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PREVIOUS ECET BITS

1. FUNCTIONS AND LIMITS

2008

1. $\underset{x\to\infty}{Lt}\left[\frac{x+1}{x-2}\right]^{2x+1}$

1) e^6 2) e^{-1} 3) -1 4) $\log 2$

2009

2. $\underset{x\to 0}{Lt}\left(\frac{\operatorname{cosec}x-\cot x}{x}\right)=$

1) 4 2) 0 3) $-\frac{5}{7}$ 4) $\frac{1}{2}$

2010

3. $\underset{x\to 0}{Lt}\left(\frac{\cos ax-\cos bx}{x}\right)=$

1) 0 2) 1

3) $\frac{a^2-b^2}{2}$ 4) $\frac{b^2-a^2}{2}$

2011

4. If $f(x)=x\sin\frac{1}{x};x\neq 0 f(x)=0,x=0$ then $\lim_{x\to 0} f(x)=$

1) 1 2) 0 3) -1 4) 2

5. $\lim_{x\to\infty}\frac{\sqrt{x^2-1}}{2x+1}=$

1) 1 2) 0 3) -1 4) $\frac{1}{2}$

6. $\lim_{x\to 0}\frac{\log(\cos x)}{x}=$

1) 0 2) ∞ 3) 1 4) $-\infty$

7. $\lim_{x\to\infty}\frac{1^3+2^3+3^3\ldots+n^3}{n^4}=$

1) 1 2) $\frac{1}{2}$ 3) $\frac{1}{3}$ 4) $\frac{1}{4}$

2012

8. $\underset{x\to 0}{Lt}\frac{\sqrt{5x-4}-\sqrt{x}}{x-1}=$ is

1) 3 2) 2 3) 4 4) 1

9. $\underset{x\to 0}{Lt}\frac{x^2\sin\left(\frac{1}{x}\right)}{\sin x}=$

1) 1 2) -1 3) 2 4) 0

10. A function f defined in (0,3) given by

$f(x)=x^2$ when $0<x,<1$

$=$ x when $1\le x<2$

$=x^3/42\le x<2$

1) is continuous at x = 1 only
2) is continuous at x = 2 only
3) is continuous at x = 1 and x=2
4) is discontinuous in (0,3)

2014

11. $\underset{x\to\infty}{Lt}\frac{3^{x+1}+4}{3^{x+2}+4}=$

1) 1 2) 0 3) $\frac{3}{4}$ 4) $\frac{1}{3}$

T.S. ECET - 2015

12. $\underset{x\to\infty}{Lt}\left(1+\frac{1}{x}\right)^x=$

1) 0 2) 1 3) e 4) x

13. $\underset{x\to\infty}{Lt}\left(\frac{e^x-1}{x}\right)=$

1) 0 2) 1 3) e 4) x

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14. If $f(x)=\begin{cases} ax^2-b, & |x|<1 \\ \frac{1}{|x|}, & |x|\geq 1 \end{cases}$ is differentiable at x=1, then

1) a=1/2, b=-1/2 2) a=-1/2, b=-3/2
3) a = b = 1/2 4) a = b = -1/2

2016

15. $\lim_{x\to 1}\frac{x^2-1}{|x-1|}=$

1) 1 2) -1 3) 2 4) -2

16. $\lim_{x\to 1}\frac{\log(x+2)}{2^x-1}=$

1) $\log_e 4$ 2) $\log_2 e$
3) $\log_e 2$ 4) $\log_4 e$

17. $\lim_{x\to 2}\frac{x|x-2|}{x-2}=$

1) 1 2) -1 3) 2 4) -2

18. If $f(x)=(1+x)^{\frac{2}{x}}$ is continuous at x = 0 then $f(0)=$

1) e 2) e^2 3) e^3 4) e^4

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19. The range of x for which the function $x^3-3x^2-45x+2$ is increasing with x is

1) $(3,-5)$ 2) $(-3,-5)$
3) $(3,5)$ 4) $(-3,5)$

20. The maximum value of the function $2x^3-12x^2+18x+5$ is

1) 13 2) 12 3) 10 4) 15

21. The three sides of a trapezium are equal each being 6" long then the area of the trapezium when it is maximum is

1) 27 square units 2) 33 square units
3) $27\sqrt{3}$ square units 4) $29\sqrt{3}$ square units

22. The interval in which the function $f(x)=x^2\log x$ is an increasing function is

1) $\left(1,e^{\frac{-1}{2}}\right)$ 2) $\left(2,e^{\frac{-1}{2}}\right)$
3) $\left(0,e^{\frac{1}{2}}\right)$ 4) $\left(0,e^{\frac{-1}{2}}\right)$

24. The stationary points and the corresponding values of the function $f(x)=x^3-9x^2+15x-1$ is

1) 6, –26 2) 3, –26 3) 6, 26 4) –6, –26

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25. The set of values of x for which the function $f(x)=2x^3-9x^2+12x+4$ is increasing is _____

1) $1<x<2$ 2) all $x\in\mathbb{R}$
3) $\mathbb{R}-[1,2]$ 4) $x\geq 2$

26. $\lim_{x\to\infty} x\left(\log\left(1+\frac{x}{2}\right)-\log\left(\frac{x}{2}\right)\right)=$ _____

1) e^2 2) ∞ 3) 1 4) 2

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27. $Lt_{n\to\infty}\left(\frac{n}{n+1}\right)^{2n}$ is

1) 0 2) e 3) e^2 4) $\frac{1}{e^2}$

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28. The interval in which the rational function

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$f(x)=\frac{x^2+x+1}{x^2-x+1}$ is decreasing is

1) $(-1,1)$ 2) $(-\infty,1)$

3) $(-1,\infty)$ 4) $(-\infty,-1)\cup(1,\infty)$

29. $\lim_{x\to 0}\left(\frac{\tan x}{x}\right)^{\frac{1}{x^2}}=$

1) 1 2) e 3) $e^{\frac{1}{3}}$ 4) e^3

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30. $\lim_{x\to 0}\frac{2^x-1}{\sqrt{2+x}-\sqrt{2}}=$

1) $\sqrt{2}\log 2$ 2) $2\log 2$

3) $2\sqrt{2}\log 2$ 4) $\log 2$

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31. For $A\neq 0$ $\underset{n\to\infty}{Lim}\left(\frac{A+e^{nx}}{x+Ae^{nx}}\right)=$

1) 1, when $x>0$ 2) $\frac{A}{x}$, when $x<0$

3) $\frac{A}{x}$, when $x>0$ 4) 0, when $x\in\mathbb{R}$

32. Let f be a differentiable function such that $f(x+y)=f(x)\cdot f(y)$, $\forall x,y\in\mathbb{R}$ If $f'(0)=-3$ and $f(5)=9$, then $f'(5)=$

1) -27 2) 6 3) $-\frac{1}{3}$ 4) -3

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33. If $f(x+y)=f(x)\cdot f(y)$, for all x, y $f(5)=2$, $f'(0)=3$, then $f'(5)=$

1) 6 2) 2 3) 3 4) 5

34. $\underset{x\to\infty}{Lt}\left[\frac{x^2+2x-1}{2x^2-3x-2}\right]^{\frac{2x+1}{2x-1}}$ is equal to

1) 0 2) ∞ 3) $\frac{1}{2}$ 4) $\frac{1}{3}$

35. $\underset{x\to 0}{Lt}\frac{\sin^2 mx}{\tan^2 nx}$ is equal to

1) $\frac{m}{n}$ 2) $m^2\cdot n^2$ 3) $\frac{m^2}{n^2}$ 4) $\frac{n^2}{m^2}$

36. If $f(x)=|x^2-5x+6|$ then $f'(x)=$

1) $2x-5$ for 2) $5-2x$ for $2<x<3$

3) $2x-5$ for $x>2$ 4) $5-2x$ for $x<3$

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37. $\underset{x\to a}{Lt}\frac{xe^{-x}-ae^{-a}}{x-a}=$

1) e^{-a} 2) ae^{-a}

3) $(1-a)e^{-a}$ 4) $(1+a)e^{-a}$

PREVIOUS ECET BITS KEY

1) 1	2) 4	3) 4	4) 4	5) 2
6) 4	7) 1	8) 2	9) 4	10)3
11) 4	12) 3	13) 2	14) 4	15)
16)	17)	18)	19)	20) 1
21) 1	22) 3	23) 4	24) 1	25) 3
26) 4	27) 4	28) 4	29) 3	30) 3
31) 2	32) 1	33) 1	34) 3	35) 3
36) 2	37) 3			

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2. DERIVATIVES

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1. If $y=\frac{a+bx}{b-ax}$ then the derivative of y with respect to x is

1) $\frac{a^2+b^2}{(b-ax)^2}$ 2) $\frac{a^2+b^2}{(b+ax)^2}$

3) $\frac{a^2-b^2}{(b-ax)^2}$ 4) $\frac{a+b}{(b-ax)^2}$

2. If $y=\frac{2+3\sinh x}{3+2\sinh x}$ then the derivative of y with respect to x is

1) $\frac{5\cosh x}{(3+2\sinh x)^2}$ 2) $\frac{5\sinh x}{(3+2\sinh x)^2}$

3) $\frac{5\sin x}{(3-2\cosh x)^2}$ 4) $\frac{\sinh^2 x}{(2-3\sinh x)^2}$

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3. The 2019^{th} derivative of the function $(x-1)e^{-x}$ is _____

