Applied Mathematics

22224

SYLLABUS

Chapter No.	Name of chapter	Marks With Option
1	Function	04
2	Derivatives	18
3	Application of Derivative	12
4	Integration	24
5	Definite Integral	04
6	Application of Definite Integrals	08
7	Differential Equation	06
8	Application of Differential Equations	06
9	Numerical Methods	20
	Total Marks :-	102

COURSE OUTCOME - CO

PROGRAMME: - INFORMATION TECHNOLOGY (IF)

COURSE: - APPLIED MATHEMATICS - (22224)

CO.NO	Course Outcome
224.1	Calculate the equation of tangent, maxima, minima, radius of curvature by differentiation.
224.2	Solve the given problem(s) of integration using suitable Methods.
224.3	Apply the concepts of integration to find the area and volume.
224.4	Solve the differential equation of first order and first degree using suitable Methods.
224.5	Apply the concepts of numerical Methods in computer programming languages to solve algebraic equation.
224.6	Apply the concepts of numerical Methods in computer programming languages to solve simultaneous equation.

BOARD THEORY PAPER PATTERN

Q.1		**Attempt any FIVE**	**5*2=10**
	a)	Function	
	b)	Function	
	c)	Derivatives	
	d)	Integration	
	e)	Integration	
	f)	Application of Definite Integrals	
	g)	Numerical Methods	
Q.2		**Attempt any THREE**	**3*4=12**
	a)	Derivatives	
	b)	Derivatives	
	c)	Application of Derivatives	
	d)	Application of Derivatives	
Q.3		**Attempt any THREE**	**3*4=12**
	a)	Application of Derivatives	
	b)	Derivatives	
	c)	Derivatives	
	d)	Integration	
Q.4		**Attempt any FOUR**	**3*4=12**
	a)	Integration	
	b)	Integration	
	c)	Integration	
	d)	Integration	
	e)	Definite Integral	
Q.5		**Attempt any TWO**	**2*6=12**
	a)	Application of Definite Integrals	
	b)	**i)** Differential Equations	

		ii) Differential Equations
	c)	Application of Differential Equations
Q.6		**Attempt any FOUR** **2*6=12**
	a)	**i)** Numerical Methods
		ii) Numerical Methods
	b)	Numerical Methods
	c)	Numerical Methods

CLASS TEST - I PAPER PATTERN

COURSE:- Applied Mathematics (22224)

Unit No.	Name of the Unit	Course Outcome (CO)
1	Function	CO-01
	Derivatives.	
	Application of derivatives.	
2	Integration.	CO-02
Q.1	**Attempt any FOUR** **4*2=8Marks**	Course Outcome (CO)
a)	Function.	CO-01
b)	Function.	CO-01
c)	Derivatives.	CO-01
d)	Derivatives.	CO-01
e)	Application of Derivatives.	CO-01
f)	Integration.	CO-02
Q.2	**Attempt any THREE** **3*4=12 Marks**	
a)	Derivatives.	CO-01
b)	Application of Derivatives.	CO-01
c)	Application of Derivatives.	CO-01
d)	Integration.	CO-02

CLASS TEST - II PAPER PATTERN

COURSE:- Applied Mathematics (22224)

Unit No.	Name of the Unit	Course Outcome (CO)
2	Integration.	CO-2
	Definite Integral.	
	Application of Definite Integral.	CO-3
3	Differential Equation.	CO-4
4	Application of Differential Equation.	
5	Numerical Methods	CO-5 / CO-6
Q.1	**Attempt any FOUR 4*2=8Marks**	**Course Outcome (CO)**
a)	Integration.	CO-2
b)	Integration.	CO-2
c)	Definite Integral.	CO-2
d)	Application of Definite Integral.	CO-3
e)	Differential Equation.	CO-4
f)	Numerical Methods	CO-5
Q.2	**Attempt any THREE 3*4=12 Marks**	
a)	Definite Integral.	CO-2
b)	Differential Equation.	CO-4
c)	Numerical Methods	CO-5
d)	Numerical Methods	CO-6

FUNCTION

Position in Question Paper **Total Marks-04**

Q.1. a) 2-Marks.

b) 2-Marks.

MCQ Question

Note: Correct answer is marked with **bold.**

1. If $f(x) = x^2 + 6x + 10$ find $f(2) + f(-2)$

   a) 28 c) 26

   b) -28 d) -26

2. If $f(x) = x^2 + 5x + 1$ find $f(0) + f(1)$

   a) 8 c) 10

   b) -8 d) -10

3. If $f(x) = x^4 - 2x + 7$ find $f(0) + f(2)$

   a) 26 c) 36

   b) -26 d) -36

4. If $f(x) = 16^x + log_2 x$ find $f\left(\frac{1}{2}\right)$

   a) 3 c) 9

   b) -3 d) -9

5. If $f(x) = x^2 - 3x + 4$ then the value of $f(1 - x)$

   a) $f(2x - 1)$ c) $f(2x + 2)$

b) $\boldsymbol{f(2x+1)}$ d) $f(2x-3)$

6. If $f(x) = x^2 - 4x + 11$ then the value of $f(x)$

a) $f(3x+1)$ c) $f(3x-3)$

b) $f(3x-2)$ **d)** $\boldsymbol{f(3x-1)}$

7. If $f(x) = 3x^2 - 5x + 7$ show that $f(-1)$

a) $3f(11)$ **c)** $\boldsymbol{3f(1)}$

b) $3f(-1)$ d) $3f(-11)$

8. If $f(x) = tanx$ show that $f(2x) =$

a) $\frac{f(x)}{1-f^2(x)}$ c) $\frac{-2f(x)}{1-f^2(x)}$

b) $\boldsymbol{\frac{2f(x)}{1-f^2(x)}}$ d) $\frac{3f(x)}{1-f^2(x)}$

9. If $f(x) = log\left(\frac{1+x}{1-x}\right)$ then prove that $f\left(\frac{2x}{1+x^2}\right) =$

a) $2f(-x)$ c) $4f(x)$

b) $3f(x)$ **d)** $\boldsymbol{2f(x)}$

10. If $f(x) = \frac{2x+5}{3x-4}$ & $t = \frac{5+4x}{3x-2}$ show that $f(t) =$

a) $\boldsymbol{x}$ c) $-x$

b) $2x$ d) $3x$

11. If $f(x) = \frac{x+3}{4x-5}$ & $t = \frac{3+5x}{4x-1}$ show that $f(t) =$

a) $2x$ c) $3x$

b) $\boldsymbol{x}$ d) $-2x$

12. If $y = f(x) = \frac{2x-3}{3x-2}$ show that $f(y) =$

a) $3x$ c) $4x$

b) $5x$ d) $\boldsymbol{x}$

13. If $f(x) = log(1 + tanx)$ show that $f\left(\frac{\pi}{4} - x\right) =$

a) $\boldsymbol{log2 - f(x)}$ c) $log2 - 2f(x)$

b) $log2 + f(x)$ d) $log2 + 2f(x)$

14. If $f(t) = 50\, sin(100\pi t + 0.04)$ then prove that $f\left(\frac{2}{100} + t\right) =$

a) $2f(t)$ c) $-f(t)$

b) $3f(t)$ **d)** $\boldsymbol{f(t)}$

15. State whether the function $f(x) = \frac{a^x + a^{-x}}{2}$

a) Even c) None

b) Odd d) All of Above

16. State whether the function $f(x) = \frac{e^x + e^{-x}}{2}$

a) Even c) None

b) Odd d) All of Above

DERIVATIVES

POSITION IN QUESTION PAPER **TOTAL MARKS-18**

Q.1. c) 2-Marks.

Q.2. a) 4-Marks.

b) 4-Marks.

Q.3. b) 4-Marks.

c) 4-Marks.

MCQ Question

Note: Correct answer is marked with **bold.**

Que. Diff.w.r.t. x OR find $\frac{dy}{dx}$ if

1. $y = e^{logx}$

a) $\frac{dy}{dx} = 1$

c) $\frac{dy}{dx} = 2$

b) $\frac{dy}{dx} = -1$

d) $\frac{dy}{dx} = -2$

2. $y = x^n + a^x + e^x + sinx$

a) $\frac{dy}{dx} = nx^{n-1} + a^x log_e a + e^x + cosx$

c) $\frac{dy}{dx} = nx^{n-1} + log_e a + e^x + cosx$

b) $\frac{dy}{dx} = nx^{n-1} + a^x + e^x + cosx$

d) $\frac{dy}{dx} = nx^{n-1} + a^x - e^x + cosx$

3. $y = a^x + x^a + a^a + \sqrt{x}$

a) $\boldsymbol{\frac{dy}{dx} = a^x log_e a + ax^{a-1} + \frac{1}{2\sqrt{x}}}$

c) $\frac{dy}{dx} = a^x log_e a + ax^{a-1} + \frac{1}{\sqrt{x}}$

b) $\frac{dy}{dx} = a^x + ax^{a-1} + \frac{1}{2\sqrt{x}}$

d) $\frac{dy}{dx} = log_e a + ax^{a-1} - \frac{1}{2\sqrt{x}}$

4. $y = e^x . sinx$

a) $\frac{dy}{dx} = e^x(cosx - sinx)$

c) $\frac{dy}{dx} = e^x(-cosx - sinx)$

b) $\boldsymbol{\frac{dy}{dx} = e^x(cosx + sinx)}$

d) $\frac{dy}{dx} = e^x(-cosx + sinx)$

5. $y = e^x . tan^{-1}x$

a) $\frac{dy}{dx} = e^x(\frac{1}{1+x^2} - tan^{-1}x)$

c) $\boldsymbol{\frac{dy}{dx} = e^x(\frac{1}{1+x^2} + tan^{-1}x)}$

b) $\frac{dy}{dx} = e^x(-\frac{1}{1+x^2} + tan^{-1}x)$

d) $\frac{dy}{dx} = e^x(\frac{1}{2+x^2} + tan^{-1}x)$

6. $y = e^x . sin^{-1}x$

a) $\frac{dy}{dx} = e^x(\frac{1}{\sqrt{1-x^2}} - sin^{-1}x)$

c) $\frac{dy}{dx} = -e^x(\frac{1}{\sqrt{1-x^2}} + sin^{-1}x)$

b) $\frac{dy}{dx} = e^x(-\frac{1}{\sqrt{1-x^2}} + sin^{-1}x)$

d) $\boldsymbol{\frac{dy}{dx} = e^x(\frac{1}{\sqrt{1-x^2}} + sin^{-1}x)}$

7. $y = x . sin^{-1}x$

a) $\frac{dy}{dx} = \frac{-x}{\sqrt{1-x^2}} + sin^{-1}x$

c) $\frac{dy}{dx} = \frac{x}{\sqrt{1+x^2}} + sin^{-1}x$

b) $\boldsymbol{\frac{dy}{dx} = \frac{x}{\sqrt{1-x^2}} + sin^{-1}x}$

d) $\frac{dy}{dx} = \frac{x}{\sqrt{1-x^2}} - sin^{-1}x$

8. $y = x . e^x$

a) $\frac{dy}{dx} = e^x(x - 1)$

c) $\boldsymbol{\frac{dy}{dx} = e^x(x + 1)}$

b) $\frac{dy}{dx} = -e^x(x - 1)$

d) $\frac{dy}{dx} = -e^x(x + 1)$

9. $y = x^2 . e^x$

a) $\frac{dy}{dx} = e^x(x^2 - 2x)$

c) $\boldsymbol{\frac{dy}{dx} = e^x(x^2 + 2x)}$

b) $\frac{dy}{dx} = e^x(x^2 + x)$

d) $\frac{dy}{dx} = e^x(x^2 + 2)$

10. $y = \frac{sinx}{1+cosx}$

a) $\frac{dy}{dx} = \frac{-1}{1+cosx}$

c) $\frac{dy}{dx} = \frac{1}{1+sinx}$

b) $\frac{dy}{dx} = \frac{1}{1-cosx}$

d) $\boldsymbol{\frac{dy}{dx} = \frac{1}{1+cosx}}$

11. $y = (x^2 + 1)^5$

a) $\frac{dy}{dx} = 10x(x^2 - 1)^4$

c) $\frac{dy}{dx} = 10x(x^2 + 1)^5$

b) $\boldsymbol{\frac{dy}{dx} = 10x(x^2 + 1)^4}$

d) $\frac{dy}{dx} = 10(x^2 + 1)^4$

12. $y = e^{3secx+4tanx}$

a) $\frac{dy}{dx} = e^{3secx+4tanx}(3secx.tanx - 4.sec^2x)$

c) $\frac{dy}{dx} = e^{3secx+4tanx}(secx.tanx + 4.sec^2x)$

b) $\frac{dy}{dx} = e^{3secx+4tanx}(3secx.tanx + sec^2x)$

d) $\boldsymbol{\frac{dy}{dx} = e^{3secx+4tanx}(3secx.tanx + 4.sec^2x)}$

13. $y = log(x^2 - 2x + sinx)$

a) $\frac{dy}{dx} = \frac{2x-2-cosx}{x^2-2x+sinx}$

c) $\boldsymbol{\frac{dy}{dx} = \frac{2x-2+cosx}{x^2-2x+sinx}}$

b) $\frac{dy}{dx} = \frac{2x-2+cosx}{x^2-2x-sinx}$

d) $\frac{dy}{dx} = \frac{2x+2+cosx}{x^2-2x+sinx}$

14. $y = cos(logx)$

a) $\frac{dy}{dx} = \frac{cos(logx)}{x}$

c) $\frac{dy}{dx} = \frac{sin(logx)}{x}$

b) $\boldsymbol{\frac{dy}{dx} = \frac{-sin(logx)}{x}}$

d) $\frac{dy}{dx} = \frac{sin(logx)}{-x}$

15. $y = log(secx + tanx)$

a) $\frac{dy}{dx} = -secx$

c) $\frac{dy}{dx} = cosecx$

b) $\boldsymbol{\frac{dy}{dx} = secx}$

d) $\frac{dy}{dx} = -cosecx$

16. $y = log(tan4 - 3x)$

a) $\boldsymbol{\frac{dy}{dx} = \frac{-3}{tan4-3x}}$ c) $\frac{dy}{dx} = \frac{-3}{-tan4+3x}$

b) $\frac{dy}{dx} = \frac{3}{tan4-3x}$ d) $\frac{dy}{dx} = \frac{3}{tan4+3x}$

17. $y = sinx.cos2x$

a) $\boldsymbol{\frac{dy}{dx} = -2sinx.sin2x + cosx.cos2x}$ c) $\frac{dy}{dx} = 2sinx.sin2x - cosx.cos2x$

b) $\frac{dy}{dx} = 2sinx.sin2x + cosx.cos2x$ d) $\frac{dy}{dx} = -2sinx.sin2x - cosx.cos2x$

