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MCQs-Short Question: Maths-II
CALCULUS AND ANALYTIC GEOMETRY, MATHEMATICS 12
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UNIT NO 1
(FUNCTIONS AND LIMITS)

I. CHOOSE THE CORRECT ANSWERS.

1. Domain of 1/x is ……
(a) R (b) {0} – R (c) R – {0} (d) N

2. If f(x) = 1/x then f^{-1} = ……..
(a) x (b) 1/x (c) $1/x^2$ (d) None

3. y = $\sqrt{x-1}$ is an …….. function
(a) Even (b) Explicit (c) Odd (d) Implicit

4. Cosec h x = ……
(a) $\frac{e^x - e^{-x}}{2}$ (b) $\frac{2}{e^x - e^{-x}}$ (c) $\frac{e^x + e^{-x}}{2}$ (d) $\frac{2}{e^x + e^{-x}}$

5. Cos x is an …….. function.
(a) Explicit (b) Implicit (c) Odd (d) even

6. If f(x) = $1/x^2$ g(x) = $\sqrt{x}$ then fog = ……..
(a) $\sqrt{x}$ (b) $1/\sqrt{x}$ (c) x (d) 1/x

7. $\lim_{x \to \infty} a/x$ = …… where a € IR
(a) a (b) x (c) ∞ (d) 0

8. $\lim_{h \to 0} (1+2h)^{1/h}$ = ……
(a) 1 (b) 0 (c) e (d) e^2

9. $\lim_{m \to \infty} (1+m)^{1/m}$ = ……..
(a) e (b) 0 (c) ∞ (d) e^m

10. $\lim_{\theta \to 0} \frac{\sin 7\theta}{\theta}$ = ……

(a) 7 (b) 1 / 7 (c) 0 (d) ∞

11. $\lim_{\theta \to 0} \frac{\cos \theta}{\theta}$ = ……..

(a) 0 (b) 1 (c) ∞ (d) None

12. $\lim_{x \to 0} \frac{\sin x}{7x}$ = ……

(a) 1 (b) 7 (c) 1/7 (d) 0

13. If $x = 10^{y}$ then y = ……

(a) ln 10 (b) ln x (c) ln 1 (d) e

14. If $4^{x} = 1$ then x = ……

(a) 0 (b) 1 (c) 2 (d) 4

15. If $2^{x} + 3^{y} = 13$ then x + y =……

(a) 4 (b) 5 (c) 6 (d) 7

16. $|x - 5| = x - 5$ If……..

(a) x = 5 (b) x > 5 (c) x < 5 (d) $x \geq -5$

17. $\lim_{\theta \to 0} \frac{\sin \theta^{0}}{\theta}$ = ……

(a) 0 (b) 1 (c) л / 180 (d) 180/л

18. $\lim_{\theta \to 0} \frac{\theta}{\sin \theta}$ = ……

(a) Undefined (b) 0 (c) 1 (d) None

19. If $3^x + 3^y = 3$ then $x + y =$ ……

(a) 0 (b) 1 (c) -1 (d) 2

20. Tan x is an …… function.

(a) Even (b) Odd (c) Explicit (d) Implicit

21. Sin h x =……

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

22. $\lim_{x \to -\infty} \left[\frac{1}{e^{-x}}\right]$

(a) 0 (b) 1 (c) $-\infty$ (d) ∞

23. $\lim_{n \to \infty} (1 + 3/n)^{2n}$ = …….

