x+4<0$ (c) ✔$2x+3>0$ (d)$2x+3<0$

23. Linear inequality $\boldsymbol{2x-7y>3}$ is satisfied by the point

(a) (5,1) (b) (-5,-1) (c) (0,0) (d) ✔ (1,-1)

24. The non-negative constraints are also called

(a) ✔Decision variable (b) Convex variable (c) Decision constraints (d) concave variable

25. If the line segment obtained by joining any two points of a region lies entirely within the region , then the region is called

(a) Feasible region (b) ✔ Convex region (c) Solution region (d) Concave region

UNIT # 06 Conic Section

Each question has four possible answer. Tick the correct answer.

1. The locus of a revolving line with one end fixed and other end on the circumference of a circle of a circle is called:

(a) a sphere (b) a circle (c) ✔a cone (d) a conic

2. The set of points which are equal distance from a fixed point is called:

(a) ✔Circle (b) Parabola (c) Ellipse (d) Hyperbola

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3. **The circle whose radius is zero is called:**
(a) Unit circle (b) ✔point circle (c) circumcircle (d) in-circle
4. **The circle whose radius is 1 is called:**
(a) ✔Unit circle (b) point circle (c) circumcircle (d) in-circle
5. **The equation $x^2+y^2+2gx+2fy+c=0$ represents the circle with centre**
(a) (g,f) (b) ✔ $(-g,-f)$ (c) $(-f,-g)$ (d) $(g,-f)$
6. **The equation $x^2+y^2+2gx+2fy+c=0$ represents the circle with centre**
(a) ✔$\sqrt{g^2+f^2-c}$ (b) $\sqrt{g^2+f^2+c}$ (c) $\sqrt{g^2+c^2-f}$ (d) $\sqrt{g+f-c}$
7. **The angle inscribed in semi-circle is:**
(a) ✔$\frac{\pi}{2}$ (b) $\frac{\pi}{3}$ (c) $\frac{\pi}{4}$ (d) None of these
8. **For any parabola in the standard form , if the directrix is $x=a$, then its equation is**
(a) $y^2=4ax$ (b) ✔ $y^2=-4ax$ (c) $x^2=4ay$ (d) $x^2=-4ay$
9. **For any parabola in the standard form , if the directrix is $x=-a$, then its equation is**
(a) ✔$y^2=4ax$ (b) $y^2=-4ax$ (c) $x^2=4ay$ (d) $x^2=-4ay$
10. **For any parabola in the standard form , if the directrix is $y=a$, then its equation is**
(a) $y^2=4ax$ (b) $y^2=-4ax$ (c) $x^2=4ay$ (d) ✔ $x^2=-4ay$
11. **For any parabola in the standard form , if the directrix is $y=-a$, then its equation is**
(a) $y^2=4ax$ (b) $y^2=-4ax$ (c) ✔ $x^2=4ay$ (d) $x^2=-4ay$
12. **All lines through vertex and points on circle generate a**
(a) ✔Circle (b) Ellipse (c) Circular cone (d) None of these
13. **The equation $x^2+y^2=0$ then circle is**
(a) ✔Point Circle (b) Unit Circle (c) Real circle (d) Imaginary Circle
14. **The line perpendicular to the tangent at any point $P(x,y)$ is known as;**
(a) Tangent line (b) ✔ Normal at P (c) Slope of tangent (d) None of these
15. **The point $P(-5,6)$ lies __________ the circle $x^2+y^2+4x-6y=12$**
(a) ✔Inside (b) Outside (c) On (d) None of these
16. **The chord containing the centre of the circle is**
(a) Radius of circle (b) ✔Diameter of circle (c) Area of circle (d) Tangent of circle
17. **The ratio of the distance of a point from the focus to distance from the directrix is denoted by**
(a) ✔r (b) R (c) E (d) e
18. **Standard equation of Parabola is :**
(a) $y^2=4a$ (b) $x^2+y^2=a^2$ (c) ✔ $y^2=4ax$ (d) $S=vt$
19. **The focal chord is a chord which is passing through**
(a) ✔Vertex (b) Focus (c) Origin (d) None of these
20. **The curve $y^2=4ax$ is symmetric about**
(a) ✔$y-axis$ (b) $x-axis$ (c) Both (a) and (b) (d) None of these
21. **Latusrectum of $x^2=-4ay$ is**
(a) $x=a$ (b) $x=-a$ (c) $y=a$ (d) ✔ $y=-a$
22. **Eccentricity of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ is**
(a) $\frac{a}{c}$ (b) ac (c) ✔ $\frac{c}{a}$ (d) None of these
23. **Focus of $y^2=-4ax$ is**
(a) $(0,a)$ (b) ✔$(-a,0)$ (c) $(a,0)$ (d) $(0,-a)$
24. **The midpoint of the foci of the ellipse is its**
(a) Vertex (b) ✔ Centre (c) Directrix (d) None of these
25. **Focus of the ellipse always lies on the**
(a) Minor axis (b) ✔Major axi (c) Directrix (d) None of these
26. **Length of the major axis of $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$, $a>b$ is**
(a) ✔$2a$ (b) $2b$ (c) $\frac{2b^2}{a}$ (d) None of these
27. **A type of the conic that has eccentricity greater than 1 is**
(a) An ellipse (b) A parabola (c) ✔ A hyperbola (d) A circle
28. **$x^2+y^2=-5$ represents the**
(a) Real circle (b) ✔Imaginary circle (c) Point circle (d) None of these
29. **Which one is related to circle**
(a) $e=1$ (b) $e>1$ (c) $e<1$ (d) ✔$e=0$
30. **Circle is the special case of :**
(a) Parabola (b) Hyperbola (c) ✔Ellipse (d) None of these
31. **Equation of the directrix of $x^2=-4ay$ is:**