18. $y = (x^4 + 2x).sin3x$

a) $\frac{dy}{dx} = 3(x^4 - 2x)cosx - sin3x(4x^3 + 2)$ **c)** $\boldsymbol{\frac{dy}{dx} = 3(x^4 + 2x)cosx + sin3x(4x^3 + 2)}$

b) $\frac{dy}{dx} = 3(x^4 - 2x)cosx + sin3x(4x^3 + 2)$ d) $\frac{dy}{dx} = 3(x^4 + 2x)cosx - sin3x(4x^3 + 2)$

19. $y = log(x^2.e^x)$

a) $\boldsymbol{\frac{dy}{dx} = \frac{x+2}{x}}$ c) $\frac{dy}{dx} = \frac{x+2}{x-x}$

b) $\frac{dy}{dx} = \frac{x-2}{x}$ d) $\frac{dy}{dx} = \frac{-x+2}{x}$

20. If $y = \frac{e^x - e^{-x}}{e^x + e^{-x}}$

a) $\boldsymbol{\frac{dy}{dx} = 1 - y^2}$ c) $\frac{dy}{dx} = -1 - y^2$

b) $\frac{dy}{dx} = 1 + y^2$ d) $\frac{dy}{dx} = 1 - 2y^2$

21. $y = sec^{-1}\left(\frac{1}{4x^3-3x}\right)$

a) $\frac{dy}{dx} = \frac{3}{\sqrt{1-x^2}}$ c) $\frac{dy}{dx} = \frac{3}{\sqrt{1+x^2}}$

b) $\frac{dy}{dx} = \frac{-3}{\sqrt{1+x^2}}$ **d)** $\boldsymbol{\frac{dy}{dx} = \frac{-3}{\sqrt{1-x^2}}}$

22. $y = cos^{-1}(1 - 2sin^2x)$

a) $\boldsymbol{\frac{dy}{dx} = 2}$

c) $\frac{dy}{dx} = 1$

b) $\frac{dy}{dx} = -2$

d) $\frac{dy}{dx} = -3$

23. $y = tan^{-1}(\frac{5x}{1-6x^2})$

a) $\boldsymbol{\frac{dy}{dx} = \frac{3}{1+9x^2} + \frac{2}{1+4x^2}}$

c) $\frac{dy}{dx} = \frac{-3}{1+9x^2} + \frac{2}{1+4x^2}$

b) $\frac{dy}{dx} = \frac{3}{1+9x^2} - \frac{2}{1+4x^2}$

d) $\frac{dy}{dx} = \frac{-3}{1+9x^2} - \frac{2}{1+4x^2}$

24. $y = tan^{-1}(\frac{x}{1+12x^2})$

a) $\frac{dy}{dx} = \frac{4}{1+16x^2} + \frac{3}{1+9x^2}$

c) $\frac{dy}{dx} = \frac{-4}{1+16x^2} - \frac{3}{1+9x^2}$

b) $\frac{dy}{dx} = \frac{-4}{1+16x^2} + \frac{3}{1+9x^2}$

d) $\boldsymbol{\frac{dy}{dx} = \frac{4}{1+16x^2} - \frac{3}{1+9x^2}}$

25. $y = tan^{-1}(\frac{5x-4}{5+4x})$

a) $\frac{dy}{dx} = \frac{1}{1-x^2}$

c) $\boldsymbol{\frac{dy}{dx} = \frac{1}{1+x^2}}$

b) $\frac{dy}{dx} = \frac{1}{2+x^2}$

d) $\frac{dy}{dx} = \frac{-1}{1+x^2}$

26. $x^2 + y^2 = xy$

a) $\frac{dy}{dx} = \frac{y+2x}{2y+x}$

c) $\boldsymbol{\frac{dy}{dx} = \frac{y-2x}{2y-x}}$

b) $\frac{dy}{dx} = \frac{y-2x}{2y+x}$

d) $\frac{dy}{dx} = \frac{y+2x}{2y-x}$

27. $x^3 + y^3 = 3axy$ at point $(\frac{3a}{2}, \frac{3a}{2})$

a) $\frac{dy}{dx} = -2$

c) $\frac{dy}{dx} = 1$

b) $\frac{dy}{dx} = 2$

d) $\boldsymbol{\frac{dy}{dx} = -1}$

28. $13x^2 + 2x^2y + y^3 = 1$ at point $(1, -2)$

a) $\frac{dy}{dx} = \frac{9}{7}$

c) $\boldsymbol{\frac{dy}{dx} = \frac{-9}{7}}$

b) $\frac{dy}{dx} = \frac{-19}{7}$

d) $\frac{dy}{dx} = \frac{-9}{17}$

29. $x.logy + ylogx = 0$

a) $\boldsymbol{\frac{dy}{dx} = \frac{(-xlogy-y)*y}{x(x+ylogx)}}$

c) $\frac{dy}{dx} = \frac{(-xlogy+y)*y}{x(x+ylogx)}$

b) $\frac{dy}{dx} = \frac{(xlogy-y)*y}{x(x+ylogx)}$

d) $\frac{dy}{dx} = \frac{(-xlogy-y)}{(x+ylogx)}$

30. $e^x + e^y = e^{x+y}$

a) $\frac{dy}{dx} = -e^{y+x}$

c) $\frac{dy}{dx} = e^{y-x}$

b) $\frac{dy}{dx} = -e^{-y+x}$

d) $\boldsymbol{\frac{dy}{dx} = -e^{y-x}}$

31. If $xy = log(xy)$

a) $\frac{dy}{dx} = \frac{y}{x}$

c) $\boldsymbol{\frac{dy}{dx} = \frac{-y}{x}}$

b) $\frac{dy}{dx} = \frac{2y}{x}$

d) $\frac{dy}{dx} = \frac{3y}{x}$

32. $x^y = e^{x-y}$

a) $\frac{dy}{dx} = \frac{-logx}{(1+logx)^2}$

c) $\boldsymbol{\frac{dy}{dx} = \frac{logx}{(1+logx)^2}}$

b) $\frac{dy}{dx} = \frac{logx}{(1-logx)^2}$

d) $\frac{dy}{dx} = \frac{-logx}{(1-logx)^2}$

33. $e^y = y^x$

a) $\frac{dy}{dx} = \frac{-(logy)^2}{logy-1}$

c) $\frac{dy}{dx} = \frac{(logy)^2}{-logy-1}$

b) $\boldsymbol{\frac{dy}{dx} = \frac{(logy)^2}{logy-1}}$

d) $\frac{dy}{dx} = \frac{(logy)^2}{logy+1}$

34. $x^p.y^q = (x+y)^{p+q}$

a) $\frac{dy}{dx} = \frac{-y}{x}$

c) $\frac{dy}{dx} = \frac{2y}{x}$

b) $\frac{dy}{dx} = \frac{-2y}{x}$

d) $\boldsymbol{\frac{dy}{dx} = \frac{y}{x}}$

35. $log\left(\sqrt{x^2+y^2}\right) = tan^{-1}(\frac{y}{x})$

a) $\boldsymbol{\frac{dy}{dx} = \frac{-y-x}{y-x}}$

c) $\frac{dy}{dx} = \frac{y-x}{y-x}$

b) $\frac{dy}{dx} = \frac{-y+x}{y-x}$

d) $\frac{dy}{dx} = \frac{-y-x}{y+x}$

36. $y = x^x$

a) $\boldsymbol{\frac{dy}{dx} = x^x(1+logx)}$

c) $\frac{dy}{dx} = x^x(-1+logx)$

b) $\frac{dy}{dx} = x^x(1-logx)$

d) $\frac{dy}{dx} = x^x(-1-logx)$

37. $y = (sinx)^{logx}$

a) $\frac{dy}{dx} = sinx^{logx}(logx.cotx - \frac{log(sinx)}{x}$

c) $\frac{dy}{dx} = sinx^{logx}(logx.cotx + \frac{-log(sinx)}{x}$

b) $\frac{dy}{dx} = sinx^{logx}(-logx.cotx + \frac{log(sinx)}{x}$

d) $\boldsymbol{\frac{dy}{dx} = sinx^{logx}(logx.cotx + \frac{log(sinx)}{x}}$

38. $y = x^x + (sinx)^{logx}$

a) $\boldsymbol{\frac{dy}{dx} = x^x(1+logx) + sinx^{logx}(logx.cotx + \frac{log(sinx)}{x}}$

c) $\frac{dy}{dx} = x^x(1+logx) - sinx^{logx}(logx.cotx + \frac{log(sinx)}{x}$

b) $\frac{dy}{dx} = x^x(1+logx) + sinx^{logx}(logx.cotx - \frac{log(sinx)}{x}$

d) $\frac{dy}{dx} = x^x(1+logx) - sinx^{logx}(logx.cotx - \frac{log(sinx)}{x}$

39. If $x^3.y^2 = (x+y)^5$

a) $\frac{dy}{dx} = \frac{-y}{x}$

c) $\frac{dy}{dx} = \frac{y+x}{x}$

b) $\boldsymbol{\frac{dy}{dx} = \frac{y}{x}}$

d) $\frac{dy}{dx} = \frac{2y}{x}$

40. $x = 3at^2$ & $y = 2at^3$

a) $\boldsymbol{\frac{dy}{dx} = t}$

c) $\frac{dy}{dx} = 6t$

b) $\frac{dy}{dx} = 2t$

d) $\frac{dy}{dx} = 3t$

41. $x = sin\theta$ & $y = cos\theta$

a) $\frac{dy}{dx} = -2tan\theta$

c) $\frac{dy}{dx} = tan\theta$

b) $\frac{dy}{dx} = 2tan\theta$

d) $\boldsymbol{\frac{dy}{dx} = -tan\theta}$

42. $x = at^2$ & $y = 2at$

a) $\frac{dy}{dx} = \frac{1}{t}$

c) $\frac{dy}{dx} = \frac{1}{2t}$

b) $\frac{dy}{dx} = \frac{-1}{t}$

d) $\boldsymbol{\frac{dy}{dx} = \frac{1}{t}}$

43. $x = a(1 + cos\theta)$ & $y = a(1 - cos\theta)$

a) $\frac{dy}{dx} = 1$

c) $\frac{dy}{dx} = -2$

b) $\boldsymbol{\frac{dy}{dx} = -1}$

d) $\frac{dy}{dx} = 2$

44. $x = asect$ & $y = b\,tant$ at $t = \frac{\pi}{2}$

a) $\frac{dy}{dx} = \frac{-b}{a}$

c) $\boldsymbol{\frac{dy}{dx} = \frac{b}{a}}$

b) $\frac{dy}{dx} = \frac{2b}{a}$

d) $\frac{dy}{dx} = \frac{-2b}{a}$

45. $x = a(\theta - sin\theta)$ & $y = a(1 - cos\theta)$ at $\theta = \frac{\pi}{4}$

a) $\frac{dy}{dx} = \frac{-1}{\sqrt{2}-1}$

c) $\boldsymbol{\frac{dy}{dx} = \frac{1}{\sqrt{2}-1}}$

b) $\frac{dy}{dx} = \frac{1}{\sqrt{2}+1}$

d) $\frac{dy}{dx} = \frac{-1}{\sqrt{2}+1}$

46. $x = a(\theta + sin\theta)$ & $y = a(1 + cos\theta)$ at $\theta = \frac{\pi}{2}$

a) $\frac{dy}{dx} = 1$

c) $\frac{dy}{dx} = -2$

b) $\boldsymbol{\frac{dy}{dx} = -1}$

d) $\frac{dy}{dx} = 2$

47. $x = a(cos\theta + \theta sin\theta)$ & $y = a(sin\theta - \theta cos\theta)$ at $\theta = \frac{\pi}{4}$

a) $\frac{dy}{dx} = -1$ c) $\frac{dy}{dx} = -2$

b) $\boldsymbol{\frac{dy}{dx} = 1}$ d) $\frac{dy}{dx} = 2$

48. $y = 3sint - 2sin^3t$ & $x = 3cost - 2cos^3t$ at $t = \frac{\pi}{4}$

a) $\frac{dy}{dx} = 1$ c) $\frac{dy}{dx} = -2$

b) $\boldsymbol{\frac{dy}{dx} = -1}$ d) $\frac{dy}{dx} = 2$

49. Diff. $(sinx)$ w.r.t. $(logx)$

a) $\boldsymbol{\frac{dy}{dx} = x.cosx}$ c) $\frac{dy}{dx} = 2x.cosx$

b) $\frac{dy}{dx} = -x.cosx$ d) $\frac{dy}{dx} = -2x.cosx$

50. Diff. $cos^{-1}(2x\sqrt{1-x^2})$ w.r.t. $sec^{-1}(\frac{1}{\sqrt{1-x^2}})$

a) $\frac{dy}{dx} = -1$ **c)** $\boldsymbol{\frac{dy}{dx} = -2}$

b) $\frac{dy}{dx} = 1$ d) $\frac{dy}{dx} = 2$

51. Diff. $tan^{-1}(\frac{2x}{1-x^2})$ w.r.t. $sin^{-1}(\frac{2x}{1+x^2})$

a) $\frac{dy}{dx} = -1$ c) $\frac{dy}{dx} = -2$

b) $\boldsymbol{\frac{dy}{dx} = 1}$ d) $\frac{dy}{dx} = 2$

52. Diff. $log(1 + x^2)$ w.r.t. $tan^{-1}x$

a) $\frac{dy}{dx} = -x$ c) $\frac{dy}{dx} = -2x$

b) $\frac{dy}{dx} = x$ **d)** $\boldsymbol{\frac{dy}{dx} = 2x}$

53. Diff. $(7x^5 - 11x^2)$ w.r.t. $(7x^2 - 15x)$

a) $\frac{dy}{dx} = \frac{-35x^4-22x}{14x-15}$

c) $\frac{dy}{dx} = \frac{35x^4-22x}{14x+15}$

b) $\frac{dy}{dx} = \frac{35x^4+22x}{14x-15}$

d) $\boldsymbol{\frac{dy}{dx} = \frac{35x^4-22x}{14x-15}}$

54. Diff. $cos^{-1}(\frac{1-x^2}{1+x^2})$ w.r.t. $sin^{-1}(\frac{2x}{1+x^2})$

a) $\frac{dy}{dx} = -1$

c) $\frac{dy}{dx} = -2$

b) $\boldsymbol{\frac{dy}{dx} = 1}$

d) $\frac{dy}{dx} = 2$

APPLICATION OF DERIVATIVES

POSITION IN QUESTION PAPER **TOTAL MARKS-12**

Q.2.c) 4-Marks.

d) 4-Marks.