(a) e (b) e^2 (c) e^4 (d) e^6

24. lnx is not defined at x = ……

(a) 0 (b) 1 (c) e (d) None

25. If f(x, y) = 0 then f is called an……function.

(a) Even (b) Odd (c) Explicit (d) Implicit

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SHORT QUESTIONS

1. Show that the parametric equation $x = a \cos t$ and $y = a \sin t$ represent the Circle $x^2 + y^2 + = a^2$.

2. Prove that $\cos h^2 x - \sin h^2 x = 1$

3. Determine whether $f(x) = x^{2/3} + 6$ is even or odd.

4. If $f(x) = (- x + 9)^3$; verify $f [f^{-1} (x)] = f^{-1} [f (x)] = x$

5. Show that $\lim_{x \to a} \frac{x^n - a^n}{x - a} = n\, a^{n-1}$

6. Show that $\lim_{x \to 0} \frac{\sqrt{x + a} - \sqrt{a}}{x} = 1/ 2 \sqrt{a}$

7. Evaluate $\lim_{x \to 3} x - 3 / (\sqrt{x} - \sqrt{3})$

8. Show that $\lim_{x \to \infty} (1 + 1/n) - e$ where $2 < e < 3$

9. Show that $\lim_{x \to 0} \frac{a^x - 1}{x} = \ln a$

10. Evaluate $\lim_{x \to \infty} (1 + 3 / n)^{2n}$

11. Evaluate $\lim_{x \to a} \frac{x^n - a^n}{x^m - a^m}$

12. Evaluate $\lim_{x \to 0} \frac{\sin x^0}{x}$

13. Evaluate Limit $\underset{x \to \pi}{\dfrac{\sin x}{\pi - x}}$

14. Evaluate Limit $\underset{\theta \to 0}{\dfrac{\tan \theta - \sin \theta}{\sin^3 \theta}}$

15. Evaluate Limit $\underset{n \to \infty}{(1 - 1/n)^n}$

16. Evaluate Limit $\underset{x \to 0}{(1 + 3x)^{2/3}}$

17. Evaluate Limit $\underset{x \to \infty}{[x/(1+x)]^x}$

18. Evaluate Limit $\underset{x \to 0}{\dfrac{e^{1/x} - 1}{e^{1/x} + 1}}$; $x < 0$

19. Evaluate Limit $\underset{x \to 0}{\dfrac{e^{1/x} - 1}{e^{1/x} + 1}}$; $x > 0$

20. Evaluate Limit $\underset{h \to 0}{\sqrt{x+h} - \sqrt{x}}$

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UNIT # 2
DERIVETIVES

1. $\frac{d}{dx}(x^0)$ = ……

   (a) Zero (b) x (c) x^0 (d) One

2. The notation dy/dx used by Mathematician……

   (a) Newton (b) Leibnitz (c) Lagrange (d) Cauchy

3. Derivative of x^2 w.r .t x at x = 1 is ……

   (a) 1 (b) 2 (c) 2x (d) None

4. Derivative of 7^x w.r.t x is ……

   (a) 7^x (b) $7^x \ln x$ (c) $7^x \ln 7$ (d) $7^x / \ln 7$

5. Derivation of x^a w.r.t x is ……

   (a) $x^a \ln a$ (b) $x^a \ln x$ (c) $x^a / \ln a$ (d) ax^{a-1}

6. $\frac{d}{dx}\text{Sin}x^2$ = ……

   (a) 2 Sinx Cosx (b) $\text{Cos}x^2$ (c) $2x\text{Cos}x^2$ (d) 2Sinx

7. $\frac{d}{dx}\text{Cos}^2x$= ……

   (a) - Sin2x (b) 2Cosx (c) Sin^2x (d) None

8. f is increasing on (a, b) if $f'(x)$ ……0

   (a) < (b) > (c) = (d) ≤

9. $\frac{d}{dx}(\ln e^x)$ = ……..

(a) I / e^x (b) $e^x \ln e$ (c) 1 (d) $\ln e^x$

10. $\frac{d}{dx}(\ln x^2)$ = ……..

(a) $1/x^2$ (b) $2/x^2$ (c) 1/x (d) 2/x

11. d/dx Sin $\sqrt{x}$ = ……

(a) Cos $\sqrt{x}$ (b) $(1/ 2\sqrt{x}$ / Cos $\sqrt{x}$

(c) 1/2x Cos $\sqrt{x}$ (d) Cos $\sqrt{x} \,/\, \sqrt{x}$

12. d/dx $(\text{Sin}^{-1}x)$ =……..

(a) $-\text{Sin}^{-2}x$ Cosx (b) - Sinx Cosx

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

13. d/dx $(\tan^{-1}x)$ =……

(a) $1/ (x^2 + 1)$ (b) $1/ \sqrt{x^2 + 1}$

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

14. d/dx x^e =……

(a) e^x (b) $\ln x^e$ (c) ex^{e-1} (d) x^{e-1}

15. A function of has Max value if $^{//}$ (c) …… 0 at x = c

(a) > (b) < (c) = (d) ≤

16. d/dx Cos hx = ……

(a) Sin hx (b) - Sin hx (c) h Sinhx (d) -h Sin hn

17. d/dx Sin h^{-1} x =……

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

18. $1 + ax + a^2 x^2/2! + a^3 x^3/3! +$…… is the expansion of ……..

(a) e^{ax} (b) $e^{a/x}$ (c) $e^{x/a}$ (d) ae^{x}

19. $- x - x^2/2 - x^3/3 -$…….is the…..... of ……

(a) log (-x-1) (b) log (x-1) (c) log (1-x) (d) log (x+1)

20. Hundredth derivative of e^{-x} is ……..

(a) 1/100 e –x (b) 100 e^{-x} (c) e^{-x} (d) e^{-100x}

21. d / dx Cot $^{-1}$ x is…….