1) $\frac{x-2019}{e^x}$ 2) $\frac{2019-x}{e^x}$

3) $\frac{x-2020}{e^x}$ 4) $\frac{2020-x}{e^x}$

4. Let $f(x+y)=f(x)\cdot f(y)$, y and $f'(0)=5$, $f(2019)=15$. Then the value of $f'(2019)$ is _____

1) 3 2) 75 3) $\frac{1}{3}$ 4) $\frac{1}{75}$

5. If $f(x,y,z)=x^3+xz^2+y^3+xyz$, $x=e^t$, $y=\cos t$, $z=t^3$ then $\frac{df}{dt}$ at $t=0$ is ____

1) 2 2) 4 3) e 4) 3

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6. If $x=y\log xy$ then $\frac{dy}{dx}=$

1) $\frac{x-y}{1+\log xy}$ 2) $\frac{x-y}{x(1+\log xy)}$

3) $\frac{x+y}{x(1+\log xy)}$ 4) $\frac{x+y}{x\log y}$

7. If $f(x)=\frac{x}{1+|x|}, x\in R$ then $f'(0)=$

1) 0 2) 1 3) 2 4) 4

8. If $y=(x^x)^x$ then $\frac{dy}{dx}=$

1) $x\cdot x^x(1+2\log x)$ 2) $(1+2\log x)x^{(x^2+1)}$

3) $(1+2\log x)x^{x^2}$ 4) $x\cdot x^x(1-2\log x)$

9. If $x=e^{3t}\cos 3t$ then $\frac{d^2x}{dt^2}$ at $t=\frac{\pi}{2}$ is

1) $6e^x$ 2) $12e^x$ 3) $-12e^x$ 4) $-6e^x$

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10. If $y=\cos^{-1}\left(\frac{a^2-x^2}{a^2+x^2}\right)+\sin^{-1}\left(\frac{2ax}{a^2+x^2}\right)$, then $\frac{dy}{dx}=$

1) $\frac{4a^2}{a^2+x^2}$ 2) $\frac{4a}{a^2+x^2}$

3) $\frac{2a}{a^2+x^2}$ 4) $\frac{2a^2}{a^2+x^2}$

11. Let $f:\mathbb{R}\to\mathbb{R}$ be defined by $f(x)=|x+1|+|x+2|+|x+3|$. If f is differentiable at x, then x belongs to the set

1) $\{-1,-2,-3\}$ 2) $\mathbb{R}-\{1,2,3\}$

3) $\mathbb{R}-\{-1,-2,-3\}$ 4) $\{1,2,3\}$

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12. If $y=\sin\left(m\sin^{-1}x\right)$, then $\left(1-x^2\right)\frac{d^2y}{dx^2}-x\frac{dy}{dx}=$

1) my 2) $-m^2y$ 3) m^2y 4) $-my$

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13. If $y=\sqrt{\frac{2+x^2}{2-x^2}}$, then $\frac{dy}{dx}=$

1) $\frac{4x}{\left(2-x^2\right)\sqrt{4-x^4}}$ 2) $\frac{4x}{\left(2-x^2\right)\sqrt{4-x^2}}$

3) $\frac{4x}{\left(4-x^2\right)\sqrt{2-x^4}}$ 4) $\frac{2x}{\left(2-x^2\right)\sqrt{4-x^4}}$

14. If $2x^2-3xy+y^2-4x+6y-7=0$, then $\frac{dy}{dx}=$

1) $\frac{-4x-3y+4}{3x+2y+6}$ 2) $\frac{-4x-3y-4}{3x-2y-6}$

3) $\frac{4x+3y+4}{3x-2y-6}$ 4) $\frac{4x-3y-4}{3x+2y-6}$

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15. If $y=x^{-x}$ then $\frac{xd^2y}{ydx^2}+1=$

1) x 2) y^2

3) $y\left(1+\log_e x\right)^2$ 4) $\left(1+\log_e x\right)$

2022 - AP ECET

16. If $=\log_y x$, then $\frac{dy}{dx}=$

1) $\frac{1}{x(1+\log y)}$ 2) $\frac{1}{x+\log y}$

3) $\frac{1}{\log x(1+y)}$ 4) $\frac{1}{y+\log x}$

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17. If $y=\tan^{-1}\left(\frac{ax-b}{bx+a}\right)$, then $\frac{dy}{dx}=$

1) $\frac{1}{1+x^2}$ 2) $\frac{1}{x^2-1}$ 3) $\frac{1}{1-x^2}$ 4) $\frac{-1}{1+x^2}$

18. If $y=\left(\frac{1}{x}\right)^x$, then $y''(1)=$

1) e 2) 1 3) -1 4) 0

PREVIOUS ECET BITS KEY

01) 1	02) 1	03) 4	04) 2	05) 4
06) 2	07) 2	08) 2	09) 2	10) 2
11) 3	12) 2	13) 1	14) 2	15) 3
16) 1	17) 1	18) 4		

3. SECOND ORDER DERIVATIVES

2007

1. The derivative of $Y=5x^2\sin x$ is

1) $10x.\cos x$ 2) $10x.\sin x$

3) $5(x^2\cos x+2x\sin x)$

4) $5\left(x\cos x+x\sin x\right)$

2. Derivative of $\sin 2x$ is :

1) $\cos 2x$ 2) $2\sin 2x$

3) $2\cos 2x$ 4) $2x\sin 2x$

3. Derivative of $\cot^{-1}(x)=$

1) $\frac{-1}{(1+x^2)}$ 2) $1\left(1+x^2\right)$

3) $\sin^{-1}(x)$ 4) $\tan^{-1}(x)$

4. If $y=\sin^{-1}\left(\sqrt{x}\right)$, then dy/dx is :

1) $1/\sqrt{x}$ 2) $1/2\sqrt{\left(x-x^2\right)}$

3) $1/2\left(x-x^2\right)$ 4) $1/\left(x+\sqrt{x}\right)$

5. If $2x^2-3xy+y^2+x+2y-8=0$, then $dy/dx=$

1) $(1+4x-3y)/(3x-2y-2)$

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2) $(1+4x+3y)/(3x+2y+2)$

3) $(x+y+1)/(2x-y+2)$

4) $(2x+3y+1)/(x+4y-6)$

2008

6. $\frac{d}{dx}\left[\tan^{-1}\left(\frac{a-x}{1+ax}\right)\right]$, a being a constant is

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

3) $\frac{1}{2\sqrt{1-x^2}}$ 4) $\frac{a+x}{2\sqrt{x}}$

7. If $3^x - 3^y = 3^{x+y}$ then $\frac{dy}{dx} =$

1) 3^{y-x} 2) $3^{y/x}$ 3) $-3^{x/y}$ 4) -3^{x-y}

8. If $x = \theta - \frac{1}{\theta}$ and $y = \theta + \frac{1}{\theta}$, then $\frac{dy}{dx} =$

1) $-\frac{y}{x}$ 2) $-\frac{x}{y}$ 3) $\frac{y}{x}$ 4) $\frac{x}{y}$

2009

9. If $y = \log\left[\sin(\log x)\right]$ then $\frac{dy}{dx} =$

1) $\tan(\log x)$ 2) $\cot(\log x)$

3) $\frac{\tan(\log x)}{x}$ 4) $\frac{\cot(\log x)}{x}$

10. If $x = \tanh^2 y$, then $\frac{dy}{dx} =$

1) $\frac{e^x}{\sinh y}$ 2) $\frac{1}{x\sqrt{1-x^2}}$

3) $\frac{1}{2(1-x)\sqrt{x}}$ 4) $\sinh^{-1}\left(\frac{3x}{4}\right)$

11. If $y = \sqrt{\sin x + \sqrt{\sin x + \sqrt{\sin x + ...to\infty}}}$

then $\frac{dy}{dx} =$

1) $\frac{\sin x}{2y-1}$ 2) $\frac{\cos x}{2y-1}$

3) $\frac{\cos x}{1-2y}$ 4) $\frac{\sin x}{1-2y}$

2010

12. $\frac{d}{dx}\left[x^n \log x\right] =$

1) $x^n(1+n\log x)$ 2) $x^{n-1}(1+n\log x)$

3) $x^n(1-n\log x)$ 4) $x^{n-1}(1-n\log x)$

2011

13. If $y = \sec x + \tan x$ then $\frac{dy}{dx}$ is

1) y sin x 2) y cos x

3) y sec x 4) y cosec x

2012

14. $\frac{d}{dx}\left[\log_7 X\right] =$

1) $\frac{1}{x}$ 2) $X \log_7^e$

3) $\frac{1}{x}\log_e^7$ 4) $\frac{1}{x}\log_7 e$

15. $\frac{d}{dx}\left[2\cosh x\right] =$

1) $\frac{e^x + e^{-x}}{2}$ 2) $\frac{e^x - e^{-x}}{2}$

3) $e^x + e^{-x}$ 4) $e^x - e^{-x}$

16. $\frac{d}{dx}\left[\cos^{-1}\left(\frac{1-x^2}{1+x^2}\right)\right] =$

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

3) $\frac{2}{1+x^2}$ 4) $\frac{-2}{1+x^2}$

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17. If $x = at^2, y = 2at$ then $\frac{dy}{dx} =$