Q.3. a) 4-Marks.

MCQ Question

Note: Correct answer is marked with **bold.**

1. Find the slope **OR** Gradient of the curve $y = \sqrt{x^3}$ at $x = 4$

   a) 3 c) 4

   b) -3 d) -4

2. Find the point on the curve $y = 7x - 3x^2$ where the inclination of the tangent is 45^0

   a) $(\mathbf{1}, \mathbf{4})$ c) $(1, -4)$

   b) $(-1, 4)$ d) $(-1, -4)$

3. At what point on the curve $y = 3x - x^2$ the slope is -5 ?

   a) $(\mathbf{4}, \mathbf{-4})$ c) $(-4, -4)$

   b) $(-4, 4)$ d) $(4, 4)$

4. At what point on the curve $y = e^x$ the slope is 1.

   a) $(0, -1)$ **c)** $(\mathbf{0}, \mathbf{1})$

   b) $(0, 2)$ d) $(0, -2)$

5. Find a & b such that slope of curve $2y^3 = ax^2 + b$ at $(1, -1)$ is same as the slope of $x + y = 0$

a) $a = -3\ ,\ b = -1$ c) $a = 3\ ,\ b = 1$

b) $\boldsymbol{a = -3\ ,\ b = 1}$ d) $a = 3\ ,\ b = -1$

6. Find the equation of tangent to the curve $y = x^2$ at $(-1,1)$

a) $\boldsymbol{x + 2y + 3 = 0}$ c) $x - 2y + 3 = 0$

b) $-x + 2y + 3 = 0$ d) $x + 2y - 3 = 0$

7. Find the equation of tangent to the curve $y = x(2 - x)$ at $(2,0)$

a) $-x - 2y - 2 = 0$ c) $x - 2y + 2 = 0$

b) $x + 2y - 2 = 0$ **d)** $\boldsymbol{x - 2y - 2 = 0}$

8. Find the equation of the tangent to the curve $x^2 + 3xy + y^2 = 5$ at $(1,1)$

a) $x + y + 2 = 0$ **c)** $\boldsymbol{x + y - 2 = 0}$

b) $x - y - 2 = 0$ d) $-x + y - 2 = 0$

9. Find the equation of the normal to the curve $2x^2 - xy + 3y^2 = 18$ at $(3,1)$

a) $3x + 11y + 2 = 0$ **c)** $\boldsymbol{3x - 11y + 2 = 0}$

b) $3x - 11y - 2 = 0$ d) $-3x - 11y + 2 = 0$

10. Find the equation of normal to the curve $4x^2 + 9y^2 = 40$ at point $(1\ ,2)$

a) $9x - 2y + 5 = 0$ c) $-9x - 2y - 5 = 0$

b) $9x + 2y - 5 = 0$ **d)** $\boldsymbol{9x - 2y - 5 = 0}$

11. Find equation of tangent to the circle $x^2 + y^2 + 6x - 6y - 7 = 0$ at a point it meets / cuts / intersects the X- axis.

a) $4x - 3y + 4 = 0$ c) $4x + 3y - 4 = 0$

b) $\boldsymbol{4x - 3y - 4 = 0}$ d) $-4x - 3y - 4 = 0$

12. Find the equation of tangent to the curve $y = 9x^2 - 12x + 7$ which is parallel to X-axis.

a) $-y - 3 = 0$ c) $y + 3 = 0$

b) $\boldsymbol{y-3=0}$ d) $-y+3=0$

13. The equation of tangent to the curve $(\frac{x}{a})^m+(\frac{y}{b})^m=2$ at point (a,b) is

a) $\frac{x}{a}-\frac{y}{b}=2$ **c)** $\boldsymbol{\frac{x}{a}+\frac{y}{b}=2}$

b) $\frac{x}{a}+\frac{y}{b}=-2$ d) $-\frac{x}{a}+\frac{y}{b}=2$

14. Find the equation of tangent to the curve $x=\frac{1}{t}$, $y=1-\frac{1}{t}$ when $t=2$

a) $x-y-1=0$ **c)** $\boldsymbol{x+y-1=0}$

b) $x+y+1=0$ d) $-x+y-1=0$

15. Find the equation of tangent to the curve $x=\frac{1}{t}$, $y=t-\frac{1}{t}$ when $t=2$

a) $5x-y-4=0$ c) $5x+y+4=0$

b) $\boldsymbol{5x+y-4=0}$ d) $-5x+y-4=0$

16. The equation of tangent at point $(2,3)$ on the curve $y=ax^3+b$ is $y=4x-5$.

Find a & b

a) $a=\frac{-1}{3}$, $b=\frac{1}{3}$ c) $a=\frac{-1}{3}$, $b=\frac{-1}{3}$

b) $a=\frac{1}{3}$, $b=\frac{-1}{3}$ **d)** $\boldsymbol{a=\frac{1}{3}}$, $\boldsymbol{b=\frac{1}{3}}$

17. Find the maximum & minimum value of x^3-18x^2+96x

a) $Max.=-160$, $Min.=128$ **c)** $\boldsymbol{Max.=160}$, $\boldsymbol{Min.=128}$

b) $Max.=160$, $Min.=-128$ d) $Max.=-160$, $Min.=-128$

18. Find the maximum & minimum value of x^3-9x^2+24x

a) $\boldsymbol{Max.=20}$, $\boldsymbol{Min.=16}$ c) $Max.=20$, $Min.=-16$

b) $Max.=-20$, $Min.=16$ d) $Max.=-20$, $Min.=-16$

19. Find the maximum & minimum value of $y=2x^3-3x^2-36x+10$

a) $Max.=-54$, $Min.=71$ **c)** $\boldsymbol{Max.=54}$, $\boldsymbol{Min.=-71}$

b) $Max. = -54\ ,\ Min. = -71$ d) $Max. = 54\ ,\ Min. = 71$

20. Find the maximum& minimum value of $y = x^3 - \frac{15x^2}{2} + 18x$

a) $Max. = -14\ ,\ Min. = 13.5$ c) $Max. = -14\ ,\ Min. = -13.5$

b) $Max. = 14\ ,\ Min. = -13.5$ **d) $\boldsymbol{Max. = 14\ ,\ Min. = 13.5}$**

21. Discuss maxima and minima of the function "$tan\ x - 2x$".

a) $Max. = 1 - \frac{3\pi}{2}\ ,\ Min. = 1 - \frac{\pi}{2}$ c) $Max. = -1 + \frac{3\pi}{2}\ ,\ Min. = 1 - \frac{\pi}{2}$

b) $\boldsymbol{Max. = -1 - \frac{3\pi}{2}\ ,\ Min. = 1 - \frac{\pi}{2}}$ d) $Max. = -1 - \frac{3\pi}{2}\ ,\ Min. = 1 + \frac{\pi}{2}$

22. Divide 80 into two parts such that their product is maximum.

a) $First\ Part = 50, Second\ Part = 30$ c) $First\ Part = 30, Second\ Part = 50$

b) $\boldsymbol{First\ Part = 40, Second\ Part = 40}$ d) $First\ Part = 10, Second\ Part = 70$

23. Divide 50 into two parts such that their product is maximum.

a) $First\ Part = 50, Second\ Part = 0$ c) $First\ Part = 0, Second\ Part = 50$

b) $\boldsymbol{First\ Part = 25, Second\ Part = 25}$ d) $First\ Part = 10, Second\ Part = 40$

24. A metal wire 36 cm long is bent to form a rectangle. Find its dimension when its area is maximum.

a) $l = 8cm\ , b = 9cm$ c) $l = 10cm\ , b = 9cm$

b) $l = 9cm\ , b = 8cm$ **d) $\boldsymbol{l = 9cm\ , b = 9cm}$**

25. A metal wire 40 cm long is bent to form a rectangle. Find its dimensions when its area is maximum.

a) $l = 8cm\ , b = 9cm$ c) $l = 10cm\ , b = 9cm$

b) $l = 9cm\ , b = 8cm$ **d) $\boldsymbol{l = 10cm\ , b = 10cm}$**

26. A manufacturer can sell x item at price of cost Rs. $(330 - x)$ each. The cost of producing x item in Rs. Is $x^2 + 10x + 12$. How many items must be sold so that his profit is maximum.

a) $Point\ of\ Max.(70\ ,12788)$ c) $Point\ of\ Max.(90\ ,12788)$

b) $\boldsymbol{Point\ of\ Max.(80\ ,12788)}$ d) $Point\ of\ Max.(60\ ,12700)$

27. A bullet is fired into a mud bank and penetrates $(120t - 3600t^2)$ meters in t Seconds after impact. Calculate maximum depth of penetration.

a) $\boldsymbol{Point\ of\ Max.(\frac{1}{60}\ ,1)}$ c) $Point\ of\ Max.(\frac{1}{60}\ ,20)$

b) $Point\ of\ Max.(\frac{1}{60}\ ,10)$ d) $Point\ of\ Max.(\frac{1}{60}\ ,30)$

28. A beam is supported at the two ends and is uniformly loaded. The bending moment M at a distance x from the end is given by $M = \frac{WL}{2}x - \frac{W}{2}x^2$. Find the point at Which M is maximum.

a) $\boldsymbol{Point\ of\ Max.(\frac{L}{2}\ ,\frac{WL^2}{8})}$ c) $Point\ of\ Max.(\frac{L}{4}\ ,\frac{WL^2}{8})$

b) $Point\ of\ Max.(\frac{L}{3}\ ,\frac{WL^2}{8})$ d) $Point\ of\ Max.(\frac{L}{5}\ ,\frac{WL^2}{8})$

29. The rate of working of an engine is given by the expression $10v + \frac{4000}{v}$ where v is the speed of the engine. Find the speed at which the rate of working is the least.

a) $Point\ of\ Min.(\ 20\ ,300)$ c) $Point\ of\ Min.(\ 10\ ,500)$

b) $\boldsymbol{Point\ of\ Min.(\ 20\ ,400)}$ d) $Point\ of\ Min.(\ 30\ ,500)$

30. Find the radius of curvature of the curve $y = x^3$ at $(\ 2\ ,8\ )$

a) 140.5 $unit$ c) 165.5 $unit$

b) 155.5 $unit$ **d)** $\boldsymbol{145.5\ unit}$

31. Find the radius of curvature of the curve $y = x^3$ at $(\ 1\ ,1\ )$

a) $\boldsymbol{5.2704\ unit}$ c) 7.2704 $unit$

b) 6.2704 $unit$ d) 8.2704 $unit$

32. Find the radius of curvature of the curve $y = log(sinx)$ at $x = \frac{\pi}{2}$

a) $2\ unit$

c) $\mathbf{1\ unit}$

b) $3\ unit$

d) $4\ unit$

33. Find the radius of curvature of the curve $x.y = c$ at (c, c)

a) $2.4142C\ unit$

c) $4.4142C\ unit$

b) $3.4142C\ unit$

d) $\mathbf{1.4142C\ unit}$

34. Find the radius of curvature of the curve $\sqrt{x} + \sqrt{y} = 1$ at $(\frac{1}{4}, \frac{1}{4})$

a) $1.7071\ unit$

c) $\mathbf{0.7071\ unit}$

b) $2.7071\ unit$

d) $0 = 3.7071\ unit$

35. A beam is bent in the form of the curve $y = 2sinx - sin2x$. Find the radius of curvature of the beam at $x = \frac{\pi}{2}$

a) $6.5901\ unit$

c) $\mathbf{5.5901\ unit}$

b) $4.5901\ unit$

d) $7.5901\ unit$

36. A telegraph wire hangs in the form of a curve $y = a.log[\sec\left(\frac{x}{a}\right)]$ where a is constant. Show that ROC at any point is

a) $a.cos\left(\frac{x}{a}\right)$

c) $\boldsymbol{a.sec\left(\frac{x}{a}\right)}$

b) $a.cosec\left(\frac{x}{a}\right)$

d) $a.sin\left(\frac{x}{a}\right)$

INTEGRATION

POSITION IN QUESTION PAPER **TOTAL MARKS-24**

Q.1. d) 2-Marks.
e) 2-Marks.
Q.3. d) 4-Marks.
Q.4. a) 4-Marks.
b) 4-Marks.
c) 4-Marks.
d) 4-Marks.

MCQ Question

Note: Correct answer is marked with **bold.**

1. Evaluate $\int (tanx + cotx)^2\, dx$

a) $tanx + cotx + c$
c) $-tanx - cotx + c$
b) $\boldsymbol{tanx - cotx + c}$
d) $-tanx + cotx + c$

2. Evaluate $\int (e^x + x^e + e^e)\, dx$

a) $\boldsymbol{e^x + \frac{x^{e+1}}{e+1} + e^e.x + c}$
c) $e^x + \frac{x^{e+1}}{e+1} - e^e.x + c$
b) $e^x - \frac{x^{e+1}}{e+1} + e^e.x + c$
d) $e^x + \frac{x^{e+1}}{e-1} + e^e.x + c$

3. Evaluate $\int e^{2logx} dx$

a) $\frac{x^2}{3} + c$
c) $\boldsymbol{\frac{x^3}{3} + c}$
b) $\frac{x^3}{4} + c$
d) $\frac{x^3}{-3} + c$

4. Evaluate $\int \frac{1}{1+cos2x} dx$

a) $\boldsymbol{\frac{tanx}{2} + c}$ c) $\frac{tanx}{3} + c$

b) $-\frac{tanx}{2} + c$ d) $\frac{tanx}{sinx} + c$

5. Evaluate $\int \sqrt{1 + sin2x}\ dx$

a) $cosx + sinx + c$ c) $cosx - sinx + c$

b) $-cosx - sinx + c$ **d)** $\boldsymbol{-cosx + sinx + c}$

6. Evaluate $\int sin^2 x dx$

a) $\frac{1}{2}\left(x + \frac{sin2x}{2}\right) + c$ **c)** $\boldsymbol{\frac{1}{2}\left(x - \frac{sin2x}{2}\right) + c}$

b) $\frac{1}{2}\left(-x - \frac{sin2x}{2}\right) + c$ d) $\frac{1}{2}\left(-x + \frac{sin2x}{2}\right) + c$

7. Evaluate $\int sin^2 2x dx$

a) $\frac{1}{2}\left(x + \frac{sin4x}{2}\right) + c$ **c)** $\boldsymbol{\frac{1}{2}\left(x - \frac{sin4x}{4}\right) + c}$

b) $\frac{1}{2}\left(-x - \frac{sin2x}{4}\right) + c$ d) $\frac{1}{2}\left(-x + \frac{sin4x}{2}\right) + c$