(a) $(1/(x^2+1)$ (b) $-1/(x^2+1)$ (c) $1/(x^2-1)$ (d) $1/(1-x^2)$

22. d / dx Sin hx = ……..

(a) $(e^x + e^{-x})/2$ (b) $(e^x - e^{-x})/2$ (c) $(e^{-x} - e^x/2$ (d) None

23. d / dx (x^x) =……..

(a) x lnx (b) x^x lnx (c) x^x (d) None

24. d / dx ($\sqrt{x + \sqrt{x}}$) =……

(a) $(1/2)\sqrt{x + \sqrt{x}}$ (b) $(1/2)(x + \sqrt{x})$

(c) $1/2(\sqrt{x + x})$ (d) None

25. d / dt (1 / t) =……

(a) - 1 / t (b) $1/t^2$ (c) 1 (d) $-1/t^2$

SHORT QUESTIONS

1. Find the derivative of xn by ab – initial method

2. Find dy / dx from first Principle's if $y = 1 / (\sqrt{x + a})$

3. If $y = x^4 + 2x^2 + 2$, Prove that $dy / dx = 4x \sqrt{y - 1}$

4. Differentiate $\frac{x^2 + 1}{x^2 - 1}$ w.r.t $\frac{x - 1}{x + 1}$

6. Show that $d / dx \ (\text{Cosec}^{-1} x) = 1 / (x \sqrt{x2 - 1})$

7. If $x = a \cos^3 \theta$; $y = b \sin^3 \theta$, show that $a .dy / dx + b \tan \theta = 0$

8. Find dy / dx if y = x Cos y.

9. Find the derivative of $a^{\sqrt{x}}$ w. r . t x

10. Show that Sin h-1 x = ln ($x + \sqrt{x^2 + 1}$)

11. Prove that $e^{x + h} = e x \{ 1 + h + \frac{h^2}{2!} + \frac{h^3}{3!} + ……..\}$

12. Show that $2^{x + h} = 2^x \{1 + (\ln 2) h + (\ln 2)^2 h^2 + ……..\}$

13. Show that y = lnx / x has maximum value at x = 1/e

14. Show that $y = x^x$ has minimum value at x = 1/e.

15. Divide 20 into two parts so that the sum of their squares will be minimum.

16. Use differentials to approximate the value of $\sin 61^0$. X.

UNIT # 3
INTEGRATION

1. $\int \ln x \, dx$ =……..

   (a) $1 / x$ (b) (b) $1 / x \ln x$ (c) $1 / x \log_{10} x$ (d) None

2. $\int e^{ax + b} \, dx$ =……

   (a) $(1/a) e^{ax + b}$ (b) $(1/b) e^{ax + b}$ (c) $ae^{ax + b} + c$ (d) $e^{ax + b}$

3. $\int 3^{dx + \mu} \, dx$ =…….

   (a) $3^{dx + \mu}$ (b) $1/d \; 3^{dx + \mu}$ (c) $\frac{3^{dx + \mu}}{d \ln 3} + c$ (d) $3^{dx + \mu} \ln 3$

4. $\int \tan x \, dx$ =……

   (a) ln Sinx (d) ln Cosx (c) $Sec^2 x$ (d) ln Secx + c

5. $\int Cot \, x \, dx$ =……

   (a) ln Cosx + c (b) ln Sinx + c (c) $CoSec^i x + c$ (d) None

6. $Sin^{-1} x \, dx$ =……

   (a) $Cos^{-1} x + c$ (b) $1 / \sqrt{1 - x^2} + c$

   (c) $-1 / \sqrt{1 - x^2} + c$ (d) $1 / \sqrt{x^2 - 1} + c$

7. $\int_a^b \ln x \, dx$ =……

   (a) lna – lnb (b) lnb – lna (c) lna + lnb (d) None

8. $\int e^x (\sin x + \cos x) \, dx$ =……..

   (a) $e^x \sin x + c$ (b) $e^x \cos x + c$ (c) $e^x \ln \sin x + c$ (d) None

9. $\int \frac{dx}{x^2+4}$ =……..

(a) $\tan^{-1}(x/4) + c$ (b) $\tan^{-1}(x/2) + c$
(c) ¼ $\tan^{-1}(x/4)$ (d) ½ $\tan^{-1}(x/2) + c$

10. $\int (ax + b) / \sqrt{ax^2 + 2b\,x + c}\, dx$ =……..

(a) ½ $\sqrt{ax^2 + 2bx + c}$ (b) $\sqrt{ax^2 + 2bx + c + d}$

(c) $\ln \sqrt{ax^2 + 2bx + c}$ (d) ½ $\ln\sqrt{ax^2 + 2bx + c} + d$

11. $\int$ Cos hkx dx = …….