1) $\sqrt{\frac{y}{x}}$ 2) $\sqrt{\frac{x}{a}}$ 3) $\sqrt{\frac{a}{x}}$ 4) $\sqrt{\frac{x}{y}}$

18. The derivative of e^x with respect to $\sqrt{x}$ is

1) $\frac{e^x}{\sqrt{x}}$ 2) $\frac{e^x}{2\sqrt{x}}$ 3) $\frac{e^x}{3\sqrt{x}}$ 4) $\frac{2e^x}{\sqrt{x}}$

2013

19. The derivative of log (cot x) is

1) -sec x cosec x 2) -sin x cos x
3) sin x cos x 4) tan x

20. If $x^y = e^{x-y}$, then $dy/dx =$

1) $x^y\left(e^x + e^y\right)$ 2) $\log x(1+\log x)^{-2}$
3) $\log x(1+\log x)^2$ 4) $(1+\log x)/2\log x$

21. The derivative of $\cos^{-1}\left[\left(1-x^2\right)/\left(1+x^2\right)\right]$ is

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

2014

22. Derivative of $\cos^{-1}\left(\frac{1-x^2}{1+x^2}\right)$ with reference x is

1) $\frac{2}{1+x^2}$ 2) $\frac{2}{1-x^2}$
3) $2x$ 4) $\sqrt{1+x^2}$

23. If $y = 3^x, (x>0)$ then $\frac{dy}{dx} =$

1) $\left(\frac{x}{y}\right)^{\frac{1}{3}}$ 2) $-\left(\frac{y}{x}\right)^{\frac{1}{3}}$
3) $-\left(\frac{x}{y}\right)^{\frac{1}{3}}$ 4) none

24. The derivative of log sec x with respect to tan x is

1) sec x. tan x 2) cos x . cot x
3) cos x.sin x 4) sec x. cot x

A.P. ECET - 2015

25. If $f(x) = \begin{cases} ax^2 - b, & |x|1 \\ |x|, & |x| \geq 1 \end{cases}$ is differentiable at x = 1, then

1) a=1/2, b=-1/2 2) a=1/2, b=-3/2
3) a=b = 1/2 4) a=b= -1/2

26. If $y = |\sin x| + |\cos x|$ then $d\frac{dy}{dx}$ at $x = \frac{4\pi}{3}$ is

1) 0 2) $\frac{-\sqrt{3}+1}{2}$
3) $\frac{\sqrt{3}+1}{2}$ 4) $\frac{\sqrt{3}}{2}$

27. If $y = x^x$, then $\frac{dy}{dx} =$ _____

1) $x^x(1+\log x)$ 2) $x^x(1-\log x)$
3) $x^x(\log x - 1)$ 4) $x^x \log x$

28. If $y = \tan^{-1}\frac{\cos x}{1+\sin x}$, then the value of $\frac{dy}{dx} =$

1) -1/2 2) 1/2 3) x/2 4) -x/2

29. If $(\cos\theta + \theta\sin\theta), y = a(\sin\theta - \theta\cos\theta)$, then the value of $\frac{dy}{dx}$ at $\theta = \frac{\pi}{4}$ is

1) 0 2) $\frac{1}{\sqrt{3}}$ 3) 1 4) $\sqrt{3}$

T.S ECET - 2015

30. If $y = (x)^x$, then $\frac{dy}{dx}$ is

1) x logx 2) $x^x \log x$
3) $x^x(1-\log x)$ 4) $x^x(1+\log x)$

31. If $y = \sqrt{x+\sqrt{x+\sqrt{x+....\infty}}}$, then $\frac{dy}{dx} =$ is

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1) 0 2) $\frac{1}{2x-1}$

3) $\frac{1}{2y-1}$ 4) 1

32. If $y = \log[\sin(\cos x)]$ then $\frac{dy}{dx} =$

1) $\operatorname{cosec}(\cos x)$ 2) $\sin x \cot(\cos x)$
3) $-\sin x \cot(\cos x)$ 4) $\sec(\cos x)$

33. If $y = A\cos x + B\sin x$, then $\frac{d^2y}{dx^2}$ is

1) 0 2) 1 3) -y 4) y

34. If $x = at^2, y = 2$ at $\frac{dy}{dx}$ is

1) 0 2) t 3) 1/t 4) 1

35. If $u\log\left(e^x + e^y\right)$, then $\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y}$ is equal to

1) 0 2) 1 3) 2 4) 3

36. If u is a homogeneous function of order n, then $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y}$ is equal to

1) 0 2) nu 3) xu 4) yu

37. If $u = \frac{x^4 + y^4}{x + y}$ then $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y}$ is equal to

1) 0 2) 1 u 3) 2 u 4) 3 u

PRIVIOUS ECET BITS KEY

1) 3	2) 3	3) 1	4) 2	5) 1
6) 2	7) 1	8) 4	9) 4	10) 3
11) 2	12) 2	13) 3	14) 4	15) 4
16) 3	17) 3	18) 2	19) 1	20) 2
21) 4	22) 1	23)3	24) 3	25) 2
26) 2	27) 1	28) 1	29) 3	30) 4
31) 3	32) 4	33) 3	34) 3	35) 2
36) 2	37) 4			

4. PARTIAL DIFFERENATIATION

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1. If u is a homogeneous function of x and y with degree n then $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} =$

1) $-nu$ 2) n^2u 3) nu 4) $nu^2 + u$

2. If $u = \log\left(\frac{x^2 + y^2}{x + y}\right)$ then $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} =$

1) 2 2) 4 3) 5 4) 1

2019 - TS ECET

3. If $z = f(x+ct) + \varphi(x-ct)$, then $\frac{\partial^2 z}{\partial t^2} =$ _____

1) $c^2\frac{\partial^2 z}{\partial x^2}$ 2) $-c^2\frac{\partial^2 z}{\partial x^2}$

3) $\frac{1}{c^2}\frac{\partial^2 z}{\partial x^2}$ 4) $-\frac{1}{c^2}\frac{\partial^2 z}{\partial x^2}$

4. If $x = r\cos\theta$, $y = r\sin\theta$ and $U = \frac{f(\theta)}{r}$ then $x\frac{\partial U}{\partial x} + y\frac{\partial U}{\partial y} =$ _____

1) 0 2) U 3) $-U$ 4) $2U$

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5. If u be a homogeneous function of degree n, then $x\frac{\partial^2 u}{\partial x^2} + y\frac{\partial^2 u}{\partial y^2} =$

1) nu 2) $n\frac{\partial u}{\partial x}$

3) $(n-1)\frac{\partial u}{\partial x}$ 4) $n(n-1)\frac{\partial u}{\partial x}$

6. If $u = f(x-y, y-z, z-x)$ then $\frac{\partial u}{\partial x}+\frac{\partial u}{\partial y}+\frac{\partial u}{\partial z}$ is

1) 3 2) –3 3) u 4) 0

2020 - TS ECET

7. If $\tan u = \frac{x^3+y^3}{x-y}$, $x \neq y$, then $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y} =$

1) $2u$ 2) $\sin 2u$ 3) $\cos 2u$ 4) $\tan 2u$

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8. If $u = \frac{x^2+y^2}{x-y}$, then $\frac{\partial u}{\partial x}+\frac{\partial u}{\partial y} =$

1) 0 2) u

3) $2\left(\frac{x+y}{x-y}\right)$ 4) $2u$

2021 - TS ECET

9. If $u = \log\left(\frac{x^2+y^2}{x^5+y^5}\right)$, then $\left(x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}\right) =$