8. Evaluate $\int tan^2 x dx$

a) $\boldsymbol{tanx - x + c}$ c) $tanx + x + c$

b) $-tanx - x + c$ d) $-tanx + x + c$

9. Evaluate $\int \frac{cos2x}{sin^2 x cos^2 x} dx$

a) $-cotx + tanx + c$ c) $cotx + tanx + c$

b) $cotx - tanx + c$ **d)** $\boldsymbol{-cotx - tanx + c}$

10. Evaluate $\int \frac{cos(logx)}{x} dx$

a) $sin(-logx) + c$ c) $-sin(logx) + c$

b) $\boldsymbol{sin(logx)+c}$ d) $cos(logx)+c$

11. Evaluate $\int cosec^2(e^x)e^x\,dx$

a) $cot(e^x)+c$ **c)** $\boldsymbol{-cot(e^x)+c}$

b) $-cot(-e^x)+c$ d) $cot(-e^x)+c$

12. Evaluate $\int \frac{sin\sqrt{x}}{\sqrt{x}}dx$

a) $2cos\sqrt{x}+c$ c) $-4cos\sqrt{x}+c$

b) $cos\sqrt{x}+c$ **d)** $\boldsymbol{-2cos\sqrt{x}+c}$

13. Evaluate $\int \frac{(tan^{-1}x)^3}{(1+x^2)}dx$

a) $\frac{(tan^{-1}x)^4}{3}+c$ c) $\frac{(tan^{-1}x)^3}{4}+c$

b) $\boldsymbol{\frac{(tan^{-1}x)^4}{4}+c}$ d) $\frac{(tan^{-1}x)^5}{5}+c$

14. Evaluate $\int \frac{(sin^{-1}x)^3}{\sqrt{1-x^2}}dx$

a) $\frac{(sin^{-1}x)^4}{3}+c$ c) $\frac{(sin^{-1}x)^5}{5}+c$

b) $\frac{(sin^{-1}x)^3}{4}+c$ **d)** $\boldsymbol{\frac{(sin^{-1}x)^4}{4}+c}$

15. Evaluate $\int \frac{e^{m\,sin^{-1}x}}{\sqrt{1-x^2}}dx$

a) $\boldsymbol{\frac{e^{m\,sin^{-1}x}}{m}+c}$ c) $\frac{e^{sin^{-1}x}}{m}+c$

b) $\frac{e^{m\,sin^{-1}x}}{2m}+c$ d) $\frac{e^{sin^{-1}x}}{2m}+c$

16. Evaluate $\int \frac{cosx}{1+sin^2x}dx$

a) $-tan^{-1}(sinx)+c$ **c)** $\boldsymbol{tan^{-1}(sinx)+c}$

b) $2tan^{-1}(sinx)+c$

d) $tan^{-1}(cosx)+c$

17. Evaluate $\int \frac{dx}{x.logx}$

a) $\boldsymbol{log|logx|+c}$

c) $log|x|+c$

b) $-log|logx|+c$

d) $log|2x|+c$

18. Evaluate $\int \frac{dx}{2x+x.logx}$

a) $\boldsymbol{log|2+logx|+c}$

c) $log|2x|+c$

b) $-log|logx|+c$

d) $log|2x-logx|+c$

19. Evaluate $\int \frac{1}{\sqrt{1-x^2}.(sin^{-1}x)^2}dx$

a) $\frac{-1}{sin^{-1}x}+c$

c) $\boldsymbol{\frac{1}{sin^{-1}x}+c}$

b) $\frac{2}{sin^{-1}x}+c$

d) $\frac{-2}{sin^{-1}x}+c$

20. Evaluate $\int \frac{e^x(x+1)}{cos^2(x.e^x)}dx$

a) $tan(-x.e^x)+c$

c) $-tan(xe^x)+c$

b) $\boldsymbol{tan(x.e^x)+c}$

d) $tan(2xe^x)+c$

21. Evaluate $\int \frac{e^x(x+1)}{sin^2(x.e^x)}dx$

a) $cot(-x.e^x)+c$

c) $-cot(xe^x)+c$

b) $\boldsymbol{-cot(x.e^x)+c}$

d) $cot(2xe^x)+c$

22. Evaluate $\int \frac{e^x(x-1)}{x^2sin^2\left(\frac{e^x}{x}\right)}dx$

a) $cot(\frac{e^x}{x})+c$

c) $2cot(\frac{e^x}{x})+c$

b) $\boldsymbol{-cot(\frac{e^x}{x})+c}$

d) $cot(\frac{e^x}{2x})+c$

23. Evaluate $\int \frac{1}{x+\sqrt{x}}\,dx$

a) $2.log\left|\sqrt{x}-1\right|+c$

c) $\boldsymbol{2.log\left|\sqrt{x}+1\right|+c}$

b) $2.log\left|\sqrt{x}+2\right|+c$

d) $-2.log\left|\sqrt{x}+1\right|+c$

24. Evaluate $\int \frac{\left[log tan\frac{x}{2}\right]}{sinx}dx$

a) $\frac{[log|tan^{x}/_{2}|]^2}{-2}+c$

c) $\frac{-[log|tan^{x}/_{2}|]^2}{2}+c$

b) $\boldsymbol{\frac{[log|tan^{x}/_{2}|]^2}{2}+c}$

d) $\frac{[log|tanx|]^2}{2}+c$

25. Evaluate $\int \frac{secx.cosecx}{log(tanx)}dx$

a) $\boldsymbol{log|log(tanx)|+c}$

c) $log|log(secx)|+c$

b) $log|log(sinx)|+c$

d) $log|log(-tanx)|+c$

26. Evaluate $\int tan^3 x dx$

a) $\frac{tan^2x}{2}+log|secx|+c$

c) $\frac{tan^2x}{3}+log|secx|+c$

b) $\frac{tan^2x}{3}-log|secx|+c$

d) $\boldsymbol{\frac{tan^2x}{2}-log|secx|+c}$

27. Evaluate $\int \frac{1}{x[9+(logx)^2]}dx$

a) $\frac{1}{3}tan^{-1}\left(\frac{logx}{4}\right)+c$

c) $\boldsymbol{\frac{1}{3}tan^{-1}\left(\frac{logx}{3}\right)+c}$

b) $\frac{1}{4}tan^{-1}\left(\frac{logx}{4}\right)+c$

d) $\frac{1}{2}tan^{-1}\left(\frac{logx}{2}\right)+c$

28. Evaluate $\int \frac{e^x}{(e^x-1)(e^x+1)}dx$

a) $\frac{1}{2}log\left|\frac{e^x+1}{e^x+1}\right|+c$

c) $\frac{1}{2}log\left|\frac{e^x-1}{e^x-1}\right|+c$

b) $\boldsymbol{\frac{1}{2}log\left|\frac{e^x-1}{e^x+1}\right|+c}$

d) $\frac{1}{2}log\left|\frac{e^x+1}{e^x-1}\right|+c$

29. Evaluate $\int \frac{1}{x^2+4x+9} dx$

a) $\frac{-1}{\sqrt{5}} tan^{-1}\left(\frac{x+2}{\sqrt{5}}\right) + c$

c) $\frac{1}{\sqrt{6}} tan^{-1}\left(\frac{x+2}{\sqrt{5}}\right) + c$

b) $\frac{1}{\sqrt{5}} tan^{-1}\left(\frac{x+2}{\sqrt{6}}\right) + c$

d) $\boldsymbol{\frac{1}{\sqrt{5}} tan^{-1}\left(\frac{x+2}{\sqrt{5}}\right) + c}$

30. Evaluate $\int \frac{1}{x^2+4x+5} dx$

a) $\boldsymbol{tan^{-1}(x+2) + c}$

c) $tan^{-1}(x) + c$

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

d) $tan^{-1}(x-2) + c$

31. Evaluate $\int \frac{1}{x^2+4x+25} dx$

a) $\frac{1}{\sqrt{21}} tan^{-1}\left(\frac{x+1}{\sqrt{21}}\right) + c$

c) $\frac{1}{\sqrt{21}} tan^{-1}\left(\frac{x22}{\sqrt{21}}\right) + c$

b) $\boldsymbol{\frac{1}{\sqrt{21}} tan^{-1}\left(\frac{x+2}{\sqrt{21}}\right) + c}$

d) $\frac{1}{\sqrt{21}} tan^{-1}\left(\frac{x+3}{\sqrt{21}}\right) + c$

32. Evaluate $\int \frac{1}{2x^2+3x+1} dx$

a) $\boldsymbol{log\left|\frac{2x+1}{2x+2}\right| + c}$

c) $log\left|\frac{2x+1}{2x+3}\right| + c$

b) $log\left|\frac{2x+3}{2x+2}\right| + c$

d) $log\left|\frac{2x-1}{2x-2}\right| + c$

33. Evaluate $\int \frac{1}{2x^2+3x+2} dx$

a) $\frac{1}{\sqrt{7}} tan^{-1}\left(\frac{4x+3}{\sqrt{7}}\right) + c$

c) $\frac{3}{\sqrt{7}} tan^{-1}\left(\frac{4x+3}{\sqrt{7}}\right) + c$

b) $\frac{-2}{\sqrt{7}} tan^{-1}\left(\frac{4x+3}{\sqrt{7}}\right) + c$

d) $\boldsymbol{\frac{2}{\sqrt{7}} tan^{-1}\left(\frac{4x+3}{\sqrt{7}}\right) + c}$

34. Evaluate $\int \frac{sec^2 x}{3tan^2 x-2tanx-5} dx$

a) $\frac{1}{8} log\left|\frac{3tanx-5}{3tanx-3}\right| + c$

c) $\boldsymbol{\frac{1}{8} log\left|\frac{3tanx-5}{3tanx+3}\right| + c}$

b) $\frac{1}{8} log\left|\frac{3tanx+5}{3tanx+3}\right| + c$

d) $\frac{1}{8} log\left|\frac{3tanx+5}{3tanx-3}\right| + c$

35. Evaluate $\int \frac{cosx}{sin^2x+10sinx+26}dx$

a) $tan^{-1}(sinx+4)+c$

c) $tan^{-1}(sinx-5)+c$

b) $\boldsymbol{tan^{-1}(sinx+5)+c}$

d) $tan^{-1}(sinx-4)+c$

36. Evaluate $\int \frac{1}{\sqrt{x^2+4x+13}}dx$

a) $\boldsymbol{log\left|(x+2)+\sqrt{(x+2)^2+3^2}\right|+c}$

c) $log\left|(x+2)+\sqrt{(x+2)^2-3^2}\right|+c$

b) $log\left|(x+2)-\sqrt{(x+2)^2+3^2}\right|+c$

d) $log\left|(x-2)+\sqrt{(x+2)^2+3^2}\right|+c$

37. Evaluate $\int \frac{1}{2+3cosx}dx$

a) $\frac{1}{\sqrt{5}}log\left|\frac{\sqrt{5}-tan^{x}/_{2}}{\sqrt{5}+tan^{x}/_{2}}\right|+c$

c) $\boldsymbol{\frac{1}{\sqrt{5}}log\left|\frac{\sqrt{5}+tan^{x}/_{2}}{\sqrt{5}-tan^{x}/_{2}}\right|+c}$

b) $\frac{1}{\sqrt{5}}log\left|\frac{\sqrt{5}+2tan^{x}/_{2}}{\sqrt{5}-tan^{x}/_{2}}\right|+c$

d) $\frac{1}{\sqrt{5}}log\left|\frac{\sqrt{5}+tan^{x}/_{2}}{\sqrt{5}-2tan^{x}/_{2}}\right|+c$

38. Evaluate $\int \frac{1}{5+4cosx}dx$

a) $\boldsymbol{\frac{2}{3}tan^{-1}\left(\frac{tan^{x}/_{2}}{3}\right)+c}$

c) $\frac{4}{3}tan^{-1}\left(\frac{tan^{x}/_{2}}{3}\right)+c$

b) $\frac{2}{5}tan^{-1}\left(\frac{tan^{x}/_{2}}{3}\right)+c$

d) $\frac{2}{3}tan^{-1}\left(\frac{tan^{x}/_{2}}{2}\right)+c$

39. Evaluate $\int \frac{1}{5+3cosx}dx$

a) $\boldsymbol{\frac{1}{2}tan^{-1}\left(\frac{tan^{x}/_{2}}{2}\right)+c}$

c) $\frac{1}{3}tan^{-1}\left(\frac{tan^{x}/_{2}}{2}\right)+c$

b) $\frac{1}{2}tan^{-1}\left(\frac{tan^{x}/_{2}}{3}\right)+c$

d) $\frac{-1}{2}tan^{-1}\left(\frac{tan^{x}/_{2}}{2}\right)+c$

40. Evaluate $\int \frac{1}{4+5cosx}dx$

a) $\frac{1}{3}log\left|\frac{3-tan^{x}/_{2}}{3+tan^{x}/_{2}}\right|+c$

c) $\frac{-1}{3}log\left|\frac{3+tan^{x}/_{2}}{3-tan^{x}/_{2}}\right|+c$

b) $\frac{1}{3}log\left|\frac{3+tan^{x}/_{2}}{3-tan^{x}/_{2}}\right|+c$

d) $\frac{1}{5}log\left|\frac{3+tan^{x}/_{2}}{3-tan^{x}/_{2}}\right|+c$

41. Evaluate $\int\frac{1}{5-4cosx}dx$

a) $\frac{1}{3}tan^{-1}(3tan^{x}/_{2})+c$

c) $\frac{2}{3}tan^{-1}(3tan^{x}/_{2})+c$

b) $\frac{2}{3}tan^{-1}(tan^{x}/_{2})+c$

d) $\frac{-2}{3}tan^{-1}(3tan^{x}/_{2})+c$

42. Evaluate $\int\frac{1}{2sinx+3cosx}dx$

a) $\frac{1}{\sqrt{13}}log\left|\frac{\sqrt{13}+3tan^{x}/_{2}-2}{\sqrt{13}-3tan^{x}/_{2}+2}\right|+c$

c) $\frac{1}{\sqrt{13}}log\left|\frac{\sqrt{13}+3tan^{x}/_{2}+2}{\sqrt{13}-3tan^{x}/_{2}+2}\right|+c$

b) $\frac{1}{\sqrt{13}}log\left|\frac{\sqrt{13}-3tan^{x}/_{2}-2}{\sqrt{13}+3tan^{x}/_{2}+2}\right|+c$

d) $\frac{1}{\sqrt{13}}log\left|\frac{\sqrt{13}-3tan^{x}/_{2}-2}{\sqrt{13}-3tan^{x}/_{2}+2}\right|+c$