(a) Sin hkx + c (b) - Sin hkx + c

(c) $\frac{\text{Sin hkx}}{\text{hk}}$ (d) $\frac{\text{Sin hkx}}{\text{k}} + c$

12. $\int$ Sin hkx dx =……

(a) Cos hkx + c (b) - Cos hkx + c

(c) $\frac{\text{Cos hkx}}{\text{hk}}$ (d) $\frac{\text{Cos hkx}}{\text{k}} + c$

13. $\int$ 1/x dx =……

(a) lnx + c (b) - 1/x + c (c) - $1/x^2$ + c (d) None

14. $\int$ k.dx =……..

(a) k + c (b) kx + c (c) Zero (d) k

15. $\int$ dx / (x lnx) =……..

(a) 1/x + c (b) 1 / lnx + c (c) ln (lnx) + c (d) lnx + c

16. $\int e^{Sinx}.\ Cosx\ dx$ =……

(a) $e^{Cosx} + c$ (b) $e^{Sinx} + c$

(c) $\frac{e^{Cosx}}{Sin\ x} + c$ (d) $\frac{e^{Sinx}}{Cosx} + c$

17. $\int \sqrt{e^x}\ dx$ =…….

(a) $\sqrt{e^x} + c$ (b) $e^x + c$ (c) $½ \sqrt{e^x} + c$ (d) $2 \sqrt{e^x} + c$

18. $\int dx / (x^2 – a^2)$ =…….

(a) ½ a. ln (x + a / x –a) + c (b) -1/2a.ln (x – a / x + a) + c

(c) 1/2a. ln (x – a / x + a) + c (d) + 1/2a ln (a – x / a + x) + c

19. $\int dx / (a^2 – x^2)$

(a) 1/2a ln (a – x / a + x) + c (b) 1/2a ln (a + x / a – x) + c

(c) -1/2a ln (a + x / a – x) (d) None

20. $\int dx / (x^2 + a^2)$ =…….

(a) $\tan^{-1}(x/a) + c$ (b) $\tan^{-1}(a/x) + c$

(c) $1/a \tan^{-1}(x/a)$ (d) None

21. $\int dx / \sqrt{x^2 + a^2}$ =……..

(a) 1/a Sin $h^{-1}x$ (b) 1/a $Sinh^{-1}(x/a)$

(c) $Sinh^{-1}(x/a) + c$ (d) $Cosh^{-1}(x/a) + c$

22. $\int dx / \sqrt{x^2 – a^2}$ =……

(a) 1/a $Cosh^{-1}(x/a) + c$ (b) $Cosh^{-1}(x/a) + c$

(c) $Cosh^{-1}(a/x) + c$ (d) $Sinh^{-1}(x/a)$

23. $\int dx / \sqrt{a^2 - x^2}$ =……

(a) $1/a \ Sin^{-1}x + c$ (b) $1/a \ Sin^{-1}(x/a)$

(c) $1/a \ Sin^{-1}(a/x)$ (d) $Sin^{-1}(x/a) + c$

24. $\int \ln ax / x \, dx$ =……..

(a) $\ln ax + c$ (b) $\ln ax / a + c$

(c) $(\ln ax)^2 / 2 + c$ (d) $(\ln ax)^2 + c$

25. $\int_a^b 1/x \, dx$ =…….

(a) lna – lnb (b) lnb – lna

(c) 1/b – 1/a (d) 1/a – 1/b

26. Solution of diff: equation. dy / dx = 1 is:

(a) x – y = c (b) y / x = c

(c) x / y = c (d) x + y = c

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SHORT QUESTION

1. Use differential to approximate the value of $\sin 61^0$
2. Evaluate $\int dx \,/\, \sqrt{3}\,(\sqrt{x+1})$.
3. Evaluate $\int \frac{ax + b}{ax2+2bx+c}$
4. Evaluate $\int \text{Cosec}\, dx$
5. Evaluate $\int \frac{\text{Cot}\sqrt{x}}{\sqrt{x}}.\, dx$
6. Find $\int ax2.\, x\, dx$.
7. Evaluate $\int \frac{x + b}{\sqrt{x2+2bx+c}} dx$
8. Evaluate $\int \text{Cos}\, x.\, \frac{\ln \text{Sin}x}{\text{Sin}x}\, .dx.$
9. Evaluate $\int \frac{2\,a}{x^2-a^2}.dx.$
10. Evaluate $\int \frac{2\,a}{a^2-x^2}.dx.$
11. Evaluate $\int_{-1}^{2} (x + |x|)\, dx.$