1) e^u 2) -2

3) $\log(u)$ 4) 1

2022 - AP ECET

10. If $u = x^y$ then $\frac{\partial^2 u}{\partial x \partial y} =$

1) $x^{y-1}(1+x\log y)$ 2) $y^{x-1}(1+y\log x)$

3) $x^{y-1}(1-y\log x)$ 4) $y^{x-1}(1-y\log x)$

2022 - TS ECET

11. If $u = \cos^{-1}\left[\frac{x^3+y^3}{xy}\right]$, then $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y} =$

1) $\cot u$ 2) $\frac{1}{2}\tan u$

3) $-\frac{1}{2}\tan u$ 4) $-\cot u$

PREVIOUS ECET BITS KEY

01) 3	02) 1	03) 1	04) 3	05)
06) 4	07) 2	08) 3	09) 2	10) 3
11) 4				

5. APPLICATIONS OF DERIVATIVES TANGENTS AND NORMALS

2007

1. A particle moving along a strainght line has the relations $S = t^2 + 2t + 3$ connecting the distance S described by the particle in time t, the acceleration at $t = 3$ is
   1)12 units/sec^2 2)13 units/sec^2
   3)4 units/sec^2 4) 8 units/sec^2
2. Find the point in which the local maxima of local minima for the function $f(x) = x^3 - 3x$
   1) Min at x = 1 and max x=-1
   2) Min at x = 2 and max x = -2
   3) Min at x = 1 and max x = 1
   4) Min at x = 3 and max at x = -3
3. If an error of 3% in the side of the value the percentage erro in its volume is
   1) 3 2) 10 3) 6 4) 9
4. If the increase in the side of a square is1% find the % of change in the area of the square.
   1) 2% 2) 3% 3) 1 % 4) 0%
5. The slope of the tangent to the following curve $y = 1(x-1)$ at $x = 3$ is
   1) 1/4 2) -1/4 3) 1/2 4) 1/3
6. The equations of the tangent and the normal to the curve $y = 5x^4$ at the point (1,5) are
   1) y = 20x = 15 and 20 y = 101 -x
   2) y = x - 1 and y = 2 + x
   3) y = x -15 and y = 100 + c
   4) x = y + 1 and x = y-1

2008

7. The slope of the tangent to the curve

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$x^{2/3}+y^{2/3}=a^{2/3}$ at the point where it meets the x-axis is

1) $\frac{a}{3}$ 2) 1 3) -1 4) 0

8. The condition for the two curves $x=y^2$ and $xy=K$, K being constant, to cut orthogonally is

1) $2K^2=1$ 2) $8K^2=1$
3) $8K^3=1$ 4) $2K^3=1$

9. The curve $y=x\,e^x$ has a
1) Minimum value at x = 1
2) Minimum value at x = 0
3) Maximum value at x= -1
4) Maximum value at $x=0$

2009

10. The point on the curve y^3-3xy+2 = Owherethe tangent is parallel to y - axis is
1) (0.0) 2) (0,1) 3) (-1-1) 4) (1,1)

2010

11. The length of the normal to the curve $y=x^3+1$ at (1,2) is

1) $\sqrt{10}$ 2) $2\sqrt{10}$ 3) $2/3$ 4) 6

12. The maximum value of x^{-x} is

1) e^e 2) e^{-e} 3) $e^{-1/e}$ 4) $e^{1/e}$

2011

13. The maximum possible area that can be enclosed in a curve of length 20 cm by bending it into the form of a sector in square centimeters is
1)10 2)25 3)30 4)45

14. The maximum value of $\frac{\log x}{x}$ is

1) 1 2) 2/e 3) e 4) 1/e

15. The set of all points where the funciton f(x)= $\frac{x}{1+|x|}$ is differenctiable is

1) $(-\infty,\infty)$ 2) $[0,\infty]$
3) $(-\infty,0)\cup(0,\infty)$ 4) $(0,\infty)$

2012

16. The equation of the normal to the curve $y=5x^4$ at the point (1,5) is
1) x + 20y = 99 2) x + 20y = 101
3) x - 20y == 99 4) x - 20y = 101

17. The angle between the curves $y^2=4x$ and $x^2+y^2=5$ is

1) $\frac{\pi}{4}$ 2) $\tan^{-1}(2)$
3) $\tan^{-1}(3)$ 4) $\tan^{-1}(4)$

2013

18. The angle between the curve $y^2=2x$ and $x+y=8$ at their point of intersection (2,2) is
1) $\tan^{-1}3$ 2) $\tan^{-1}2$
3) 45^0 4) 60^0

19. If the sum of two positive numbers is 48, then the numbers such that the sum of their square is minimum are
1) 16,32 2) 20,28 3) 24,24 4) 6,42

20. A sphere of radius 10 cm shrinks to 9.8 cm. The approximate decrease in volume in cubic centimeters is
1) 80 π 2) 20 π 3) 60 π 4) 40 π

2014

21. The coordinates of thepoint P (x, y) on the curve of $y=x^2-4x+5$ such that the tangent at P is parallel to $y=2x+4$ are .
1) (3,2) 2) (1,2) 3) (2,1) 4) (5,4)

22. The function $f(x)=x\log^2 x$ has

1) Maximum value occurs when $x=\frac{1}{e}$
2) Maximum value of occurs when x = e
3) Maximum value occurs when $x=e^{-1}$
4) Maximum value occurs when $x=e^2$

23. In a cube the percentage increase in side is 2 units. The percentage increases in the volume of

the cube is

1) 3 2)6 3)8 4) 16

24. The curves $x = y^2$ and $xy = m$ cut at right angle if

1) $m = 0$ 2) $m^2 = 8$

3) $8m^2 = 1$ 4) $m = -1$

A.P.ECET 2015

25. Given the function $f(x) = x^2 e^{-2x}, x > 0$ Then f(x) has the maximum value equal to

1) e^{-2} 2) $(2e)^{-1}$

3) e^{-1} 4) none of these

26. If the curves $ay + x^2 = 7$ and $x^3 = y$ cut or thogonally at (1,1). Then a =

1) 1 2) -6 3) 6 4) 0

27. The maximum possible area thea can be enclos by a wire of length 20 cm by bending it into t form of a sectro in sq. cm is

1) 20 sq. cm 2) 25 sq. cm

3) 30 sq.cm 4) 15 sq.cm

T.S ECET 2015

28. The maximum value of the function $y = 2x^3 - 6x^2 - 18x + 21$ is

1) 21 2) 31 3) -1 4) 3

2019 - AP ECET

29. The angle between the curves $y = x^2 + 3x - 7$ and $y^2 = 2x + 5$ at $(2,3)$ is

1) $\tan\theta = 2$ 2) $\sec\theta = 2$

3) $\cos\theta = 1$ 4) $\sin\theta = 3$

2020 - AP ECET

30. The tangents drawn from the pint $P(-2,19)$ to the parabola $y^2 = 8x$ are perpendicular to each other. Then the point P lies on the parabola at

1) tangent at the vertex

2) directrix

3) latus-rectum

4) diameter through the focus

2020 - TS ECET

31. The slope of the tangent to the curve $x^{\frac{2}{3}} + y^{\frac{2}{3}} = 2$ at $(1,1)$ is

1) 0 2) -1 3) 1 4) 2

2021 - AP ECET

32. The equation of the normal at $(1,1)$ to the curve $y = 2x^3 - 3x^2 + x + 1$ is

1) $x + y - 2 = 0$ 2) $x - y = 0$

3) $2x - 3y + 1 = 0$ 4) $x - 2y + 1 = 0$

33. The angle between the curves $x^2 + y^2 = 2$ and $y^2 = x$ is

1) $\tan^{-1}(3)$ 2) $\tan^{-1}(2)$

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

34. If the volume of a cube is increasing at the rate of 5 cu. cm/sec, the rate of change in the length of the edge of the cube, when the length of the edge is 5 cm., is

1) $\frac{1}{15}$ sq. cm./sec 2) 15 cm./sec

3) $\frac{1}{15}$ cm./sec 4) $\frac{1}{3}$ cm./sec

2021 - TS ECET

35. The angle of intersection between the curves $x^2 + y^2 = 36\sqrt{2}$ and $x^2 - y^2 = 36$, is

1) $\frac{\pi}{6}$ 2) $\frac{\pi}{4}$ 3) $\frac{\pi}{3}$ 4) $\frac{\pi}{12}$

36. If m is the slope of a tangent to the curve $e^y = 1 + x^2$, then

1) $|m| > 1$ 2) $m > 1$

3) $m > -1$ 4) $|m| \le 1$

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2022 - AP ECET

37. The angle between tangents to the curve $y=x^2-5x+6$ at the points $(2,0)$ and $(3,0)$ is

1) $\frac{\pi}{3}$ 2) $\frac{\pi}{2}$ 3) $\frac{\pi}{6}$ 4) $\frac{\pi}{4}$

2022 - TS ECET

38. The length of tangent at $\sqrt{x}+\sqrt{y}=5$ at $(9,4)$ is

1) $2\sqrt{13}$ 2) $\sqrt{13}$ 3) $4\sqrt{13}$ 4) $5\sqrt{13}$

39. If the displacement in time "t" of a particle is given by $s=ae^t+be^{-t}$, then the accelertion is equal to

1) velocity 2) displacement
3) initital velocity 4) negative of velocity

PREVIOUS ECET BITS KEY

1) 1	2) 3	3) 4	4) 2	5) 2
6) 1	7) 4	8) 2	9) 1	10) 4
11) 2	12) 4	13) 2	14) 4	15) 1
16) 2	17) 3	18) 1	19) 3	20) 1
21) 2	22) 3	23) 2	24) 3	25) 1
26) 3	27) 2	28) 2	29) 1	30) 2
31) 2	32) 1	33) 1	34) 3	35) 2
36) 4	37) 2	38) 1	39) 2	