43. Evaluate $\int\frac{1}{5+3cos2x}dx$

a) $\frac{-1}{4}tan^{-1}\left(\frac{tanx}{2}\right)+c$

c) $\frac{1}{4}tan^{-1}\left(\frac{tanx}{3}\right)+c$

b) $\frac{1}{2}tan^{-1}\left(\frac{tanx}{2}\right)+c$

d) $\frac{1}{4}tan^{-1}\left(\frac{tanx}{2}\right)+c$

44. Evaluate $\int\frac{1}{9sin^{2}x+4cos^{2}x}dx$

a) $\frac{1}{6}tan^{-1}\left(\frac{tanx}{2}\right)+c$

c) $\frac{1}{8}tan^{-1}\left(\frac{3tanx}{2}\right)+c$

b) $\frac{1}{6}tan^{-1}\left(\frac{-3tanx}{2}\right)+c$

d) $\frac{1}{6}tan^{-1}\left(\frac{3tanx}{2}\right)+c$

45. Evaluate $\int\frac{1}{4sin^{2}x+5cos^{2}x}dx$

a) $\frac{1}{2\sqrt{5}}tan^{-1}\left(\frac{tanx}{\sqrt{5}}\right)+c$

c) $\frac{1}{2\sqrt{5}}tan^{-1}\left(\frac{2tanx}{5}\right)+c$

b) $\frac{1}{2\sqrt{5}}tan^{-1}\left(\frac{2tanx}{\sqrt{5}}\right)+c$

d) $\frac{1}{\sqrt{5}}tan^{-1}\left(\frac{2tanx}{\sqrt{5}}\right)+c$

46. Evaluate $\int x\,.\,e^{x}\,dx$

a) $e^x(x+1)+c$

c) $\boldsymbol{e^x(x-1)+c}$

b) $e^x(x-2)+c$

d) $e^x(x+2)+c$

47. Evaluate $\int x.\sin x\,dx$

a) $xcosx+sinx+c$

c) $-xcosx-sinx+c$

b) $\boldsymbol{-xcosx+sinx+c}$

d) $xcosx-sinx+c$

48. Evaluate $\int x.\cos x\,dx$

a) $xcosx+sinx+c$

c) $-xcosx-sinx+c$

b) $\boldsymbol{xsinx+cosx+c}$

d) $xcosx-sinx+c$

49. Evaluate $\int \frac{x.\sin^{-1}x}{\sqrt{1-x^2}}dx$

a) $\boldsymbol{-sin^{-1}x.cos(sin^{-1}x)+x+c}$

c) $-sin^{-1}x.cos(sin^{-1}x)-x+c$

b) $sin^{-1}x.cos(sin^{-1}x)+x+c$

d) $sin^{-1}x.cos(sin^{-1}x)-x+c$

50. Evaluate $\int logxdx$

a) $xlogx+x+c$

c) $-xlogx-x+c$

b) $xlogx-2x+c$

d) $\boldsymbol{xlogx-x+c}$

51. Evaluate $\int tan^{-1}x\,dx$

a) $x.tan^{-1}x+\frac{1}{2}log|1+x^2|+c$

c) $\boldsymbol{x.tan^{-1}x-\frac{1}{2}log|1+x^2|+c}$

b) $x.tan^{-1}x-log|1+x^2|+c$

d) $x.tan^{-1}x-2log|1+x^2|+c$

52. Evaluate $\int x.tan^{-1}x\,dx$

a) $x^2.tan^{-1}x-2(x-tan^{-1}x)+c$

c) $x^2.tan^{-1}x-\frac{1}{2}(x+tan^{-1}x)+c$

b) $x^2.tan^{-1}x+\frac{1}{2}(x-tan^{-1}x)+c$

d) $\boldsymbol{\frac{x^2}{2}.tan^{-1}x-\frac{1}{2}(x-tan^{-1}x)+c}$

53. Evaluate $\int x^2.tan^{-1}x\,dx$

a) $\boldsymbol{\frac{x^3}{3}.tan^{-1}x-\frac{1}{3}(\frac{x^2}{2}-\frac{1}{2}log\lvert x^2+1\rvert)+c}$

c) $\frac{x^3}{3}.tan^{-1}x-\frac{1}{3}(\frac{x^2}{2}+\frac{1}{2}log\lvert x^2+1\rvert)+c$

b) $\frac{x^3}{3}.tan^{-1}x+\frac{1}{3}(\frac{x^2}{2}-\frac{1}{2}log\lvert x^2+1\rvert)+c$

d) $\frac{x^3}{3}.tan^{-1}x-\frac{1}{3}(\frac{x^2}{2}-\frac{1}{2}log\lvert x^2-1\rvert)+c$

54. Evaluate $\int x.log(1+x)dx$

a) $\frac{x^2}{2}.log\lvert 1+x\rvert+\frac{1}{2}(\frac{x^2}{2}-xlog\lvert 1+x\rvert+c$

c) $\frac{x^2}{2}.log\lvert 1+x\rvert-\frac{1}{2}(\frac{x^2}{2}-xlog\lvert 1-x\rvert+c$

b) $\frac{x^2}{2}.log\lvert 1+x\rvert-\frac{1}{2}(\frac{x^2}{2}+xlog\lvert 1+x\rvert+c$

d) $\boldsymbol{\frac{x^2}{2}.log\lvert 1+x\rvert-\frac{1}{2}(\frac{x^2}{2}-xlog\lvert 1+x\rvert+c}$

55. Evaluate $\int e^x.sin4x\,dx$

a) $\frac{e^x}{17}(sin4x+4cos4x)+c$

c) $\boldsymbol{\frac{e^x}{17}(sin4x-4cos4x)+c}$

b) $\frac{e^x}{17}(-sin4x-4cos4x)+c$

d) $\frac{e^x}{17}(-sin4x+4cos4x)+c$

56. Evaluate $\int cos(logx)\,dx$

a) $\frac{x}{2}[cos(logx)-sin(logx)]+c$

c) $\frac{x}{2}[-cos(logx)+sin(logx)]+c$

b) $\boldsymbol{\frac{x}{2}[cos(logx)+sin(logx)]+c}$

d) $\frac{x}{2}[-cos(logx)-sin(logx)]+c$

57. Evaluate $\int \sec^3 x\,dx$

a) $\frac{1}{2}[secx.tanx-log\lvert secx+tanx\rvert+c$

c) $\frac{1}{2}[-secx.tanx+log\lvert secx+tanx\rvert+c$

b) $\frac{1}{2}[secx.tanx+log\lvert secx-tanx\rvert+c$

d) $\boldsymbol{\frac{1}{2}[secx.tanx+log\lvert secx+tanx\rvert+c}$

58. Evaluate $\int \frac{1}{x(x+1)}dx$

a) $\boldsymbol{log\left\lvert\frac{x}{x+1}\right\rvert+c}$

c) $log\left\lvert\frac{x+2}{x+1}\right\rvert+c$

b) $log\left\lvert\frac{x-1}{x+1}\right\rvert+c$

d) $log\left\lvert\frac{2x}{x+1}\right\rvert+c$

59. Evaluate $\int \frac{1}{(x+1)(x+2)}dx$

a) $log\left\lvert\frac{x-1}{x+2}\right\rvert+c$

c) $\boldsymbol{log\left\lvert\frac{x+1}{x+2}\right\rvert+c}$

b) $log\left|\frac{x+1}{x-2}\right|+c$

d) $log\left|\frac{x-1}{x-2}\right|+c$

60. Evaluate $\int\frac{2x^2+5}{(x-1)(x+2)(x+3)}dx$

a) $\boldsymbol{\frac{7}{12}log|x-1|-\frac{13}{3}log|x+2|+\frac{23}{4}log|x+3|+c}$

c) $\frac{7}{12}log|x-1|-\frac{1}{3}log|x+2|+\frac{23}{4}log|x+3|+c$

b) $\frac{7}{2}log|x-1|-\frac{13}{3}log|x+2|+\frac{23}{4}log|x+3|+c$

d) $\frac{7}{12}log|x-1|-\frac{1}{3}log|x+2|+\frac{3}{4}log|x+3|+c$

61. Evaluate $\int\frac{x^2+1}{(x+1)(x+2)(x-3)}dx$

a) $\frac{1}{2}log|x+1|+log|x+2|+\frac{1}{2}log|x-3|+c$

c) $\frac{-1}{2}log|x+1|-log|x+2|+\frac{1}{2}log|x-3|+c$

b) $\boldsymbol{\frac{-1}{2}log|x+1|+log|x+2|+\frac{1}{2}log|x-3|+c}$

d) $\frac{-1}{2}log|x+1|+log|x+2|-\frac{1}{2}log|x-3|+c$

62. Evaluate $\int\frac{x-3}{x^3-3x^2-16x+48}dx$

a) $\frac{1}{8}log\left|\frac{x-3}{x+4}\right|+c$

c) $\boldsymbol{\frac{1}{8}log\left|\frac{x-4}{x+4}\right|+c}$

b) $\frac{1}{8}log\left|\frac{x+4}{x-4}\right|+c$

d) $\frac{1}{8}log\left|\frac{x-4}{x+3}\right|+c$

63. Evaluate $\int\frac{x^2+6x-8}{x^3-4x}dx$

a) $-2log|x|+log|x-2|-2log|x+2|+c$

c) $\boldsymbol{2log|x|+log|x-2|-2log|x+2|+c}$

b) $2log|x|-log|x-2|-2log|x+2|+c$

d) $2log|x|+log|x-2|+2log|x+2|+c$

64. Evaluate $\int\frac{x+1}{x(x^2-4)}dx$

a) $\boldsymbol{\frac{-1}{4}log|x|+\frac{3}{8}log|x-2|-\frac{1}{8}log|x+2|+c}$

c) $\frac{-1}{4}log|x|-\frac{3}{8}log|x-2|-\frac{1}{8}log|x+2|+c$

b) $\frac{1}{4}log|x|+\frac{3}{8}log|x-2|-\frac{1}{8}log|x+2|+c$

d) $\frac{-1}{4}log|x|+\frac{3}{8}log|x-2|+\frac{1}{8}log|x+2|+c$

65. Evaluate $\int\frac{logx}{x(2+logx)(3+logx)}dx$

a) $2log|2+logx|+3log|3+logx|+c$

c) $\boldsymbol{-2log|2+logx|+3log|3+logx|+c}$

b) $-2log|2+logx|-3log|3+logx|+c$

d) $2log|2+logx|-3log|3+logx|+c$

66. Evaluate $\int \frac{sec^2x}{(1+tanx)(3+tanx)}dx$

a) $\frac{1}{2}log\left|\frac{1+tanx}{3+tanx}\right|+c$

c) $\frac{1}{2}log\left|\frac{1+tanx}{3-tanx}\right|+c$

b) $\frac{1}{2}log\left|\frac{1-tanx}{3+tanx}\right|+c$

d) $\frac{1}{2}log\left|\frac{1-tanx}{3-tanx}\right|+c$

67. Evaluate $\int \frac{sec^2x}{(1+tanx)(2+tanx)}dx$

a) $log\left|\frac{1-tanx}{2+tanx}\right|+c$

c) $log\left|\frac{1-tanx}{2-tanx}\right|+c$

b) $log\left|\frac{1+tanx}{2-tanx}\right|+c$

d) $log\left|\frac{1+tanx}{2+tanx}\right|+c$

68. Evaluate $\int \frac{sec^2x}{(1-tanx)(2+tanx)}dx$

a) $\frac{1}{3}log\left|\frac{1+tanx}{2+tanx}\right|+c$

c) $\frac{1}{3}log\left|\frac{1-tanx}{2-tanx}\right|+c$

b) $\frac{1}{3}log\left|\frac{1-tanx}{2+tanx}\right|+c$

d) $\frac{1}{3}log\left|\frac{1+tanx}{2-tanx}\right|+c$

69. Evaluate $\int \frac{cosec^2x}{(1+cotx)(3+cotx)}dx$

a) $\frac{1}{2}log\left|\frac{3-cotx}{1+cotx}\right|+c$

c) $-\frac{1}{2}log\left|\frac{3+cotx}{1+cotx}\right|+c$

b) $\frac{1}{2}log\left|\frac{3+cotx}{1-cotx}\right|+c$

d) $\frac{1}{2}log\left|\frac{3+cotx}{1+cotx}\right|+c$

70. Evaluate $\int \frac{x}{(x^2-1)(x^2+2)}dx$

a) $\frac{-1}{6}log\left|\frac{x^2-1}{x^2+2}\right|+c$

c) $\frac{1}{6}log\left|\frac{x^2+1}{x^2+2}\right|+c$

b) $\frac{1}{6}log\left|\frac{x^2-1}{x^2+2}\right|+c$

d) $\frac{1}{6}log\left|\frac{x^2-1}{x^2-2}\right|+c$

71. Evaluate $\int \frac{2x}{(x^2-1)(x^2+3)}dx$

a) $\frac{1}{4}log\left|\frac{x^2-1}{x^2+3}\right|+c$

c) $\frac{1}{4}log\left|\frac{x^2-1}{x^2-3}\right|+c$

b) $\frac{1}{4} log \left|\frac{x^2+1}{x^2+3}\right| + c$

d) $\frac{-1}{4} log \left|\frac{x^2-1}{x^2+3}\right| + c$

72. Evaluate $\int \frac{x}{(x^2+4)(x^2+9)} dx$

a) $\boldsymbol{\frac{1}{10} log \left|\frac{x^2+4}{x^2+9}\right| + c}$

c) $\frac{1}{10} log \left|\frac{x^2+4}{x^2-9}\right| + c$

b) $\frac{1}{10} log \left|\frac{x^2-4}{x^2+9}\right| + c$

d) $\frac{-1}{10} log \left|\frac{x^2+4}{x^2+9}\right| + c$

DEFINITE INTEGRATION

POSITION IN QUESTION PAPER **TOTAL MARKS-04**

Q.4. e) 4-Marks.