12. $\int_{-1}^{5} |x-3|\,dx.$

13. Evaluate $\int_{1/8}^{1} \left(\frac{x^{1/3}+2}{x^{2/3}}\right) dx$

14. Find the area bounded by Cos function form $x = -\pi/2$ to $x = \pi/2$

15. Solve the differential equation $\frac{dy}{dx} + \frac{2xy}{2y+1}$

16. Solve the differential equation $\text{Sec } x + \tan y \frac{dy}{dx}$

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UNIT # 4
ANALYTIC GEOMETRY

1. Slope of vertical line is …….

   (a) Zero (b) Undefined (c) One (d) None

2. Gradient of horizontal line is……

   (a) Zero (b) Undefined (c) One (d) None

3. Slope of the line $2y + x + 3 = 0$ is ……..

   (a) 2 (b) - 2 (c) ½ (d) - ½

4. Y- intercept of the line $5x + \sqrt{5}\,y + \sqrt{5} = 0$ is ……..

   (a) $\sqrt{5}$ (b) $-\sqrt{5}$ (c) 5 (d) - 1

5. L, is horizontal iff m =……

   (a) 0 (b) 1 (c) -1 (d) ∞

6. L, is vertical iff m = ……..

   (a) 0 (b) 1 (c) -1 (d) ∞

7. If slope of AB = Slope o BC then A, B and C are……..

   (a) Concurrent (b) Collinear (c) Coplanar (d) None

8. Two lines l_1 and l_2 with slopes m_1 and m_2 are parallel if $m_1 - m_2$ =……

   (a) 0 (b) 1 (c) -1 (d) ∞

9. Two lines are perpendicular If 1 + m1m2 = ……..

   (a) -1 (b) + 1 (c) 0 (d) ∞

10. Equation of x – axis is ……..

(a) x = 0 (b) y = 0 (c) x – y = 0 (d) x + y = 0

11. Equation of y – axis is …….

(a) x = 0 (b) y = 0 (c) x + y = 0 (d) x – y = 0

12. If a line intersects x – axis at (a, 0) then a is called …….

(a) a – intercept (b) x – intercept
(c) y – intercept (d) None

13. P lies above the line if $ax_1 + by_1 + c$……0

(a) > (b) < (c) = (d) ≤

14. P lies below the line if $ax_1 + by_1 + c$ ……..0

(a) = (b) > (c) < (d) ≥

15. P (2, - 1) line …….. the line 3x + 7y + 15 = 0

(a) Above (b) Below (c) On (d) None

16. Three lines l_1, l_2 and l_3 are ……..if $\begin{vmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{vmatrix} = 0$

(a) Collinear (b) Concurrent (c) Coplanar (d) None

17. The lines are real and distinct if h^2…….. ab

(a) > (b) < (c) = (d) ≤

18. Three points P, Q, R are collinear if Δ ……0

(a) = (b) > (c) < (d) None

19. The angle between two lines $ax^2 + 2hxy - by^2 = 0$ is …….

(a) л/3 (b) л/2 (c) л/4 (d) л/6

20. Slope of the line bisecting I and III. A quadrant is …….

(a) 0 (b) 1 (c) ∞ (d) None of these

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SHORT QUESTION

1. Find the point three – fifth of the way along the line segment from A (-5, 8) to B (5, 3)?

2. Find K so that the line joining A (7, 3); B (k, -6) and the line joining C (-4, 5), D (-6, 4) are Perpendicular?

3. Find an equation of the vertical line through (-5, 3)?

4. Find an equation of the horizontal line through (7, -9)?

5. Find an equation of the line through (-4, 7) and parallel to the line $2x-7y+4 + 0$?

6. Find the area o the triangular region whose vertices are A (5, 3), B (-=2, 2), C (4, 2)?

7. Find the equation of the line through (5, -8) and perpendicular to the join of A (-15, -8), B (10, 7)?

8. Find an equation of the line through (-8, 5) having slope undefined?

9. By means of slopes show that the points (-1, -3), (1, 5) and (2, 9) are Collinear.

10. Transform the equation $5x – 12y + 39 = 0$ in to Symmetric form.

UNIT # 5
LINEAR INEQUALITIES

1. An expression involving any one of the four symbols $>, <, \geq, \leq$ is called:

   (a) An equation (b) An identity
   (c) An inequality (d) A linear equality

2. $ax + by > 2$ is an:

   (a) Equation (b) In-equation
   (c) Identity (d) A linear equality

3. The inequality $x > 0$ shows:

   (a) Right half-plane (b) Left half-plane
   (c) Upper half-plane (d) lower half-plane