6. INDEFINITE INTEGRALS

2019 - AP ECET

1. The value of $\int \log x\,dx$ is

1) $x\log x+x+c$ 2) $x^2\log x-x+c$

3) $x\log x-x+c$ 4) $x\log x-\frac{x^2}{2}+c$

2. The value of $\int \frac{\cos\sqrt{x}}{\sqrt{x}}dx$ is

1) $2\sin\sqrt{x}+c$ 2) $3\sin\sqrt{x}+c$

3) $2\sin x+c$ 4) $\sin\sqrt{x}+c$

2020 - AP ECET

3. $\int \frac{dx}{1+\sin x+\cos x}=$

1) $\log\left(\tan\left(\frac{x}{2}\right)\right)+c$

2) $\log\left(1+\tan\left(\frac{x}{2}\right)\right)+c$

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

4) $\log\left(1+\sec\left(\frac{x}{2}\right)\right)+c$

4. $\int \frac{e^x-1}{e^x+1}dx=$

1) $2\log\left(e^x+1\right)+c$

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

3) $2\log\left(e^x+1\right)-x+c$

4) $\log\left(e^{2x}+1\right)+c$

2020 - TS ECET

5. $\int \frac{dx}{e^x+1}=$

1) $\log\left(1+e^{-x}\right)+C$ 2) $\log\left(1+e^x\right)+C$

3) $\log\left(\frac{e^x}{1+e^x}\right)+C$ 4) $-\log\left(1+e^x\right)+C$

6. $\int \frac{dx}{9\sin^2 x+4\cos^2 x}=$

1) $\frac{1}{6}\tan^{-1}\left(\frac{3}{2}\tan x\right)+C$

2) $\frac{1}{9}\tan^{-1}\left(\tan x\right)+C$

3) $\frac{1}{12}\tan^{-1}\left(\tan\frac{2}{3}x\right)+C$

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4) $\frac{1}{6}\tan^{-1}\left(\tan\frac{3}{2}x\right)+C$

2021 - AP ECET

7. $\int\frac{x^2+2x-1}{\sqrt{x^3+3x^2-3x+6}}dx=$

1) $\frac{2}{3}\sqrt{x^3+3x^2-3x+6}+c$

2) $\frac{1}{3}\sqrt{x^3+3x^2-3x+6}+c$

3) $\frac{2}{3\sqrt{x^3+3x^2-3x+6}}+c$

4) $\frac{1}{6\sqrt{x^3+3x^2-3x+6}}+c$

8. $\int e^{2x}\sec 2x(1+\tan 2x)dx=$

1) $e^{2x}\sec 2x+c$ 2) $e^{2x}\tan 2x+c$

3) $\frac{1}{2}e^{2x}\sec 2x+c$ 4) $2e^{2x}\sec 2x+c$

9. $\int\frac{dx}{\sqrt{x^2-2x+5}}=$

1) $\tanh^{-1}\left(\frac{x-1}{2}\right)+c$ 2) $\sinh^{-1}(x-1)+c$

3) $\cosh^{-1}\left(\frac{x-1}{2}\right)+c$ 4) $\sinh^{-1}\left(\frac{x-1}{2}\right)+c$

2021 - TS ECET

10. If $f(t)=1+t^2+t^4+t^6$, then $\int f(\tan x)dx=$

1) $x+\frac{(\tan x)^3}{3}+\frac{(\tan x)^5}{5}+\frac{(\tan x)^7}{7}+c$

2) $\tan x+\frac{(\tan x)^5}{5}+c$

3) $(\tan x)^2+\frac{(\tan x)^5}{5}+c$

4) $\tan x+\frac{(\tan x)^3}{3}+\frac{(\tan x)^5}{5}+\frac{(\tan x)^7}{7}+c$

11. If $\int((1+x)\sin x+(1-x)\cos x)dx=$ $A(\sin x-\cos x)+f(x)(\sin x+\cos x)+C$, then $Af(x)=$

1) $3x$ 2) $3\sin x$ 3) $-2x$ 4) $2x+\sin x$

12. If $\int x^5e^{x^2}dx=\frac{1}{2}e^{x^2}f(x)+c$ then $f(2)=$

1) 8 2) 9 3) 10 4) 12

2022 - AP ECET

13. The value of $\int e^{\sin^{-1}x}\frac{1}{\sqrt{1-x^2}}dx$

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

3) $e^{\sin x}+c$ 4) $e^{\cos^{-1}x}+c$

14. If $\int\frac{4x+1}{x^2+3x+2}dx=a\log|x+1|+b\log|x+2|+C$, then

1) $a=b$ 2) $a+b=4$

3) $a=2b$ 4) $b=2a$

15. $\int\frac{\cos 2x}{(\sin x+\cos x)^2}dx=$

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

2) $\log|\sin x+\cos x|+c$

3) $\log|\sin x-\cos x|+c$

4) $(\sin x+\cos x)^2+c$

16. If $\int f(x)dx=2(f(x))^3+C$ then $f(x)=$

1) $\frac{x}{2}$ 2) x^3 3) $\frac{1}{\sqrt{x}}$ 4) $\sqrt{\frac{x}{3}}$

17. If $\int e^{ax}\cos bx\,dx=\frac{e^{2x}}{29}f(x)+C$, then

$f^{n}(x)=$

1) $29f(x)$ 2) $-29f(x)$

3) $25f(x)$ 4) $-25f(x)$

2022 - TS ECET

18. $\int \frac{dx}{(x+100)\sqrt{x+99}}$

1) $2(x+100)^{\frac{1}{2}}+C$ 2) $3(x+100)^{\frac{1}{2}}+C$

3) $2\tan^{-1}\left(\sqrt{x+100}\right)+C$

4) $2\tan^{-1}\left(\sqrt{x+99}\right)+C$

PREVIOUS ECET BITS KEY

01) 3	02) 1	03) 2	04) 3	05) 3
06) 1	07) 1	08) 3	09) 4	10) 2
11) 3	12) 3	13) 2	14) 2	15) 2
16) 4	17) 4	18) 4		