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(a) $x + a = 0$ (b) $x - a = 0$ (c) $y + a = 0$ (d) ✔ $y - a = 0$

32. $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ **is symmetric about the:**

(a) $y - axis$ (b) $x - axis$ (c) ✔Both (a) and (b) (d) None of these

33. $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ **is symmetric about the:**

(a) $y - axis$ (b) $x - axis$ (c) ✔Both (a) and (b) (d) None of these

34. If $c = \sqrt{65}$, $b = 7$ and $a = 4$ then the eccentricity of hyperbola is :

(a) ✔$\frac{\sqrt{65}}{4}$ (b) $\frac{65}{16}$ (c) $\frac{\sqrt{65}}{7}$ (d) $\frac{7}{4}$

35. The foci of an ellipse are $(4, 1)$ and $(0, 1)$ then its centre is:

(a) $(4,2)$ (b) ✔$(2,1)$ (c) $(2,0)$ (d) $(1,2)$

36. The foci of hyperbola always lie on :

(a) $x - axis$ (b) ✔ $Transverse\ axis$ (c) $y - axis$ (d) Conjugate axis

37. Length of transverse axis of the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ is

(a) ✔$2a$ (b) $2b$ (c) a (d) b

38. The parabola $y^2 = -12x$ opens

(a) Downwards (b) Upwards (c) rightwards (d) ✔ leftwards

39. In the cases of ellipse it is always true that:

(a) ✔$a^2 > b^2$ (b) $a^2 < b^2$ (c) $a^2 = b^2$ (d) $a < 0, b < 0$

40. Two conics always intersect each other in ______ points

(a) No (b) one (c) two (d) ✔ four

41. The eccentricity of ellipse $\frac{x^2}{16} + \frac{y^2}{9} = 1$ is

(a) ✔ $\frac{\sqrt{7}}{4}$ (b) $\frac{7}{4}$ (c) 16 (d) 9

UNIT # 07 Vectors

Each question has four possible answer. Tick the correct answer.