4. $ax + by > c$ is a linear inequality in:

   (a) One variable (b) Two variables
   (c) Three variables (d) Four variables

5. Associated equation of $ax + by > c$ is:

   (a) $ax + by = 0$ (b) $ax + by < c$
   (c) $ax + by = c$ (d) $ax + by > c$

6. The solution of $ax + by < c$ is:

   (a) Closed half-plane (b) Open half –plane
   (c) Circle (d) Parabola

7. If the line segment obtained by joining any two points of a region lies entirely with in the region then the region is called:

(a) Feasible (b) Convex
(c) Non-convex (d) Optimal

8. A function which is to be maximized or minimized is called:

(a) Subjective function (b) Objective function
(c) Qualitative function (d) Quantitative function

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

(a) Exact solution (b) Optimal solution
(c) Objective solution (d) Final solution

10. The point where two boundary lies of a shaded region intersect is called:

(a) Boundary point (b) Corner point
(c) Stationary point (d) Feasible point

11. If $x > b$, then

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

12. A linear inequality contains at least ----- variable:

(a) One (b) Two
(c) Three (d) More then three

13. The graph of a linear equation of the form $ax + by = c$ is line which divides the whole plane into------ disjoint part.

(a) Two (b) Four
(c) More then four (d) Infinitely line

14. 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

15. The graph of the inequality $x \leq b$ is:

(a) Upper half plane (b) Lower half plane
(c) Left half plane (d) Right half plane

16. The graph of the inequality $y \leq b$ is:

(a) Upper half plane (b) Lower half plane
(c) Left half plane (d) Right half plane

17. Associated equation of $x + 2y \leq 6$ or $x + 2y \geq 6$ is the:

(a) Same (b) Not same
(c) Sometimes same (d) None of these

18. The non-negative constraints; $x \geq 0$, $y \geq 0$ indicate the:

(a) Quadrant I (b) Quadrant II
(c) Quadrant III (d) Quadrant IV

19. $x = 0$ is the solution of the inequality:

(a) $2x + 1 > 0$ (b) $2x + 1 < 0$
(c) $2x + 1 \leq 0$ (d) None of these

SHORT QUESTIONS

1. Graph the solution of each of the following linear in equality in xy-plane.
   (i) $2x + y \leq 6$
   (ii) $2x + 1 \geq 0$
   (iii) $3y - 4 \leq 0$

2. Indicate the solution set of the following system of linear inequality by shading.

(i) $2x - 3y \leq 6$
(ii) $x - y \leq 1$
(iii) $4x - 3y \leq 12, \quad x \geq 3/2.$

3. Graph the solution region of the following system of linear inequalities by shading.

   (i) $3x - 4y \leq 12$ and $3x + 2y \geq 3$
   (ii) $2x + y \leq 4$ and $2x - 3y \geq 12$

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UNIT # 6
Conic section

1. If radius of the Circle is Zero, then the Circle is called……

   (a) Zero circle (b) Point circle

   (c) Concentric circle (d) In circle

2. A line may be a tangent to the parabola if C =……

   (a) am (b) a/m (c) m/a (d) Zero

3. The point (2, 2) lies …… the circle $x^2 + y^2 = 1$

   (a) Outside (b) inside (c) On (d) None

4. An angle in a Semi circle is a/an ……. angle

   (a) Right (b) A cute (c) Obtuse (d) None

5. The point where the axes meet, the parabola, is called…….. of the parabola.

   (a) Focus (b) Vertex
   (c) Directrix (d) Centre

6. Latus rectum of the parabola $x^2 = y$ is……..

   (a) 1 (b) 2 (c) 3 (d) 4

7. Directrix of the parabola $x^2 = 4y$ is……..
   (a) $y + 1 = 0$ (b) $y - 1 = 0$ (c) $y - 4 = 0$ (d) $y + 4 = 0$

8. The Conic is a parabola if e…….. |

   (a) = (b) > (c) < (d) $\geqslant$

9. The Conic is an ellipse if e…… |

(a) = (b) > (c) < (d) $\gtrless$

10. The mid point of the hypotenuse of a right triangle is the ……. Centre of the triangle.
(a) In (b) Circum (c) e (d) None

11. Directrices of the ellipse $x^2 / b^2 + y^2 / a^2 = 1$ are -------

(a) $x = a / e$ (b) $x = - a / e$ (c) $y = \pm e / a$ (d) $\pm a / e$

12. The Conic is a hyperbola if e …… |

(a) = (b) > (c) < (d) $\gtrless$

13. The focal chord perpendicular to the axis of the parabola is X = …….

(a) b (b) a (c) a (d) None

14. Axis of the parabola $y^2 = -x$ is ……..

(a) x = 0 (b) y = 0 (c) x = 1 (d) x = -1

15. Vertex of the parabola $x^2 = 2y$ is ……

(a) (0, 0) (b) (0, 2) (c) (2, 0) (d) (1. 2)