7. DEFINITE INTEGRALS

2007

1. $\int(2+4x+3\sin(x)+4e^{x})dx=$

1) $2x+2x^{2}-3\cos(x)4e^{x}+e$

2) $2+4x+3\sin(x)+4e^{x}+e$

3) $2x+2x^{2}+3\cos(x)-4e^{x}+e$

4) $2x+4x^{2}+3\cos(x)+4e^{x}+e$

2. $\int x^{3}e^{x^{4}}dx=$

1) $e^{x^{4}}+e$ 2) $\frac{1}{2}x^{3}e^{x^{4}}$

3) $x^{3}e^{x^{4}}+e$ 4) $\frac{1}{4}e^{x^{4}}+e$

3. $\int xe^{x}dx=$

1) $xe^{x}+e$ 2) $e^{x}+e$

3) $xe^{x}-e^{x}$ 4) $(1+x)e^{x}+e$

4. $\int_{a}^{b} Cdx=$

1) $c(b-a)$ 2) $c(b+a)$

3) cab 4) $a+b+c$

5. $\int\cot(x)dx=$

1) $1n|\cos x|+c$ 2) $1n|\sin x|+c$

3) $1n|\tan x|+c$ 4) $1n|\sec x|+c$

6. $\int 1/(x+2)^{4}dx=$

1) $4\left[1/(x+2)^{3}\right]+e$

2) $\left[4/(x+2)\right]+e$

3) $-\left[1/3(x+2)^{3}\right]+e$

4) $\left[1/(x+2)\right]+e$

7. $\int_{1}^{3}(2x^{2}+2x+1)\,dx=$

1) 27 2) 28 3) $27\frac{1}{3}$ 4) 26

2008

8. $\int\cot^{2}dx=$

1) $\cot x-x+c$ 2) $\cot x+x+c$

3) $-\cot x+x+c$ 4) $-\cot x-x+c$

9. $\int\frac{1}{e^{x}+e^{-x}}dx=$

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

3) $\log\left(e^{2x}+1\right)+c$ 4) $\sin^{-1}(ex)$

SAIMEDHA

10. The smallest interval [a,b] such that $\int_0^1 \frac{dx}{\sqrt{1+x^4}} \in [a,b]$ is given by

1) $\left[\frac{1}{\sqrt{2}},1\right]$ 2) $[0,1]$

3) $\left[\frac{1}{2},1\right]$ 4) $\left[\frac{3}{4},1\right]$

11. $\int \frac{e^x(x\log x+1)}{x}dx =$

1) $xe^x\log x+c$ 2) $\frac{e^x\log x}{x}+c$

3) $\frac{e^x}{\log x}+c$ 4) $x^x\log x+c$

12. $\int_{-\pi}^{\pi} \sin^5\theta\cos^5\theta d\theta =$

1) $\frac{1}{80}$ 2) $\frac{\pi}{80}$ 3) 0 4) $\frac{\pi}{40}$

2009

13. The value of $\int_0^{\pi/2} \sin^2 x\,dx$ is

1) $-\frac{\pi}{2}$ 2) 0 3) $\frac{\pi}{4}$ 4) $\frac{\pi}{2}$

14. $\int x^3(\log x)^2 dx =$

1) $\frac{1}{32}x^4\left[8(\log x)^2+4(\log x)-1\right]$

2) $\frac{1}{32}x^4\left[8(\log x)^2+4\log x+1\right]$

3) $\frac{1}{32}x^4\left[8(\log x)^2-4\log x-1\right]$

4) $\frac{1}{32}x^4\left[8(\log x)^2-4\log x+1\right]+c$

15. If $m\neq n$, then $\int_0^{\pi} \cos mx\cos nx\,dx$ is

1) 0 2) $\frac{\pi}{2}$ 3) π 4) 2π

16. $\int(\tan x+\cot x)^2 dx =$

1) $\tan x+\cot x+c$ 2) $\cot x-\tan x+c$

3) $\tan x-\cot x+c$ 4) $-\cot x-\tan x+c$

2010

17. $\int \frac{x^4}{x^2+1}dx =$

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

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

18. $\int \tan^{-1} dx =$

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

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

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

4) $x\tan^{-1}x-\log(1+x^2)+c$

19. $\int_0^a \sqrt{a^2-x^2}\,ax =$

1) $\frac{a^2}{4}$ 2) πa^2 3) $\frac{\pi a^2}{2}$ 4) $\frac{\pi a^2}{4}$

SAIMEDHA

20. $\int e^x\sqrt{e^x+1}\,dx =$

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

3) $(1-e^x)^{3/2}+c$ 4) $\frac{2}{3}(1+e^x)^{3/2}+c$

21. $\int\frac{\cos\sqrt{x}}{\sqrt{x}}dx =$

1) $2\sin\sqrt{x}+c$ 2) $\cos^2\sqrt{x}+c$

3) $\cos^2\sqrt{x}+c$ 4) $2\cos\sqrt{x}+c$

22. $\int\frac{dx}{x^2-5x+6} =$

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

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

23. $\int_{\pi/6}^{\pi/3}\frac{dx}{\sin 2x} =$

1) $\frac{1}{2}\log(-1)$ 2) $\log(-1)$

3) $\log 3$ 4) $\log\sqrt{3}$

24. $\int_{-1}^{1}|1-x|dx =$

1) -2 2) 0 3) 2 4) 4

25. $\int\frac{dx}{e^x+e^{-x}} =$

1) $\log(e^x+e^{-x})$ 2) $\tan^{-1}(e^x)$

3) $\log(e^{2x}+1)$ 4) e^{3x}

26. $\int\frac{\log x^2}{x}dx =$

1) $\log(x)^2+c$ 2) $\frac{1}{2}(\log x)^2+c$

3) $\log x^2+c$ 4) $\log x+c$

27. $\int\log x\,dx =$

1) $x+x\log x$ 2) $x\log x+c$

3) $x^2\log x$ 4) $\frac{\log x}{x}+x$

28. $\int e^x[\varnothing(x)+\varnothing'(x)]dx$ is

1) $\int e^x\varnothing'(x)dx$ 2) $e^x\varnothing(x)+c$

3) $e^x\varnothing'(x)+c$ 4) $\varnothing'(x)e^{-x}$

29. If $(a-x)=f(x)$ then $\int_0^a xf(x)dx =$

1) $\frac{a}{2}\int_0^a f(x)dx$ 2) $a\int_0^a f(x)dx$

3) $\frac{a^2}{2}\int_0^a f(x)dx$ 4) $a^3\int_0^a f(x)dx$

2012

30. $\int\text{cosec}\,x\,dx =$

1) $\log(\text{cosec}\,x+\cot x)+C$

2) $\log(\cot x/2)+C$

3) $\log(\tan x/2)+C$

4) $-\text{cosec}\,x.\cot x+c$

SAIMEDHA

31. $\int_0^{\frac{\pi}{2}} \cos^{11} x \, dx =$

1) $\frac{256}{693}$ 2) $\frac{256\pi}{693}$ 3) $\frac{\pi}{4}$ 4) $\frac{128}{693}$