1. The vector whose magnitude is 1 is called

(a) Null vector (b) ✔ unit vector (c) free vector (d) scalar

2. If the terminal point B of the vector $\overrightarrow{AB}$ coincides with its initial point A, then $|\overrightarrow{AB}| = |\overrightarrow{BB}| =$

(a) 1 (b) ✔ 0 (c) 2 (d) undefined

3. Two vectors are said to be negative of each other if they have the same magnitude and __________direction.

(a) Same (b) ✔ opposite (c) negative (d) parallel

4. Parallelogram law of vector addition to describe the combined action of two forces, was used by

(a) Cauchy (b) ✔ Aristotle (c) Alkhwarzmi (d) Leibnitz

5. The vector whose initial point is at the origin and terminal point is P , is called

(a) Null vector (b) unit vector (c) ✔position vector (d) normal vector

6. If R be the set of real numbers, then the Cartesian plane is defined as

(a) $R^2 = \{(x^2, y^2): x, y \in R\}$ (b) ✔ $R^2 = \{(x, y): x, y \in R\}$ (c) $R^2 = \{(x, y): x, y \in R, x = -y\}$ (d) $R^2 = \{(x, y): x, y \in R, x = y\}$

7. The element $(x, y) \in R^2$ represents a

(a) Space (b) ✔ point (c) vector (d) line

8. If $\underline{u} = [x, y]$ in R^2, then $|\underline{u}| =?$

(a) $x^2 + y^2$ (b) ✔ $\sqrt{x^2 + y^2}$ (c) $\pm\sqrt{x^2 + y^2}$ (d) $x^2 - y^2$

9. If $|\underline{u}| = \sqrt{x^2 + y^2} = 0$, then it must be true that

(a) $x \geq 0, y \geq 0$ (b) $x \leq 0, y \leq 0$ (c) $x \geq 0, y \leq 0$ (d) ✔ $x = 0, y = 0$

10. Each vector $[x, y]$in R^2 can be uniquely represented as

(a) $x\underline{i} - y\underline{j}$ (b) ✔ $x\underline{i} + y\underline{j}$ (c) $x + y$ (d) $\sqrt{x^2 + y^2}$

11. The lines joining the mid-points of any two sides of a triangle is always _____to the third side.

(a) Equal (b) ✔ Parallel (c) perpendicular (d) base

12. A point P in space has __________ coordinates.

(a) 1 (b) 2 (c) ✔ 3 (d) infinitely many

13. In space the vector $\underline{i}$ can be written as

(a) ✔ (1,0,0) (b) (0,1,0) (c) (0,0,1) (d) (1,0)

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14. In space the vector $\underline{j}$ can be written as

(a) (1,0,0) (b) ✔ (0,1,0) (c) (0,0,1) (d) (1,0)

15. In space the vector $\underline{k}$ can be written as

(a) (1,0,0) (b) (0,1,0) (c) ✔ (0,0,1) (d) (1,0)

16. $\underline{u} = 2\underline{i} + 3\underline{j} + \underline{k}, \underline{v} = -6\underline{i} - 9\underline{j} - 3\underline{k}$ are _________vectors.

(a) ✔Parallel (b)perpendicular (c) reciprocal (d) negative

17. The angles $\alpha, \beta, and\ \gamma$ which a non-zero vector r makes with $x - axis, y - axis$ and $z - axis$ respectively are called_____________ of r.

(a) Direction cosines (b) direction ratios (c) ✔ direction angles (d) inclinations

18. Measures of directions angles $\alpha, \beta\ and\ \gamma$ are

(a) $\alpha \le 0, \beta \le 0, \gamma \le 0$ (b) $0 \le \alpha \le \frac{\pi}{2}, 0 \le \beta \le \frac{\pi}{2}, 0 \le \gamma \le \frac{\pi}{2}$ (c) $\alpha \ge 0, \beta \ge 0, \gamma \ge 0$

(d)✔ $0 \le \alpha \le \pi, 0 \le \beta \le \pi, 0 \le \gamma \le \pi$

19. If $\underline{u} = 3\underline{i} - \underline{j} + 2\underline{k}$ then [3,-1,2] are called ____________ of $\underline{u}$.

(a) Direction cosines (b) ✔ direction ratios (c) direction angles (d) elements

20. Which of the following can be the direction angles of some vector

(a) $45°, 45°, 60°$ (b) $30°, 45°, 60°$ (c) ✔$45°, 60°, 60°$ (d) obtuse

Recall that here $cos^2\alpha + cos^2\beta + cos^2\gamma = 1$ should hold.