16. Eccentricity of the ellipse is……..

(a) a / c (b) c / a (c) ac (d) None

17. Centre of the ellipse: $\frac{(x+1)^2}{4} + \frac{(y+1)^2}{2} = 1$ is ----
(a) (1, 1) (b) (-1, 1) (c) (-1, -1) (d) (1, -1)

18. With usual notation: the points A and A' are called…… of the ellipse $x^2 / a^2 + y^2 / b^2 = 1$

(a) Vertices (b) Co-vertices (c) Transverse (d) Conjugate

19. Length of Latus rectum of the ellipse is ……

(a) $2a^2 / b$ (b) $2a / b^2$ (c) $2b^2 / a$ (d) $2b / a^2$

20. In hyperbola $x^2 / a^2 – y^2 / b^2 = 1$; c^2 = ……

(a) $a^2 – b^2$ (b) $a^2 + b^2$ (c) $b^2 – a^2$ (d) $\sqrt{a^2 – b^2}$

21. A conic is hyperbola if $h^2 – ab$ ……0

(a) = (b) > (c) < (d) $\gtrless$

22. The mid point C of the foci F and F' is called the …….. of the ellipse

(a) Vertex (b) Centre (c) Focus (d) Directrix

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SHORT QUESTIONS

1. Find the centre and radius of the circle $4x^2 + 4y2 – 8x + 12y – 25 = 0$.

2. Find the length of the tangent drawn from the point (-5, 4) to the Circle $5x^2 + 5y^2 – 10x + 15y – 131 = 0$

3. Find an equation of the parabola having its focus at the origin and Directrix Parallel to y – axis.

4. Find an equation of the ellipse with foci (± 3, 0) and minor axis of length 10.

5. Prove that lactus rectum of the ellipse is $2b^2 / a$

6. Find an equation of the ellipse with vertices (0, ± 6) and e = 2 and e = 3 / 5

7. Find an equation of the hyperbola with foci (0, ± 6) and e = 2.

8. Find an equation of the hyperbola with foci (± 5, 0); vertex (3, 0).

CHATER # 7
VECTORS

1. A unit vector is a vector whose magnitude is ……..

   (a) Zero (b) unity (c) -1 (d) None

2. If P is the mid point of AB then $k_1 : k_2 =$ .....

   (a) 1 : 2 (b) 2 : 1 (c) 1 : 1 (d) ½ : 2

3. $Cos^2\alpha + Cos^2\beta + Cos^2r$ = ……..

   (a) 0 (b) 1 (c) - 1 (d) ± 1

4. $\hat{j} \cdot \hat{i}$ = ……..

   (a) 0 (b) 1 (c) $\hat{k}$ (d) $-\hat{k}$

5. $\hat{i} \times \hat{j}$ = ……

   (a) 0 (b) 1 (c) $\hat{k}$ (d) $-\hat{k}$

6. $\hat{i} \times \hat{j}$ = ……

   (a) $\hat{j}$ (b) $-\hat{j}$ (c) 1 (d) 0

7. U and V are orthogonal if θ = ……

   (a) Л / 6 (b) Л / 4 (c) Л / 3 (d) Л / 2

8. U and V are parallel if U x V = ……..

   (a) 0 (b) - V x U (c) 1 (d) - 1

9. Two vectors U And V are Collinear if θ =…….

(a) 0 (b) Л (c) Л / 2 (d) a and b

10. If $\underline{V}$ = ai + bi + c k then projection of $\underline{V}$ along j = ……

(a) b (b) a (c) j (d) k

11. If $\underline{V}$ = ai + bj + ck then projection of V along k = ……

(a) $\underline{c}$ (b) $\underline{a}$ (c) $\underline{b}$ (d) $\underline{k}$

12. In any triangle ABC a = b Cos C + ……..

(a) c Cos B (b) a Cos B (c) b Cos A (d) b Cos B

13. U x V = ……..

(a) V x W (b) - V x U (c) W x U (d) - W x V

14. Projection of U along V =……

(a) $\frac{U \,.\, V}{|\, V \,|}$ (b) $\frac{U \,.\, V}{|U|}$ (c) $\frac{|U \,.\, V|}{\underline{V}}$ (d) $\frac{|U \,.\, V|}{\underline{U}}$

15. Work Done =……..

(a) F . d (b) F . r (c) r . d (d) None of these

16. U, V and W are Coplanar if (U x V) . w = ……..

(a) 0 (b) Л / 3 (c) Л / 2 (d) Л / 4

17. Volume of tetrahedron = …….

(a) ½ (u x v).w (b) ¼ (u x v).w

(c) 1 / 3 (u x v) .w (d) 1 / 6 (u x v). w

18. If K is +ve, then V and kv are in the ……. Direction

(a) Opposite (b) Same (c) Upward (d) downward.