32. $\int f'(x).[f(x)]^n dx =$

1) $\frac{[f(x)]^{n-1}}{n-1}$ 2) $\frac{[f(x)]^{n+1}}{n+1}+C$

3) $n[f(x)]^{n-1}+C$

4) $(n+1)[f(x)]^{n+1}+C$

33. $\int \frac{dx}{(x+7)\sqrt{x+6}} =$

1) $\tan^{-1}(\sqrt{x+6})+C$ 2) $2\tan^{-1}(\sqrt{x+6})+C$

3) $\tan^{-1}(\sqrt{x+7})+C$ 4) $2\tan^{-1}(x+7)+C$

34. $\int \tan^{-1} x \, dx =$

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

2) $\frac{1}{1+x^2}+C$ 3) $x^2.\tan^{-1}+C$

4) $x^2.\tan^{-1}x-\log\sqrt{1+x^2}+C$

35. $\int \frac{dx}{1+e^{-x}} =$

1) $\log(1+e^{-x})+C$ 2) $\log(1+e^{x})+C$

3) $e^{-x}+C$ 4) $e^{x}+C$

36. $\int_{\frac{-\pi}{2}}^{\frac{\pi}{2}} \sin|x| dx =$

1) 0 2) 1 3) 2 4) -1

2013

37. $\int \frac{\sin x+\cos x}{\sqrt{1+\sin 2x}} dx =$

1) $\sin x-\cos x+c$ 2) $\cos 2x+c$

3) $\sin 2x+c$ 4) $x+c$

38. $\int_0^{\infty} \frac{dt}{t^2+2t+2}$

1) $\pi/2$ 2) $\pi/4$ 3) 0 4) $1/2$

39. $\int e^x \frac{(1+x\log x)}{x} dx =$

1) $xe^x \log x+c$ 2) $x\log x+c$

3) $e^x \log x+c$ 4) $-x\log x+e^x+c$

40. $\int_{-2}^{2} (4x+3x^2+7x^2+12x^7) dx =$

1) 432 2) 516 3) 1132 4) 16

2014

41. $\int \frac{\cos\sqrt{x}}{\sqrt{x}} dx =$

1) $\sqrt{x}\sin\sqrt{x}+c$ 2) $2\sin\sqrt{x}+c$

3) $\sqrt{\cos x}+C$ 4) $\frac{\sin\sqrt{x}}{\sqrt{x}}+c$

42. $\int \left(\frac{x+2}{x+1}\right) dx =$

1) $x\log(x+1)+c$

2) $x\log(x+1)+2\log(x+1)+c$

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3) $x+\log(x+1)+c$

4) $\frac{1}{x}\log(x+1)+c$

43. $\int\frac{x^2}{\sqrt{1+x^6}}dx=$

1) $\frac{1}{2}\sin^{-1}(x^3)+c$ 2) $2\cos^{-1}(x^3)+c$

3) $\frac{1}{2}\cosh^{-1}(x^3)+c$ 4) $\frac{1}{3}\sinh^{-1}(x^3)+c$

44. $\int 8x^3e^{2x}dx=$

1) $(4x^3-6x^2+6x-3)e^{2x}+c$

2) $4x^3+6x^2+6x+3e^{2x}+c$

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

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

45. $\int_0^{\frac{\pi}{2}}\frac{\sqrt{\sin x}}{\sqrt{\cos x}+\sqrt{\sin x}}dx=$

1) $\frac{\pi}{2}$ 2) $\frac{\pi}{4}$ 3) 0 4) 2

A.P. ECET - 2015

46. $\int\frac{\sin x-\cos x}{\sqrt{\sin 2x}}dx=$

1) $-\cosh^{-1}(\sin x+\cos x)$

2) $-\cosh^{-1}(\sin x-\cos x)$

3) $-\cosh^{-1}(\sin x+\cos x)$

4) $-\cosh^{-1}(\sin x-\cos x)$

47. $\int\frac{\sqrt{x-1}}{x}dx=$

1) $\frac{2}{3}\log 2$ 2) $\frac{1}{5}\log 2$

3) $\frac{5}{2}\log 5$ 4) $\frac{1}{2}\log 5$

48. $\int_0^1\frac{\sin^{-1}}{x}dx=$

1) $\frac{\pi}{2}\log 2$ 2) $\frac{\pi}{4}\log 4$

3) $\frac{\pi}{6}\log 6$ 40 $\frac{\pi}{8}\log 8$

49. $\int_0^{\pi}\frac{1}{5+4\cos x}dx=$

1) $\frac{\pi}{2}$ 2) $\frac{\pi}{3}$ 3) $\frac{\pi}{4}$ 4) π

T.S. ECET - 2015

50. $\int e^x dx$

1) e^x 2) e^x+c 3) e 4) log x

51. $\int\frac{1}{x}dx=$

1) e^x 2) log x + c

3) log x 4) 1/x

52. $\int e^{\log x}dx=$

1) $e^{\log x}$ 2) $e^{\log x}+c$

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3) $\frac{x^2}{2}+c$ 4) x

53. $\int \log e^x dx =$

1) e^{-x} 2) $e^{-x}+c$

3) $\frac{x^2}{2}+c$ 4) x

54. $\int_0^{\pi} \sin x\, dx =$

1) 0 2) 1 3) 2 4) - cos x

55. $\int_0^{\pi/2} e^{\sin^2} \sin 2x\, dx =$

1) 0 2) e 3) e-1 4) 1

56. $\int_{-\pi/2}^{\pi/2} \cos x\, dx =$

1) 0 2) 1 3) 2 4) $\sin x$

57. $\int_{-\pi/2}^{\pi/2} \log(\tan x)\, dx =$

1) 0 2) 1 3) 2 4) $\cot x$

2019 - AP ECET

58. The value of $\lim_{n\to\infty}\left[\frac{1}{n+1}+\frac{1}{n+2}+.....+\frac{1}{n+n}\right]$ is

1) $\log 2$ 2) $\log 3$

3) $-\log 2$ 4) $\log n$

59. The value of $\int_1^{\frac{\pi}{2}} \sin^2 x\, dx$ is

1) $\frac{\pi}{2}$ 2) $-\frac{\pi}{4}$ 3) $\frac{\pi}{6}$ 4) $\frac{\pi}{4}$

60. The value of $\int_1^4 \left(\sqrt{x}+\frac{1}{\sqrt{x}}\right) dx$ is

1) $\frac{20}{3}$ 2) $-\frac{20}{3}$ 3) $\frac{10}{3}$ 4) $\frac{15}{3}$

61. The value of $\int_0^{\frac{\pi}{4}} \sqrt{1+\sin 2x}\, dx =$

1) –1 2) –3 3) 3 4) 1

62. The value of $\int_0^{\frac{\pi}{2}} \frac{\sin x}{1+\cos^2 x} dx =$

1) $\frac{\pi}{4}$ 2) $-\frac{\pi}{4}$ 3) $\frac{\pi}{3}$ 4) $\frac{\pi}{2}$

2019 - TS ECET

63. $\lim_{n\to\infty} \frac{1}{n^6} \sum_{k=1}^{n} k^5 =$ _____

1) $\frac{1}{6}$ 2) $\frac{1}{5}$ 3) 1 4) 6

64. $\int_{-1}^{1} \frac{x^{15}\left(1-x^2\right)^{12}}{\left(1+x^2\right)^8} dx =$ _____

1) 0 2) $\frac{22}{7}-\pi$

3) $\frac{2}{105}$ 4) $\frac{71}{15}-\frac{3\pi}{4}$

65. Which of the following is the value of

$$5050\times\frac{\int_0^1 \left(1-(1-x)^{50}\right)^{100} x^{49} dx}{\int_0^1 \left(1-x^{50}\right)^{101} x^{49} dx}\ ?$$

1) 5100 2) 1 3) 5050 4) $\frac{1}{2}$

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66. $\int_0^1 \max\left\{x, \frac{1}{2}-x\right\}dx =$ _____

1) 0 2) $\frac{1}{2}$ 3) $\frac{9}{16}$ 4) $\frac{9}{8}$

2020 - AP ECET

67. $\int_0^1 \frac{\log(1+x)}{x}dx$ is

1) 0 2) $\frac{\pi}{4}$ 3) $\frac{\pi^2}{4}$ 4) $\frac{\pi^2}{12}$

68. $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \sin|x|dx$ is

1) 0 2) 2 3) $\frac{1}{2}$ 4) $-\frac{1}{2}$

2020 - TS ECET

69. $\int_0^{\frac{\pi}{2}}\left(\sin^{\frac{5}{2}}x - \cos^{\frac{5}{2}}x\right)dx =$

1) 0 2) 1 3) -1 4) 2

70. $\lim_{n\to\infty}\frac{3^k+6^k+9^k+\ldots\ldots\ldots\ldots+(3n)^k}{n^{k+1}} =$

1) $\frac{3^{k+1}}{k+1}$ 2) $\frac{3^k}{k+1}$ 3) $\frac{3^{k+1}}{k}$ 4) $\frac{3^k}{k!}$

2021 - AP ECET

71. $\int_{-2}^{2}\frac{x^2}{x-1}dx =$

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

3) $2-\log 3$ 4) $4+\log 3$

2021 - TS ECET

72. $\lim_{n\to\infty}\frac{1}{n}\left(\sin\left(\frac{1}{n}\right)+\sin\left(\frac{2}{n}\right)+\sin\left(\frac{3}{n}\right)\right.$
$\left.+\ldots.\sin(1)\right) =$

1) $\cos(1)$ 2) $\cos\left(\frac{1}{2}\right)$

3) $2\sin^2\left(\frac{1}{2}\right)$ 4) $\log 2$

2022 - AP ECET

73. The value of x in $\int_{\sqrt{2}}^{x}\frac{1}{t\sqrt{t^2-1}}dt = \frac{\pi}{2}$ is

1) $\frac{\sqrt{3}}{2}$ 2) $2\sqrt{2}$ 3) 2 4) $-\sqrt{2}$

74. The value of $\int_0^1 \frac{\left(\sin^{-1}x\right)^2}{\sqrt{1-x^2}}dx$

1) $\frac{\pi^3}{24}$ 2) $\frac{\pi^3}{48}$ 3) $\frac{\pi^3}{64}$ 4) $\frac{\pi^3}{12}$

75. If $f(x)$ is a polynomial of degree 2 satisfying $f(0)=1$, $f'(0)=-2$ and $f''(0)=6$ then $\int_{-1}^{2} f(x)dx =$

1) 6 2) 0 3) 9 4) -8

2022 - TS ECET

76. $\int_0^1 \frac{1-x^2}{1+x^2}dx$

1) $\frac{\pi}{4}-1$ 2) $\frac{\pi}{4}+1$ 3) $\frac{\pi}{2}-1$ 4) $\frac{\pi}{4}$

PREVIOUS ECET KEY

1) 1	2) 4	3) 4	4) 1	5) 2
6) 3	7)	8) 4	9)2	10) 1
11) 4	12) 3	13) 3	14) 4	15) 1
16) 3	17) 1	18) 3	19) 4	20) 4
21) 1	22) 2	23) 4	24) 3	25) 2
26) 1	27) 2	28) 2	29) 1	30) 3
31) 2	32) 2	33) 2	34) 4	35) 2
36) 3	37) 4	38) 2	39) 3	40) 4

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41) 2	42) 3	43) 34	44) 1	45) 2
46) 1	47) 4	48) 1	49) 2	50) 2
51) 2	52) 3	53) 3	54) 3	55) 3
56) 3	57) 1	58) 1	59) 4	60) 1
61) 4	62) 1	63) 1	64) 2	65) 1
66) 3	67) 4	68) 2	69) 1	70) 2
71) 2	72) 3	73) 4	74) 1	75) 3
76) 3				

8. APPLICATIONS OF THE DEFINITE INTEGRAL

2008

1. Area enclosed between one arch of the curve v and x-axis is

   1) a 2) a^2 3) 0 4) 2a

2. The volume of solid of revolution generated when the curve $y = x$ *is* revolved about x - axis between (0,0) and (4,0) is

   1) $\frac{16}{3}\pi$ 2) $\frac{64}{3}\pi$ 3) $\frac{8}{3}\pi$ 4) 16π

2009

3. Area lying between the parabola $y^2 = 4ax$ and latus rectum is

   1) $\frac{8a^2}{3}$ 2) $\frac{8a}{3}$ 3) $\frac{4a}{3}$ 4) $\frac{4a^2}{3}$

4. Area lying between the curves $y^2 = 4x$ and is latus rectum is

   1) $\frac{2}{3}$ 2) $\frac{1}{3}$ 3) $\frac{1}{4}$ 4) $\frac{1}{2}$

5. The volume of the solid generated by the revolution of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ about y-axis is

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

6. The volume of the solid generated by revolution cdH the part of the parabola $y^2 = 4\,ax$ off by the latusP rectum about the tangent at the vertex is

   1) $\frac{8\pi a^3}{105}$ 2) $\frac{23\pi a^3}{105}$ 3) $\frac{16\pi a^3}{105}$ 4) $\frac{8\pi a^3}{105}$

7. Find the volume of the solid generated by the revolution of $x^{\frac{2}{3}}+y^{\frac{2}{3}}=a^{\frac{2}{3}}$ about x-axis