MCQ Question

Note: Correct answer is marked with **bold.**

1. Evaluate $\int_2^4 \frac{1}{2x+3} dx$

a) $\mathbf{\frac{1}{2} log(\frac{11}{7})}$ c) $\frac{1}{4} log(\frac{11}{7})$

b) $\frac{1}{3} log(\frac{11}{7})$ d) $\frac{1}{5} log(\frac{11}{7})$

2. Evaluate $\int_0^{\frac{\pi}{2}} sin5x.cos3x dx$

a) $\mathbf{\frac{1}{2}}$ c) $\frac{11}{2}$

b) $\frac{-1}{2}$ d) $\frac{-11}{2}$

3. Evaluate $\int_5^{10} \frac{1}{(x-1)(x-2)} dx$

a) $log(\frac{23}{27})$ c) $log(\frac{27}{32})$

b) $\mathbf{log(\frac{32}{27})}$ d) $log(\frac{31}{27})$

4. Evaluate $\int_3^7 \frac{(10-x)^2}{x^2+(10-x)^2} dx$

a) 2 c) 1

b) -2 d) -1

5. Evaluate $\int_1^5 \frac{\sqrt{9-x}}{\sqrt{9-x}+\sqrt{x+3}}dx$

a) 2 c) 1

b) -2 d) -1

6. Evaluate $\int_0^5 \frac{\sqrt{5-x}}{\sqrt{x}+\sqrt{5-x}}dx$

a) $\frac{-5}{2}$ c) 2

b) $\mathbf{\frac{5}{2}}$ d) -2

7. Evaluate $\int_0^7 \frac{\sqrt[3]{x}}{\sqrt[3]{x}+\sqrt[3]{7-x}}dx$

a) $\frac{-7}{2}$ c) 7

b) $\mathbf{\frac{7}{2}}$ d) -7

8. Evaluate $\int_0^{\frac{\pi}{2}} \frac{1}{1+cotx}dx$

a) $-\frac{\pi}{4}$ **c)** $\mathbf{\frac{\pi}{4}}$

b) $\frac{3\pi}{4}$ d) $\frac{5\pi}{4}$

9. Evaluate $\int_0^{\frac{\pi}{2}} \frac{1}{1+\sqrt{tanx}}dx$

a) $-\frac{\pi}{4}$ **c)** $\mathbf{\frac{\pi}{4}}$

b) $\frac{3\pi}{4}$ d) $\frac{5\pi}{4}$

10. Evaluate $\int_0^{\frac{\pi}{2}} \frac{tanx}{1+tanx}dx$

a) $-\frac{\pi}{4}$ **c)** $\mathbf{\frac{\pi}{4}}$

b) $\frac{3\pi}{4}$ d) $\frac{5\pi}{4}$

11. Evaluate $\int_0^{\frac{\pi}{4}} log(1+tanx)dx$

a) $log2.\frac{\pi}{10}$

c) $log2.\frac{\pi}{4}$

b) $\boldsymbol{log2.\frac{\pi}{8}}$

d) $-log2.\frac{\pi}{8}$

12. Evaluate $\int_0^{\pi} \frac{x.sinx}{1+cos^2x}dx$

a) $-\frac{\pi^2}{4}$

c) $\boldsymbol{\frac{\pi^2}{4}}$

b) $\frac{3\pi^2}{4}$

d) $\frac{5\pi^2}{4}$

APPLICATION OF DEFINITE INTEGRATION

POSITION IN QUESTION PAPER **TOTAL MARKS-08**

Q.1. f) 2-Marks.

Q.5. a) 6-Marks.

MCQ Question

Note: Correct answer is marked with **bold.**

1. Obtain the area between the line $y = x$, X-axis & co-ordinates $x = 0$ & $x = 4$

   a) 10 $Sq.unit$ **c) 8 $Sq.unit$**

   b) 9 $Sq.unit$ d) 7 $Sq.unit$

2. Obtain the area between the line $y = 2x$, X-axis & co-ordinates $x = 1$ & $x = 3$

   a) 10 $Sq.unit$ **c) 8 $Sq.unit$**

   b) 9 $Sq.unit$ d) 7 $Sq.unit$

3. Obtain the area between the line $y = 2x$, X-axis & co-ordinates $x = 0$ & $x = 2$

   a) 10 $Sq.unit$ **c) 4 $Sq.unit$**

   b) 9 $Sq.unit$ d) 7 $Sq.unit$

4. Obtain the area between the line $y = 3x$, X-axis & co-ordinates $x = 1$ & $x = 5$

   a) 40 $Sq.unit$ c) 42 $Sq.unit$

   b) 36 $Sq.unit$ d) 47 $Sq.unit$

5. Find the area bounded by the curve $y = x^2$, X-axis & co-ordinates $x = 0$ & $x = 3$

   a) 10 $Sq.unit$ c) 12 $Sq.unit$

   b) 9 $Sq.unit$ d) 14 $Sq.unit$

6. Find the area bounded by the curve $y = 3x^2$, X-axis & co-ordinates $x = 1$ & $x = 3$

a) 40 $Sq.unit$ c) 42 $Sq.unit$

b) 26 $Sq.unit$ d) 47 $Sq.unit$

7. Find the area bounded by the curve $y = x^3$, X-axis & co-ordinates $x = 1$ & $x = 3$

a) 20 $Sq.unit$ c) 24 $Sq.unit$

b) 26 $Sq.unit$ d) 28 $Sq.unit$

8. Find the area under the parabola $y^2 = 4x$ & the lines $x = 0$, $y = 0$ & $x = 4$

a) $\frac{32}{3}$ $Sq.unit$ c) $\frac{31}{3}$ $Sq.unit$

b) $\frac{38}{3}$ $Sq.unit$ d) $\frac{35}{3}$ $Sq.unit$

9. Find the area enclosed between the parabola $y = x^2$ & the line $y = 4$

a) $\frac{16}{3}$ $Sq.unit$ c) $\frac{11}{3}$ $Sq.unit$

b) $\frac{13}{3}$ $Sq.unit$ d) $\frac{10}{3}$ $Sq.unit$

10. Find the area enclosed by the curve $y = e^x$, X -axis & co-ordinates at $x = 0$ & $x = 1$

a) $(e - 1)$ $Sq.unit$ c) $\frac{11}{3}$ $Sq.unit$

b) $\frac{13}{3}$ $Sq.unit$ d) $\frac{10}{3}$ $Sq.unit$

11. Find the area under the curve $y = Sinx$ from $x = 0$ to $x = \frac{\pi}{2}$

a) $2Sq.unit$ c) 4 $Sq.unit$

b) 3 $Sq.unit$ **d) 1 $Sq.unit$**

12. Find the area of the loop $y^2 = x^2(1 - x)$

a) $\frac{8}{15}$ $Sq.unit$ c) $\frac{11}{3}$ $Sq.unit$

b) $\frac{13}{3}$ $Sq.unit$ d) $\frac{10}{3}$ $Sq.unit$

13. Find the area of the circle $x^2 + y^2 = 9$ by integration.

a) $16\pi\ Sq.unit$ c) $36\pi\ Sq.unit$

b) $25\pi\ Sq.unit$ **d) $9\pi\ Sq.unit$**

14. Find the area of the circle $x^2 + y^2 = 25$ by integration.

a) $16\pi\ Sq.unit$ c) $36\pi\ Sq.unit$

b) $25\pi\ Sq.unit$ d) $9\pi\ Sq.unit$

15. Find the area of the circle $x^2 + y^2 = 36$ by integration.

a) $16\pi\ Sq.unit$ **c) $36\pi\ Sq.unit$**

b) $25\pi\ Sq.unit$ d) $9\pi\ Sq.unit$

16. Find the area of the ellipse $4x^2 + 9y^2 = 36$ by integration.

a) $6\pi\ Sq.unit$ c) $36\pi\ Sq.unit$

b) $25\pi\ Sq.unit$ d) $9\pi\ Sq.unit$

17. Find the area between the parabola $y = x^2$ & the line $y = x$.

a) $\frac{1}{6}\ Sq.unit$ c) $\frac{11}{3}\ Sq.unit$

b) $\frac{13}{3}\ Sq.unit$ d) $\frac{10}{3}\ Sq.unit$

18. Find the area between the parabola $y^2 = 2x$ & $x^2 = 2y$.

a) $\frac{8}{3}\ Sq.unit$ **c) $\frac{4}{3}\ Sq.unit$**

b) $\frac{13}{3}\ Sq.unit$ d) $\frac{10}{3}\ Sq.unit$

19. Find the area between the parabola $y^2 = 4x$ & $x^2 = 4y$

a) $\frac{8}{3}\ Sq.unit$ **c) $\frac{16}{3}\ Sq.unit$**

b) $\frac{13}{3}\ Sq.unit$ d) $\frac{10}{3}\ Sq.unit$

20. Find the area between the parabola $y^2 = 9x$ & $x^2 = 9y$

a) $27\ Sq.unit$
c) $36\ Sq.unit$
b) $25\ Sq.unit$
d) $9\ Sq.unit$

21. Find the area of the region lying between the parabola $y^2 = 4ax$ & $x^2 = 4ay$.

a) $\frac{1}{3}a^2\ Sq.unit$
c) $\frac{16}{3}a^2\ Sq.unit$
b) $\frac{8}{3}a^2\ Sq.unit$
d) $\frac{11}{3}a^2\ Sq.unit$

22. Find the area between $y = x^2 + 1$ & the line $y = 2x + 1$.

a) $\frac{8}{3}\ Sq.unit$
c) $\frac{4}{3}\ Sq.unit$
b) $\frac{13}{3}\ Sq.unit$
d) $\frac{10}{3}\ Sq.unit$

23. Find the volume of solid obtained by revolving the area under the curve $9x^2 - 4y^2 = 36$ in the interval from $x = 2$ to $x = 4$ about X-axis.

a) $6\pi\ Cu.unit$
c) $36\pi\ Cu.unit$
b) $24\pi\ Cu.unit$
d) $9\pi\ Cu.unit$

24. Find the volume of revolution of the solid generated by revolving the ellipse $\frac{x^2}{9} + \frac{y^2}{4} = 1$ about X-axis.

a) $16\pi\ Cu.unit$
c) $36\pi\ Cu.unit$
b) $24\pi\ Cu.unit$
d) $9\pi\ Cu.unit$

DIFFERENTIAL EQUATION

POSITION IN QUESTION PAPER **TOTAL MARKS-06**

Q.5. b) i) 2-Marks.

Q.5. b) ii) 4-Marks.

MCQ Question

Note: Correct answer is marked with **bold.**

1. Find Order and Degree of $\left[1+(\frac{dy}{dx})^3\right]^{5/3} = 2\frac{d^2y}{dx^2}$

   a) $Order = 2\,,\ Degree = 2$ **c) $\boldsymbol{Order = 2\,,\ Degree = 3}$**

   b) $Order = 3\,,\ Degree = 3$ d) $Order = 1\,,\ Degree = 3$

2. Find Order and Degree of $\frac{d^2y}{dx^2} = \left[y+\frac{dy}{dx}\right]^{3/2}$

   a) $\boldsymbol{Order = 2\,,\ Degree = 2}$ c) $Order = 2\,,\ Degree = 3$

   b) $Order = 3\,,\ Degree = 3$ d) $Order = 1\,,\ Degree = 3$

3. Find Order and Degree of $\frac{d^2y}{dx^2} = \sqrt{1+\frac{dy}{dx}}$

   a) $\boldsymbol{Order = 2\,,\ Degree = 2}$ c) $Order = 2\,,\ Degree = 3$

   b) $Order = 3\,,\ Degree = 3$ d) $Order = 1\,,\ Degree = 3$

4. Find Order and Degree of $\frac{d^2y}{dx^2} = (y+\frac{dy}{dx})^{3/2}$

   a) $\boldsymbol{Order = 2\,,\ Degree = 2}$ c) $Order = 2\,,\ Degree = 3$

   b) $Order = 3\,,\ Degree = 3$ d) $Order = 1\,,\ Degree = 3$

5. Form a differential equation $y = Asinx + Bcosx$

a) $\frac{d^2y}{dx^2} - y = 0$

c) $\frac{d^2y}{dx^2} + 2y = 0$

b) $\frac{d^2y}{dx^2} - 2y = 0$

d) $\boldsymbol{\frac{d^2y}{dx^2} + y = 0}$

6. Form a differential equation $y = ax^2 + b$

a) $x\frac{d^2y}{dx^2} - 2\frac{dy}{dx} = 0$

c) $x\frac{d^2y}{dx^2} + \frac{dy}{dx} = 0$

b) $x\frac{d^2y}{dx^2} + 2\frac{dy}{dx} = 0$

d) $\boldsymbol{x\frac{d^2y}{dx^2} - \frac{dy}{dx} = 0}$

7. Verify that $y = logx$ is solution of

a) $\boldsymbol{x\frac{d^2y}{dx^2} + \frac{dy}{dx} = 0}$

c) $\frac{d^2y}{dx^2} + \frac{dy}{dx} = 0$

b) $x\frac{d^2y}{dx^2} - \frac{dy}{dx} = 0$

d) $x\frac{d^2y}{dx^2} + 2\frac{dy}{dx} = 0$

8. Verify that $y = acos(logx) + bsin(logx)$ is a solution of

a) $x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx} - y = 0$

c) $x^2\frac{d^2y}{dx^2} - x\frac{dy}{dx} + y = 0$

b) $\boldsymbol{x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx} + y = 0}$

d) $-x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx} + y = 0$

9. Show that $y^2 = ax^2$ is a solution of

a) $x(\frac{dy}{dx})^2 + 3y\frac{dy}{dx} + ax = 0$

c) $\boldsymbol{x(\frac{dy}{dx})^2 - 2y\frac{dy}{dx} + ax = 0}$

b) $x(\frac{dy}{dx})^2 + 2y\frac{dy}{dx} + ax = 0$

d) $x(\frac{dy}{dx})^2 - 2y\frac{dy}{dx} - ax = 0$

10. Solve: $x(1 + y^2)dx + y(1 + x^2)dy = 0$

a) $\boldsymbol{(1 + x^2)(1 + y^2) = C}$

c) $(1 + x^2)(1 - y^2) = C$

b) $(1 - x^2)(1 + y^2) = C$

d) $(1 - x^2)(1 - y^2) = C$

11. Solve: $\frac{dy}{dx} = e^{3x-2y} + x^2e^{-2y}$

a) $\boldsymbol{\frac{e^{2y}}{2} = \frac{e^{3x}}{3} + \frac{x^3}{3} + C}$

c) $\frac{e^{2y}}{2} = \frac{e^{3x}}{3} - \frac{x^3}{3} + C$

b) $\frac{e^{2y}}{2} = -\frac{e^{3x}}{3} + \frac{x^3}{3} + C$

d) $\frac{e^{2y}}{2} = -\frac{e^{3x}}{3} - \frac{x^3}{3} + C$

12. Solve: $\frac{dy}{dx} + ytanx = cos^2x$

a) $y.secx = -sinx + C$

c) $y.secx = 3sinx + C$

b) $y.secx = -2sinx + C$

d) $\boldsymbol{y.secx = sinx + C}$

13. Solve: $\frac{dy}{dx} + ycotx = cosx$

a) $y.secx = -sinx + C$

c) $y.secx = 3sinx + C$

b) $y.sinx = -2sinx + C$

d) $\boldsymbol{y.sinx = \frac{sin^2x}{2} + C}$

14. Solve: $x\frac{dy}{dx} - y = x^2$

a) $\frac{y}{x} = -x + C$

c) $\frac{y}{x} = 2x + C$

b) $\boldsymbol{\frac{y}{x} = x + C}$

d) $\frac{y}{x} = x^2 + C$

15. Solve: $x\frac{dy}{dx} + y = x^3$

a) $y.x = -\frac{x^4}{4} + C$

c) $\boldsymbol{y.x = \frac{x^4}{4} + C}$

b) $-y.x = \frac{x^4}{4} + C$

d) $-3y.x = \frac{x^4}{4} + C$

16. Solve: $(1 + x^2)\frac{dy}{dx} + y = e^{\tan^{-1}x}$

a) $ye^{tan^{-1}x} = \frac{e^{3tan^{-1}x}}{3} + C$

c) $\boldsymbol{ye^{tan^{-1}x} = \frac{e^{2tan^{-1}x}}{2} + C}$

b) $ye^{tan^{-1}x} = \frac{e^{4tan^{-1}x}}{4} + C$

d) $ye^{tan^{-1}x} = \frac{e^{5tan^{-1}x}}{5} + C$

17. Solve: $(x + 1)\frac{dy}{dx} - y = e^x(x + 1)^2$

a) $\boldsymbol{\frac{y}{x+1} = e^x + C}$

c) $\frac{4y}{x+1} = 3e^x + C$

b) $\frac{2y}{x+1} = e^x + C$

d) $\frac{y}{x+1} = 2e^x + C$

18. Solve: $xlogx\frac{dy}{dx} + y = 2logx$

a) $-y.logx = (logx)^2 + C$

c) $y.logx = -(logx)^2 + C$

b) $\boldsymbol{y.logx = (logx)^2 + C}$

d) $y.logx = (2logx)^2 + C$

APPLICATION OF DIFFERENTIAL EQUATION

POSITION IN QUESTION PAPER **TOTAL MARKS-06**

Q.5. c) 6-Marks.