19. The vector whose initial point is the origin 0 and terminal point is P is called the ---------- vector.

(a) Unit (b) Position (c) Zero vector (d) None

20. U x U = …….

(a) - U (b) U (c) 0 (d) 1

SHORT QUESTIONS

1. Find a unit vector in the direction of the vector $\underline{\gamma} = -\sqrt{3/2}\ \underline{i} - \frac{1}{2}\underline{j}$

2. Find the direaction cosines for the vector $\overrightarrow{PQ}$ where P = (2, 1, 5) and Q = (1, 3, 1).

3. By means of vector prove that $a^2 = b^2 + c^2 - 2bc \cos A$.

4. By means of vector prove that $a = b \cos C + c \cos B$.

5. Prove that $\cos(\alpha - \beta) = \cos\alpha \cos\beta + \sin\alpha \sin\beta$ (by use of vectors)

6. Prove that $\cos(\alpha + \beta) = \cos\alpha \cos\beta - \sin\alpha \sin\beta$ (by use of vectors)

7. Prove that $\sin(\alpha + \beta) = \sin\alpha \cos\beta + \cos\alpha \sin\beta$ (//)

8. Prove that $\sin(\alpha - \beta) = \sin\alpha \cos\beta - \cos\alpha \sin\beta$ (//)

9. Prove that in any triangle.
   (i) $b = c \cos A + a \cos C$ (ii) $C = a \cos B + b \cos A$.

10. Find the volume of the tetrahedron whose vertices are A (2, 1, 8), B (3, 2, 9), C (2, 1, 4), D (3, 3, 10).

11. Prove that the vertices $\underline{i} - 2\underline{j} + 3\underline{k}$, $-2\underline{i} + 3\underline{j} - 4\underline{k}$ and $\underline{i} - 3\underline{j} + 5\underline{k}$ are Coplanar.

12. If $\underline{a} + \underline{b} + \underline{c} = 0$ then prove that $= \underline{b} \times \underline{c} = \underline{c} \times \underline{a}$.

ANSWERS

UNIT # 1

1.	c	8.	d	15.	a	22.	a
2.	b	9.	a	16.	b	23.	d
3.	b	10.	a	17.	c	24.	a
4.	b	11.	c	18.	c	25.	d
5.	d	12.	c	19.	b		
6.	d	13.	b	20.	b		
7.	d	14.	a	21.	d		

UNIT # 2

1.	a	8.	b	15.	b	22.	a
2.	b	9.	c	16.	a	23.	d
3.	b	10.	d	17.	b	24.	d
4.	c	11.	b	18.	a	25.	d
5.	d	12.	d	19.	c		
6.	c	13.	a	20.	c		
7.	a	14.	c	21.	b		

UNIT # 3

1.	d	8.	a	15.	c	22.	b
2.	a	9.	d	16.	b	23.	d
3.	c	10.	b	17.	d	24.	c
4.	d	11.	d	18.	c	25.	b
5.	b	12.	d	19.	b	26.	a
6.	b	13.	a	20.	c		
7.	c	14.	b	21.	c		

UNIT # 4

1.	b	6.	d	11.	a	16.	a
2.	a	7.	b	12.	b	17.	c
3.	d	8.	a	13.	a	18.	a
4.	d	9.	a	14.	c	19.	b
5.	a	10.	b	15.	a	20.	b

UNIT # 5

1.	c	6.	b	11.	d	16.	b
2.	b	7.	b	12.	a	17.	a
3.	a	8.	b	13.	a	18.	a
4.	b	9.	b	14.	a	19.	a
5.	a	10.	b	15.	c		

UNIT # 6

1.	b	7.	a	13.	b	19.	c
2.	b	8.	a	14.	b	20.	b
3.	a	9.	a	15.	a	21.	b
4.	a	10.	b	16.	b	22.	b
5.	b	11.	d	17.	c		
6.	a	12.	b	18.	a		

UNIT # 7

1.	b	6.	b	11.	a	16.	a
2.	c	7.	d	12.	a	17.	d
3.	b	8.	a	13.	b	18.	b
4.	a	9.	d	14.	a	19.	b
5.	c	10.	a	15.	a	20.	c