21. Measure of angle θ between two vectors is always.

(a) $0 < \theta < \pi$ (b) $0 \le \theta \le \frac{\pi}{2}$ (c) ✔$0 \le \theta \le \pi$ (d) obtuse

22. If the dot product of two vectors is zero, then the vectors must be

(a) Parallel (b) ✔ orthogonal (c) reciprocal (d) equal

23. If the cross product of two vectors is zero, then the vectors must be

(a) ✔ Parallel (b) orthogonal (c) reciprocal (d) Non coplanar

24. If θ be the angle between two vectors $\underline{a}$ and $\underline{b}$, then $cos\theta =$

(a) $\frac{\underline{a} \times \underline{b}}{|\underline{a}||\underline{b}|}$ (b) ✔ $\frac{\underline{a}.\underline{b}}{|\underline{a}||\underline{b}|}$ (c) $\frac{\underline{a}.\underline{b}}{|\underline{a}|}$ (d) $\frac{\underline{a}.\underline{b}}{|\underline{b}|}$

25. If θ be the angle between two vectors $\underline{a}$ and $\underline{b}$, then projection of $\underline{b}$ along $\underline{a}$ is

(a) $\frac{\underline{a} \times \underline{b}}{|\underline{a}||\underline{b}|}$ (b) $\frac{\underline{a}.\underline{b}}{|\underline{a}||\underline{b}|}$ (c) ✔ $\frac{\underline{a}.\underline{b}}{|\underline{a}|}$ (d) $\frac{\underline{a}.\underline{b}}{|\underline{b}|}$

26. If θ be the angle between two vectors $\underline{a}$ and $\underline{b}$, then projection of $\underline{a}$ along $\underline{b}$ is

(a) $\frac{\underline{a} \times \underline{b}}{|\underline{a}||\underline{b}|}$ (b) $\frac{\underline{a}.\underline{b}}{|\underline{a}||\underline{b}|}$ (c) $\frac{\underline{a}.\underline{b}}{|\underline{a}|}$ (d) ✔ $\frac{\underline{a}.\underline{b}}{|\underline{b}|}$

27. Let $\underline{u} = a\underline{i} + b\underline{j} + c\underline{k}$ then projection of $\underline{u}$ along $\underline{i}$ is

(a) ✔a (b) b (c) c (d) u

28. Let $\underline{u} = a\underline{i} + b\underline{j} + c\underline{k}$ then projection of $\underline{u}$ along $\underline{j}$ is

(a) a (b) ✔ b (c) c (d) u

29. Let $\underline{u} = a\underline{i} + b\underline{j} + c\underline{k}$ then projection of $\underline{u}$ along $\underline{k}$ is

(a) a (b) b (c) ✔ c (d) u

30. In any ΔABC, the law of cosine is

(a) ✔$a^2 = b^2 + c^2 - 2bcCosA$ (b) $a = bCosC + cCosB$ (c) $a.b = 0$ (d) $a - b = 0$

31. In any ΔABC, the law of projection is

(a) $a^2 = b^2 + c^2 - 2bcCosA$ (b) ✔ $a = bCosC + cCosB$ (c) $a.b = 0$ (d) $a - b = 0$

32. If $\underline{u}$ is a vector such that $\underline{u}.\underline{i} = 0, \underline{u}.\underline{j} = 0, \underline{u}.\underline{k} = 0$ then $\underline{u}$ is called

(a) Unit vector (b) ✔ null vector (c) $[\underline{i}, \underline{j}, \underline{k}]$ (d) none of these

33. Cross product or vector product is defined

(a) In plane only (b) ✔in space only (c) everywhere (d) in vector field

34. If $\underline{u}$ and $\underline{v}$ are two vectors, then $\underline{u} \times \underline{v}$ is a vector

(a) Parallel to $\underline{u}$and $\underline{v}$ (b) parallel to $\underline{u}$ (c) ✔ perpendicular to $\underline{u}$ and $\underline{v}$ (d) orthogonal to $\underline{u}$

35. If $\underline{u}$ and $\underline{v}$ be any two vectors, along the adjacent sides of ||gram then the area of ||gram is

(a) $\underline{u} \times \underline{v}$ (b) ✔ $|\underline{u} \times \underline{v}|$ (c) $\frac{1}{2}(\underline{u} \times \underline{v})$ (d) $\frac{1}{2}|\underline{u} \times \underline{v}|$