MCQ Question

Note: Correct answer is marked with **bold.**

1. In a single closed electric circuit the current i at a time t is given by $L\frac{di}{dt} + Ri = E$. Find the current i at time t given that $i = 0$, $t = 0$ L, E, R are constant.

   a) $\boldsymbol{i = \frac{E}{R}[1 - e^{-\frac{Rt}{L}}]}$ c) $i = \frac{E}{R}[1 - e^{\frac{Rt}{L}}]$

   b) $i = \frac{E}{R}[1 + e^{-\frac{Rt}{L}}]$ d) $i = \frac{E}{R}[1 + e^{\frac{Rt}{L}}]$

2. A voltage $E = ke^{-bt}$ where k & b are constant is applied at $t = 0$ to $L - R$ circuit of inductance L henry & resistance R ohms. Find the current at any time using KVL $L\frac{di}{dt} + Ri = E$

   a) $i = \frac{k}{R+Lb}[e^{-bt} - e^{-\frac{Rt}{L}}]$ c) $i = \frac{k}{R-Lb}[e^{-bt} - e^{\frac{Rt}{L}}]$

   b) $\boldsymbol{i = \frac{k}{R-Lb}[e^{-bt} - e^{-\frac{Rt}{L}}]}$ d) $i = \frac{k}{R-Lb}[e^{bt} - e^{-\frac{Rt}{L}}]$

3. Solve the D.E. $\frac{dq}{dt} + \frac{1}{RC}q = \frac{E}{R}$ Given that $q = 0$ & $t = 0$ & E, R, C are constant.

   a) $q = EC(1 + e^{-t/RC})$ **c)** $\boldsymbol{q = EC(1 - e^{-t/RC})}$

   b) $q = EC(1 - e^{t/RC})$ d) $q = EC(1 + e^{t/RC})$

4. A circuit containing a resistance R & a condenser of a capacity C farads is Connected to a constant e.m.f. E if the D.E of circuit is $E - \frac{dq}{dt} = \frac{q}{C}$ find q given

that $q = 0$, $t = 0$

a) $q = EC(1 + e^{-t/RC})$

c) $\boldsymbol{q = EC(1 - e^{-t/RC})}$

b) $q = EC(1 - e^{t/RC})$

d) $q = EC(1 + e^{t/RC})$

5. The discharge of a condenser of capacity C through a large resistance R satisfies The law $\frac{dq}{dt} = \frac{-q}{RC}$, q- being the amount of charge at time t. Find q after t second if the initial charge is q_0

a) $q = q_0 e^{t/RC}$

c) $q = -q_0 e^{-t/RC}$

b) $q = -q_0 e^{-t/RC}$

d) $\boldsymbol{q = q_0 e^{-t/RC}}$

6. A resistance of $100\ \Omega$ & inductance of $0.1\ H$ are connected in series with a battery of $20\ volts$. Find the current i in the circuit at any instance if the equation is $L\frac{di}{dt} + RI = E$.

a) $i = -0.2(1 - e^{-1000t})$

c) $\boldsymbol{i = 0.2(1 - e^{-1000t})}$

b) $i = 0.2(1 + e^{-1000t})$

d) $i = -0.2(1 + e^{-1000t})$

7. Find the current as function of time t using KVL $L\frac{di}{dt} + Ri = E$ if resistance of 10 ohm & an inductance of 2 H are connected in series with battery of 200 Volts.

a) $i = -20(1 - e^{-5t})$

c) $i = 20(1 + e^{-5t})$

b) $\boldsymbol{i = 20(1 - e^{-5t})}$

d) $i = 20(1 - e^{5t})$

8. Find the current as function of time t using KVL $L\frac{di}{dt} + Ri = E$ if resistance of $100\ ohm$ & an inductance of $0.5\ H$ are connected in series with battery of $20\ Volts$.

a) $\boldsymbol{i = 0.2(1 - e^{-200t})}$

c) $i = 0.2(1 + e^{-200t})$

b) $i = -0.2(1 - e^{-200t})$

d) $i = 0.2(1 - e^{200t})$

9. A coil having a resistance of $15\ ohms$ & an inductance of $10\ H$ is connected to $90\ volts$ supply. Determine the value of current after 2 second.

a) $i = 2.7012\ ampere$

c) $i = 4.7012\ ampere$

b) $i = 3.7012\ ampere$

d) $\boldsymbol{i = 5.7012\ ampere}$

10. The quantity of a charge of coulombs passes through a conducting wire during small interval of time t sec. is given by $\frac{dq}{dt} = i$ where i is current in ampere. If $i = 10sin100t$ $q = 0$, $t = 0$

a) $q = -0.1(1 - cos100t)$

c) $\boldsymbol{q = 0.1(1 - cos100t)}$

b) $q = 0.1(1 + cos100t)$

d) $q = -0.1(1 + cos100t)$

11. The current in a current is given by $i = \frac{dq}{dt} = 20e^{-5t}$ find amount of charge q transferred between $t = 0$ to $t = 0.1\ sec$

a) $q = 0.5738$ Coulomb

c) $q = 3.5738$ Coulomb

b) $q = 2.5738$ Coulomb

d) $\boldsymbol{q = 1.5738}$ Coulomb

12. The current in a current is given by $i = \frac{dq}{dt} = 10e^{-2t}$ find amount of charge q transferred between $t = 0$ to $t = 0.2\ sec.$ Assume that there is no charge at time $t = 0$

a) $q = 0.6483$ Coulomb

c) $q = 3.6483$ Coulomb

b) $q = 2.6483$ Coulomb

d) **$\boldsymbol{q = 1.6483}$ Coulomb**

13. If $L\frac{di}{dt} = 30sin(10\pi t)$ find i at any time t given that $L = 2$, $i = 0$, $t = 0$

a) $\boldsymbol{i = \frac{1.5}{\pi}(1 - cos10\pi t)}$

c) $i = \frac{1.5}{\pi}(-1 - cos10\pi t)$

b) $i = \frac{1.5}{\pi}(1 + cos10\pi t)$

d) $i = \frac{1.5}{\pi}(2 - cos10\pi t)$

14. If $L\frac{di}{dt} = 60sin(20\pi t)$ find i at any time t given that $L = 2$, $i = 0$, $t = 0$

a) $\boldsymbol{i = \frac{1.5}{\pi}(1 - cos20\pi t)}$

c) $i = \frac{1.5}{\pi}(-1 - cos10\pi t)$

b) $i = \frac{1.5}{\pi}(1 + cos10\pi t)$

d) $i = \frac{1.5}{\pi}(2 - cos10\pi t)$

15. The electrical circuit containing an inductance L in henries, resistance R in series with an e.m.f. $Esin\omega t$ Satisfies the equation of $L\frac{di}{dt}+Ri=Esin\omega t$. Find the value of the current at any time t if initially there is no current.

a) $i=\frac{E}{R^2+L^2\omega^2}(Rsin\omega t+L\omega cos\omega t)$

c) $\boldsymbol{i=\frac{E}{R^2+L^2\omega^2}(Rsin\omega t-L\omega cos\omega t)}$

b) $i=\frac{E}{R^2+L^2\omega^2}(-Rsin\omega t-L\omega cos\omega t)$

d) $i=\frac{E}{R^2+L^2\omega^2}(-Rsin\omega t+L\omega cos\omega t)$

16. Find the equation of curve if it passes through a point $(2,3)$ whose slope at any time is x^2-2x+1

a) $y=\frac{x^3}{3}-x^2-\frac{7}{3}$

c) $y=\frac{x^3}{3}-x^2+\frac{7}{3}$

b) $\boldsymbol{y=\frac{x^3}{3}-x^2+\frac{7}{3}}$

d) $y=-\frac{x^3}{3}-x^2+\frac{7}{3}$

17. Find the equation of curve if it passes through a point $(2,0)$ whose slope at any time is $x-3$

a) $y=\frac{x^2}{2}-3x-4$

c) $y=\frac{x^2}{2}+3x+4$

b) $\boldsymbol{y=\frac{x^2}{2}-3x+4}$

d) $y=-\frac{x^2}{2}-3x+4$

18. The Equation for KVL is

a) $\boldsymbol{L\frac{di}{dt}+RI=E}$

c) $L\frac{di}{dt}+RI=R$

b) $R\frac{di}{dt}+LI=E$

d) $E\frac{di}{dt}+RI=L$

NUMERICAL METHODS

POSITION IN QUESTION PAPER **TOTAL MARKS-20**

Q. 1. g) 2- Marks.
Q. 6. a) 6-Marks.
Q. 6. b) 6-Marks.
Q. 6. c) 6-Marks.

MCQ Question

Note: Correct answer is marked with **bold.**

1. Find the approximate root of the equation $x^2 + x - 3 = 0$ in the interval $(1, 2)$ by using Bisection Method.

   a) $x = 1.9754$ c) $x = 1.8750$

   b) $x = 1.3125$ d) $x = -1.3751$

2. Show that the roots of the equation $x^3 - 9x + 1 = 0$ lies between 2 and 3. obtain the root by Bisection Method.

   a) $x = 2.1750$ **c) $x = 2.9375$**

   b) $x = 2.2754$ d) $x = 2.3751$

3. Using Bisection Method find the approximate root of $x^3 - x - 4 = 0$

   a) $x = 1.8125$ c) $x = 1.2750$

   b) $x = 1.1754$ d) $x = -1.8757$

4. Using Bisection Method, find the approximate root of $x^3 - 2x - 5 = 0$ in the interval $(2, 3)$

a) $x = 2.9254$ c) $x = -2.1251$

b) $x = 2.8253$ **d) $x = 2.0625$**

5. Using Bisection Method find the approximate root of the equation $x^3 - 6x + 3 = 0$

a) $x = 0.1254$ c) $x = 0.2257$

b) $x = 2.0937$ d) $x = 0.3250$

6. Find a real root of the equation $x^3 - 4x - 9 = 0$ in the interval $(2, 3)$ by using Bisection Method

a) $x = 1.9354$ **c) $x = 2.6875$**

b) $x = 1.0354$ d) $x = -1.1354$

7. Find a root of the equation $x^3 + 4x - 9 = 0$ in the interval $(1, 2)$ by using Bisection Method

a) $x = 1.9350$ **c) $x = 1.4375$**

b) $x = 1.0352$ d) $x = -1.1357$

8. Using bisection Method find the approximate value of $\sqrt{10}$

a) $x = 3.1875$ c) $x = 3.925$

b) $x = -3.125$ d) $x = 3.825$

9. Find approximate root of equation $x.log_e x = 1.2$ by using bisection Method.

a) $x = 1.175$ c) $x = -1.875$

b) $x = 1.075$ **d) $x = 1.9375$**

10. Using Bisection Method find the approximate root of the equation $e^{-x} - x = 0$

a) $x = -0.625$ c) $x = 0.025$

b) $x = 0.5625$ d) $x = 0.125$

11. Using Regula-Falsi Method, find the root of the equation $x^2 - 2x - 1 = 0$

a) $x = -2.4136$ c) $x = 2.0136$

b) $x = 2.9136$ **d) $x = 2.4136$**

12. Using Regula-Falsi Method ,find the root of the equation $x^2 - x - 1 = 0$

a) $x = 1.6175$ c) $x = 1.0175$

b) $x = -1.6175$ d) $x = 1.1175$

13. Find root of the equation $x^2 + x - 3 = 0$ using Regula Falsi Method.

a) $x = 1.9024$ **c) $x = 1.3024$**

b) $x = 1.8024$ d) $x = 1.7024$

14. Using Regula Falsi Method find the root of equation $x^3 + 2x^2 - 8 = 0$

a) $x = 1.8084$ c) $x = 1.9084$

b) $x = 1.0084$ **d) $x = 1.5084$**

15. Find the root of the equation $x^3 - 9x + 1 = 0$ in 2 and 3 using Regula falsi Method.

a) $x = 2.0427$ c) $x = 2.1427$

b) $x = 2.9427$ d) $x = 2.2427$

16. Use Regula falsi Method to find approximate root of the equation $x^3 - x - 4 = 0$

a) $x = 1.7960$ c) $x = 1.1960$

b) $x = 1.0960$ d) $x = 1.2960$

17. Find the approximate root of the equation $x^3 - x - 1 = 0$ by using Regula - Falsi Method

a) $x = 1.9080$ **c) $x = 1.3080$**

b) $x = 1.8080$ d) $x = 1.7080$

18. Obtain the approximate root value of equation $x^3 - 4x + 1 = 0$ using Regula-Falsi

Method upto 4 decimal places.