36. If $\underline{u}$ and $\underline{v}$ be any two vectors, along the adjacent sides of triangle then the area of triangle is

(a) $\underline{u} \times \underline{v}$ (b) $|\underline{u} \times \underline{v}|$ (c) $\frac{1}{2}(\underline{u} \times \underline{v})$ (d) ✔ $\frac{1}{2}|\underline{u} \times \underline{v}|$

37. The scalar triple product of $\underline{a}$, $\underline{b}$ and $\underline{c}$ is denoted by

(a) $\underline{a}.\underline{b}.\underline{c}$ (b) ✔ $\underline{a}.\underline{b} \times \underline{c}$ (c) $\underline{a} \times \underline{b} \times \underline{c}$ (d) $(\underline{a} + \underline{b}) \times \underline{c}$

38. The vector triple product of $\underline{a}$, $\underline{b}$ and $\underline{c}$ is denoted by

(a) $\underline{a}.\underline{b}.\underline{c}$ (b) $\underline{a}.\underline{b} \times \underline{c}$ (c) ✔ $\underline{a} \times \underline{b} \times \underline{c}$ (d) $(\underline{a} + \underline{b}) \times \underline{c}$

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39. Notation for scalar triple product of $\underline{a}$,$\underline{b}$ and $\underline{c}$ is

(a) $\underline{a}.\underline{b}\times\underline{c}$ (b) $\underline{a}\times\underline{b}.\underline{c}$ (c)$[\underline{a}.\underline{b}.\underline{c}]$ (d) ✔ all of these

40. If the scalar product of three vectors is zero, then vectors are

(a) Collinear (b) ✔ coplanar (c) non coplanar (d) non-collinear

41. If $\underline{a}$ and $\underline{b}$ have same direction , then $\underline{a}.\underline{b} =$

(a) ✔ab (b) $-ab$ (c) $ab\sin\theta$ (d) $\underline{a}\ \underline{b}tan\theta$

42. For a vector $\underline{a}$, $\underline{a}.\underline{a} =$

(a) $2\underline{a}$ (b) ✔ $\underline{a}^2$ (c) $\frac{\underline{a}}{2}$ (d) $\frac{\underline{a}^2}{2}$

43. If $\underline{a}$ and $\underline{b}$ have the opposite direction , then $\underline{a}.\underline{b} =$

(a) ab (b) ✔ $-\underline{a}.\ \underline{b}$ (c) $absin\theta$ (d) $abtan\theta$

44. The angle in semi-circle is equal to:

(a) ✔$\frac{\pi}{2}$ (b) π (c) $\frac{\pi}{3}$ (d) 3π

45. Two non zero vectors are perpendicular iff

(a) $\underline{u}.\underline{v} = 1$ (b) $\underline{u}.\underline{v} \neq 1$ (c) $\underline{u}.\underline{v} \neq 0$ (d) ✔ $\underline{u}.\underline{v} = 0$

46. If any two vectors of scalar triple product are equal, then its value is equal to

(a) 1 (b) ✔0 (c) -1 (d) 2

47. If $\hat{n}$ is a unit vector perpendicular to the plane containing $\underline{a}$ and $\underline{b}$

(a) $\hat{n} = \frac{\underline{a}.\underline{b}}{ab}$ (b) $\hat{n} = \frac{\underline{a}\times\underline{b}}{ab}$ (c) ✔ $\hat{n} = \frac{\underline{a}\times\underline{b}}{|\underline{a}\times\underline{b}|}$ (d) $\hat{n} = \underline{a}\times\underline{b}$

48. If α, β, γ are the direction angles of a vector $\underline{r}$, then $cos^2\alpha + cos^2\beta + cos^2\gamma =$

(a) 3 (b) 2 (c) ✔1 (d) 0

49. A vector perpendicular to each of vectors $2\underline{i}$ and $\underline{k}$ is

(a) $\underline{i}$ (b) $2\underline{j}$ (c) ✔ $-2\underline{j}$ (d) $\underline{k}$

←----------THE END--------→

WITH BEST WISHES BY:-

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