a) $\boldsymbol{x = 0.2542}$ c) $x = 0.2102$

b) $x = 0.2201$ d) $x = 0.2012$

19. Using Regula Falsi Method find the root of $x^2 - log_{10}x = 12$

a) $x = 3.0424$ **c)** $\boldsymbol{x = 3.5424}$

b) $x = 3.1424$ d) $x = 3.9424$

20. Find the real root of the equation $x.e^x = 3$ using False position Method

a) $\boldsymbol{x = 1.0458}$ c) $x = 1.8458$

b) $x = 1.9458$ d) $x = 1.7458$

21. Use Newton-Raphson Method to find root of equation $x^2 + x - 3 = 0$

a) $x = 1.9027$ **c)** $\boldsymbol{x = 1.3027}$

b) $x = 1.8027$ d) $x = 1.7027$

22. By using Newton- Raphson Method find the positive root of $x^2 + x - 5 = 0$ correct to three decimal places.

a) $x = 1.0912$ c) $x = 1.2912$

b) $x = 1.1912$ **d)** $\boldsymbol{x = 1.7912}$

23. Using Newton-Raphson Method find the approximate root of the equation

$x^3 - 2x - 5 = 0$

a) $x = 2.9945$ c) $x = 2.8945$

b) $\boldsymbol{x = 2.0945}$ d) $x = 2.7945$

24. Find the roots of the equation using Newton–Raphson Method $x^2 - 4x - 6 = 0$ near to 5.

a) $\boldsymbol{x = 5.1622}$ c) $x = 5.7622$

b) $x = 5.8622$ d) $x = 5.6622$

25. Find the positive root of $x^3 + x - 1 = 0$ by Newton-Raphson Method.

a) $x = 0.0823$ c) $x = 0.2823$

b) $x = 0.1823$ **d) $x = 0.6823$**

26. Find the positive root of $x^3 - x - 1 = 0$ by Newton-Raphson Method.

a) $x = 1.8247$ **c) $x = 1.3247$**

b) $x = 1.7247$ d) $x = 1.9247$

27. Find the approximate root of the equation $x^4 - x - 10 = 0$ by Newton–Raphson Method.

a) $x = 1.8555$ c) $x = 1.1555$

b) $x = 1.0555$ d) $x = 1.2555$

28. Using Newton-Raphson Method, find approximate value of $\sqrt{10}$.

a) $x = 3.1622$ c) $x = 3.8622$

b) $x = 3.9622$ d) $x = 3.7622$

29. Using Newton-Raphson Method find the approximate root of the equation $\sqrt[3]{100}$

a) $x = 4.0415$ **c) $x = 4.6415$**

b) $x = 4.1415$ d) $x = 4.2415$

30. Use Newton Raphson Method to evaluate $\sqrt[3]{20}$

a) $x = 2.0144$ c) $x = 2.1144$

b) $x = 2.7144$ d) $x = 2.2144$

31. Solve by Gauss Elimination Method

$x + y + z = 6$ $2x - 3y + 3z = 5$ $3x + 2y - z = 4$

a) $x = 1,\ y = 2,\ z = 3$ c) $x = 1,\ y = -2,\ z = 3$

b) $x = -1,\ y = 2,\ z = 3$ d) $x = 1,\ y = 2,\ z = -3$

32. Solve by Gauss Elimination Method

$x + 2y + 3z = 14$ $3x + y + 2z = 11$ $2x + 3y + z = 11$

a) $x = 1,\ y = 2,\ z = 3$ c) $x = 1,\ y = -2,\ z = 3$

b) $x = -1,\ y = 2,\ z = 3$ d) $x = 1,\ y = 2,\ z = -3$

33. Solve by Gauss Elimination Method

$2x + y + z = 10$ $3x + 2y + 3z = 18$ $x + 4y + 9z = 16$

a) $x = -7,\ y = -9,\ z = 5$ **c) $x = 7,\ y = -9,\ z = 5$**

b) $x = 7,\ y = -9,\ z = -5$ d) $x = 7,\ y = -9,\ z = -5$

34. Solve by Gauss Elimination Method

$x + y + z = 4$ $2x + y + z = 5$ $3x + 2y + z = 7$

a) $x = 1,\ y = 1,\ z = 2$ c) $x = 1,\ y = -2,\ z = 3$

b) $x = -1,\ y = 2,\ z = 3$ d) $x = 1,\ y = 2,\ z = -3$

35. Solve by Gauss Elimination Method

$2x + 3y + 2z = 2$ $10x + 3y + 4z = 16$ $3x + 6y + z = -6$

a) $x = -1,\ y = -2,\ z = 3$ c) $x = 1,\ y = 2,\ z = 3$

b) $x = 1,\ y = -2,\ z = 3$ d) $x = 1,\ y = -2,\ z = -3$

36. Solve by Gauss Elimination Method

$x + y + z = 6$ $3x - y + 3z = 10$ $5x + 5y - 4z = 3$

a) $x = 1,\ y = 2,\ z = 3$ c) $x = 1,\ y = -2,\ z = 3$

b) $x = -1,\ y = 2,\ z = 3$ d) $x = 1,\ y = 2,\ z = -3$

37. Solve by Gauss Elimination Method

$4x + y + 2z = 12$ $-x + 11y + 4z = 33$ $2x - 3y + 8z = 20$

a) $x = 1,\ y = 2,\ z = 3$ c) $x = 1,\ y = -2,\ z = 3$

b) $x = -1,\ y = 2,\ z = 3$ d) $x = 1,\ y = 2,\ z = -3$

38. Solve by Gauss Elimination Method

$2x + 3y + z = 13$ $x - y - 2z + 1 = 0$ $3x + y + 4z = 15$

a) $x = 3,\ y = 2,\ z = 1$ c) $x = 3,\ y = -2,\ z = 1$

b) $x = -3,\ y = 2,\ z = 1$ d) $x = 3,\ y = 2,\ z = -1$

39. Solve by Gauss Elimination Method

$6x - y - z = 19$ $3x + 4y + z = 26$ $x + 2y + 6z = 22$

a) $x = 4,\ y = 3,\ z = 2$ c) $x = 3,\ y = -2,\ z = 1$

b) $x = -3,\ y = 2,\ z = 1$ d) $x = 3,\ y = 2,\ z = -1$

40. Solve by Gauss Elimination Method

$x + 2y + 3z = 14$ $3x + 3y + 5z = 24$ $4x + 5y + 7z = 35$

a) $x = 1,\ y = 2,\ z = 3$ c) $x = 1,\ y = -2,\ z = 3$

b) $x = -1,\ y = 2,\ z = 3$ d) $x = 1,\ y = 2,\ z = -3$

41. Solve by Jacobis Method

$10x + y + 2z = 13$ $3x + 10y + z = 14$ $2x + 3y + 10z = 15$

a) $x = 1,\ y = 1,\ z = 1$ c) $x = 1,\ y = 2,\ z = 1$

b) $x = 2,\ y = 1,\ z = 1$ d) $x = 1,\ y = 1,\ z = 2$

42. Solve by Jacobis Method

$20x + y - 2z = 17$ $2x - 3y + 20z = 25$ $3x + 20y - z = -18$

a) $x = 1,\ y = -1,\ z = 1$ c) $x = -1,\ y = -1,\ z = 1$

b) $x = 1,\ y = -1,\ z = -1$ d) $x = 1,\ y = 1,\ z = 1$

43. Solve by Jacobis Method

$15x + 2y + z = 18$ $2x + 20y - 3z = 19$ $3x - 6y + 25z = 22$

a) $x = 1,\ y = 1,\ z = 1$ c) $x = 1,\ y = 2,\ z = 1$

b) $x = 2,\ y = 1,\ z = 1$ d) $x = 1,\ y = 1,\ z = 2$

44. Solve by Jacobis Method

$5x - y = 9$ $x - 5y + z = -4$ $y - 5z = 6$

a) $x = 2,\ y = -1,\ z = -1$ c) $x = -2,\ y = 1,\ z = -1$

b) $\boldsymbol{x = 2,\ y = 1,\ z = -1}$ d) $x = -2,\ y = 1,\ z = 1$

45. Solve by Jacobis Method

$5x + 2y + z = 12$ $x + 4y + 2z = 15$ $x + 2y + 5z = 20$

a) $\boldsymbol{x = 1,\ y = 2,\ z = 3}$ c) $x = 1,\ y = -2,\ z = 3$

b) $x = -1,\ y = 2,\ z = 3$ d) $x = 1,\ y = 2,\ z = -3$

46. Solve by Jacobis Method

$20x + y - 2z = 17$ $2x - 3y + 20z = 25$ $3x + 20y - z = 18$

a) $x = 0.4368,\ y = 0.8234,\ z = 1.2798$ c) $x = 0.9368, y = 0.1234,\ z = 1.2798$

b) $\boldsymbol{x = 0.9368,\ y = 0.8234,\ z = 1.2798}$ d) $x = 0.9368, y = 0.8234,\ z = 1.9798$

47. Solve by Jacobis Method

$2x + 3y - 4z = 1$ $5x + 9y + 3z = 17$ $8x - 2y - z = 5$

a) $\boldsymbol{x = 1,\ y = 1,\ z = 1}$ c) $x = 1,\ y = 2,\ z = 1$

b) $x = 2,\ y = 1,\ z = 1$ d) $x = 1,\ y = 1,\ z = 2$

48. Solve by Jacobis Method

$10x + 2y + z = 9$ $2x + 20y - 2z = -44$ $-2x + 3y + 10z = 22$

a) $x = -1,\ y = -2,\ z = 3$ **c)** $\boldsymbol{x = 1,\ y = -2,\ z = 3}$

b) $x = 1,\ y = 2,\ z = 3$ d) $x = 1,\ y = -2,\ z = -3$

49. Solve by Jacobis Method

$4x + y + 2z = 12$ $-x + 11y + 4z = 33$ $2x - 3y + 8z = 20$

a) $\boldsymbol{x = 1,\ y = 2,\ z = 3}$ c) $x = 1,\ y = -2,\ z = 3$

b) $x = -1,\ y = 2,\ z = 3$ d) $x = 1,\ y = 2,\ z = -3$

50. Solve by Jacobis Method

$30x + y + z = 32$ $x + 30y + z = 32$ $x + y + 30z = 32$

a) $x = 1,\ y = 1,\ z = 1$ c) $x = 1,\ y = 2,\ z = 1$

b) $x = 2,\ y = 1,\ z = 1$ d) $x = 1,\ y = 1,\ z = 2$

51. Solve by Gauss Seidal Method

$5x - 2y + 3z = 18$ $x + 7y - 3z = -22$ $2x - y + 6z = 22$

a) $x = -1,\ y = -2,\ z = 3$ c) $x = 1,\ y = -2,\ z = -3$

b) $x = 1,\ y = 2,\ z = 3$ **d) $x = 1,\ y = -2,\ z = 3$**

52. Solve by Gauss Seidal Method

$5x - 2y + 3z = 18$ $x + 7y - 3z = 22$ $2x - y + 6z = 22$

a) $x = 0.4368,\ y = 0.8234,\ z = 1.2798$ c) $x = 0.9368, y = 0.1234,\ z = 1.2798$

b) $x = 3.2758,\ y = 4.0689,\ z = 3.2528$ d) $x = 0.9368, y = 0.8234,\ z = 1.9798$

53. Solve by Gauss Seidal Method

$10x + 2y + z = 9$ $x + 10y - z = -22$ $-2x + 3y + 10z = 22$

a) $x = -1,\ y = -2,\ z = 3$ c) $x = 1,\ y = -2,\ z = -3$

b) $x = 1,\ y = 2,\ z = 3$ **d) $x = 1,\ y = -2,\ z = 3$**

54. Solve by Gauss Seidal Method

$15x + 2y + z = 18$ $2x + 20y - 3z = 19$ $3x - 6y + 25z = 22$

a) $x = -1,\ y = 1,\ z = 1$ **c) $x = 1,\ y = 1,\ z = 1$**

b) $x = 1,\ y = -1,\ z = 1$ d) $x = 1,\ y = 1,\ z = -1$

55. Solve by Gauss Seidal Method

$8x + 2y + 3z = 30$ $x - 9y + 2z = 1$ $2x + 3y + 6z = 31$

a) $x = -1,\ y = 1,\ z = 1$ **c) $x = 2,\ y = 1,\ z = 4$**

b) $x = 1,\ y = -1,\ z = 1$ d) $x = 1,\ y = 1,\ z = -1$

56. Solve by Gauss Seidal Method

$6x + y + z = 105$ $4x + 8y + 3z = 155$ $5x + 4y - 10z = 65$

a) $x = -15,\ y = 10,\ z = 5$ c) $x = 15,\ y = 10,\ z = -5$

b) $x = 15,\ y = -10,\ z = 5$ **d) $x = 15,\ y = 10,\ z = 5$**

57. Solve by Gauss Seidal Method

$5x - y = 9$ $x - 5y + z = -4$ $y - 5z = 15$

a) $x = 0.4368,\ y = 0.8234,\ z = 1.2798$ *c)* $x = 0.9368, y = 0.1234,\ z = 1.2798$

b) $x = 1.9217, y = 0.6086, z = -2.8782$ *d)* $x = 0.9368, y = 0.8234,\ z = 1.9798$

58. Solve by Gauss Seidal Method

$10x + y + 2z = 13$ $3x + 10y + z = 14$ $2x + 3y + 10z = 15$

a) $x = -1,\ y = 1,\ z = 1$ **c) $x = 1,\ y = 1,\ z = 1$**

b) $x = 1,\ y = -1,\ z = 1$ d) $x = 1,\ y = 1,\ z = -1$

59. Solve by Gauss Seidal Method with approximation $x_0 = 0.4$, $y_0 = 1.6$, $z_0 = 0$

$3x + 2y = 4.5$ $2x + 3y - z = 5$ $-y + 2z = 0.52$

a) $x = 0.2085, y = 1.9371, z = 1.2285$ c) $x = 0.2085, y = -1.9371, z = 1.2285$

b) $x = -0.2085, y = 1.9371, z = 1.2285$ d) $x = 0.2085, y = 1.9371, z = 0.2285$

60. Solve by Gauss Seidal Method with approximation $x_0 = 1.8,\ y_0 = 1.2,\ z_0 = -0.96$

$5x - y = 9$ $5y - z = 6$ $x + 5z = -3$

a) $x = -1.9999, y = 1$, $z = -0.9999$ c) $x = 1.9999, y = -1$, $z = -0.9999$

b) $x = 1.9999, y = 1$, $z = -0.9999$ d) $x = 1.9999, y = 1$, $z = 0.9999$