2010

8. The area bounded by the curve $y = 7x - 10 - x^2$ with x-axis is

   1) 9 sq.units 2) 3 sq.units

   3) $\frac{9}{2}$ sq. units 4) $\frac{16\pi}{5}$

2011

9. The area enclosed by the curve $y^2 = 4x$ and the line y = x is

   1) $\frac{2}{3}$ 2) $\frac{4}{3}$ 3) $\frac{1}{2}$ 4) $\frac{8}{3}$

10. The area of the figure bounded by the lines $x = 0, x = -\frac{\pi}{2}, f(x)$ =sin x and g(x) = cos x is

    1) $2\left(\sqrt{2}-1\right)$ 2) $\sqrt{3}-1$

    3) $2\left(\sqrt{3}-1\right)$ 4) $2\left(\sqrt{2}+1\right)$

2012

11. Area under the curve $f(x)=\sin x$ in$[0,\pi]$ is

    1) 4 sq.units 2) 2 sq.units

    3) 6 sq. units 4) 8 sq.units

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2013

12. The area included under x + y = 2 and the co-ordinate axis is

1) 8 units 2) 4 units

3) 2 untis 4) 1 unit

13. The volume of solid of revolution in cobic units when y = 4 is rotated about x-axis between (0,0) and (0,4)

1) 64π 2) 32π 3) 16π 4) 16

2014

14. The area of the region in the first quadrant enclosed by x-axis, y-aixs, y=3x-2 and y=4 is

1) 16 2) 8 3) $\frac{16}{3}$ 4) $\frac{8}{3}$

15. The root mean sqare (RMS) value of log x over the range x = 1 to x = e is

1) $\frac{\sqrt{(e+1)}}{\sqrt{(e-2)}}$ 2) $\frac{\sqrt{(e-2)}}{\sqrt{(e-1)}}$

3) $\frac{\sqrt{(e+2)}}{\sqrt{(e+1)}}$ 4) $\frac{\sqrt{(e+2)}}{\sqrt{(e-1)}}$

A.P. ECET - 2015

16. The area of the segment cut off from the parabola $x^2 = 8y$ by the line $x - 2y + 8 = 0$ is

1) 36 2) 34 3) 32 4) 38

17. The area bounded by the parabola $y = 4 - x^2$, y=0 y=3 is

1) $\frac{26}{3}$ 2) $-\frac{26}{3}$ 3) $\frac{28}{3}$ 4) $-\frac{28}{3}$

T.S. ECET - 2015

18. The area enclosed by the curve $y = f(x)$, x-aixs and ordinates x=a and x=b is

1) $\int_a^b \pi f(x)\,dx$ 2) $\int_a^b |f(x)dx|$

3) $\int |f(x)dx|$ 4) $\int \pi |f(x)dx|$

19. The volume of the solid generated by the curve y=f(x) between x =a and x = b when it is revolved about the x-axis is given by

1) $\int_a^b \pi f(x)\,dx$ 2) $\int_a^b \pi^2 f(x)\,dx$

3) $\int_a^b \pi [f(x)]^2\,dx$ 4) $\int_a^b \pi^2 [f(x)]^2\,dx$

20. The mean value of f(x) over [a,b] is

1) $\frac{1}{2}\int_a^b f(x)\,dx$ 2) $\frac{1}{b-a}\int_a^b f(x)\,dx$

3) $\frac{1}{b+a}\int_a^b f(x)\,dx$ 4) $\frac{1}{a-b}\int_a^b f(x)\,dx$

21. The root square value of f(x) over [a,b] is

1) $\sqrt{\frac{1}{2}\int_a^b f(x)\,dx}$

2) $\sqrt{\frac{1}{b-a}\int_a^b f(x)\,dx}$

3) $\sqrt{\frac{1}{b-a}\int_a^b [f(x)]^2\,dx}$

4) $\sqrt{\frac{1}{2}\int_a^b [f(x)]^2\,dx}$

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PREVIOUS ECET BITS KEY				
1) 4	2) 2	3) 1	4) 2	5) 4
6) 1	7) 1	8) 3	9) 4	10) 1
11) 2	12) 3	13) 1	14) 3	15) 2
16) 1	17) 4	18) 2	19) 3	20) 2
21) 3				

9. DEFFERENTIAL EQUATIONS

2007

1. The degree of the differential equation $(dy/dx)^2 = 3x/4y$ is

   1) 2 2) 1 3) 0 4) 3

2. Solution of $dy/dx = 3x^2/y^2$ is

   1) $3x^2 = y^2$ 2) $6x = 2y$

   3) $y^3 = 3x^3 + 3e$ 4) $y^3 = -3x^3 + c$

3. Integrating factor of $dy/dx + y\tan(x)e^2e^x\cos(x)$ is

   1) sec (x) 2) cos (x) 3) tan (x) 4) sin (x)

4. The general solution of $y^{11} - 3y^1 + 2y = 0$ is

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

   3) $c_1x + c_2 2x$ 4) $c_1x^{2x} + c_2e^{5x}$

5. The general solution of $y^{11} - 6y^1 + 9y = 0$ is

   1) $(c_1 + c_2x)e^{2x}$ 2) $c_1e^{3x} + c_2e^{2x}$

   3) $(c_1 + c_2x)e^{3x}$ 4) $c_1e^x + c_2e^{3x}x^2$

6. The general solution of $y^{11} + 9y = 0$ is

   1) $c_1\sin(3x) + c_2\cos(3x)$

   2) $c_1\sin(x) + c_2\cos(x)$

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

   4) $c_1\sin(x) - c_2\cos(x)$

2008

7. Degree of the differential equation $y = x\frac{dy}{dx} + \sqrt{1+\left(\frac{dy}{dx}\right)^2}$ is

   1) 1 2) 3 3) 2 4) 4

8. The differential equation whose solution $x = A\cos(pt - \alpha)$, where A and B are arbitrary constants is given by

   1) $\frac{d^2x}{dt^2} - 2\frac{dx}{dt} + 2x = 0$

   2) $\frac{d^2x}{dt^2} - p^2x = 0$

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

   4) $\frac{d^2x}{dt^2} = p^2$

9. The solution of the differential equation $x\frac{dy}{dx} + y = 0$ is

   1) $\frac{x}{y} = c$ 2) $xy = c$

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

10. The integrating factor of $x^2ydx - (x^3 + y^3)dy = 0$ is

    1) $\frac{1}{y(x^2 - y^2)}$ 2) $\frac{1}{y^4}$

    3) $\frac{1}{x^2y^2}$ 4) $\frac{1}{xy}$

11. the general solution of the differential equation

    $\frac{d^3y}{dx^3} + 6\frac{d^2y}{dx^2} + 11\frac{dy}{dx} + 6y = 0$ is

    1) $y = c_1e^{-x} + c_2e^{-2x} + c_3^{-3x}$

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2) $y=(c_1+c_2x+c_xx^2)e^{-x}$

3) $y=c_1e^x+(c_2+c_3x)e^{3x}$

4) $y=(c_1+c_2x)e^x+c_3e^{4x}$

12. The particular value of $\frac{1}{D^3}\cos x$ is

1) $\sin x$ 2) $-\sin x$ 3) $2\sin x$ 4) $x\sin xm$

13. The particular integral of $(D^2-5D=6)y=e^{4x}$

1) $\frac{e^{4x}}{2}$ 2) $e^{4x}+e^{6x}$

3) $\frac{xe^{4x}}{2}$ 4) $\frac{x^2e^{4x}}{2}$

14. The particular integral of the differential equation $(D^2-2D+4)y=e^{2x}$ is

1) $\frac{x^2e^{2x}}{2}$ 2) x^2e^{2x} 3) $\frac{x^3e^{2x}}{6}$ 4) none

2009

15. Solution of $\frac{dy}{dx}+\sqrt{\frac{1-y^2}{1+x^2}}=0$ is

1) $\sin^{-1}x+\sin^{-1}y=c$

2) $\sin^{-1}x-\sin^{-1}y=c$

3) $\sinh^{-1}x+\sinh^{-1}y=c$

4) $\tan^{-1}x=\tan^{-1}y+c$

16. The integrating factor of

$y(xy+2x^2y^2)dx+x(xy-x^2y^2)dy=0$

1) $\frac{1}{3x^3y^3}$ 2) $\frac{1}{x^3}$ 3) $\frac{1}{y^3}$ 4) $\frac{1}{3x^3y^3}$

17. Integrating factor of $\frac{dy}{dx}+Py=Q$ to make it an exact equation is

1) $e^{\int Pdx}$ 2) $e^{\int Q(y)dx}$ 3) e^x 4) e^y

18. The particular solution of

$(D^2-D-2)y=\sin 2x$ is

1) $\frac{1}{20}(\cos 2x-3\sin 2x)$

2) $\frac{1}{2}\cos x$

3) $\frac{1}{2}\sin x$ 4) $\frac{1}{4}x\sin 2x$

19. Particular solution of $(D^2-4D+4)y=x^3$ is

1) $\frac{1}{8}(2x^3+6x^2+9x+6)$

2) $9x^2+6x-25$

3) $12x^2+30x$ 4) x^2+2x+5

20. Particular solution of

$(D^2-6D+13)y=8e^{3x}\sin 2x$

1) $-2xe^{3x}\cos 2x$ 2) xe^{3x}

3) $x^2e^{3x}\cos 3x$ 4) $-2xe^x\sin 2x$

21. Differential equation of the family of circles having centres onthe x-axis and passing through the origin is

1) $y^2-x^2-2xy\frac{dy}{dx}=0$

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

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

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

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2010

22. The degree and order of the differential equation $y = x\frac{dy}{dx} + \sqrt{\left(\frac{dy}{dx}\right)^2}$

1) 2 & 1 2) 1 & 2 3) 2 & 2 4) 1 & 1

23. The general solution of differential equation $(x+y)\frac{dy}{dx} + y = 0$ is

1) $(x+y)x^2 = c$ 2) $(x+y)^2 + x^2 = c$

3) $(x+y)^2 - x^2 = c$ 4) $x^2 + y^2 = c$

24. If $y = Ae^x + Be^{2x}$, Where A & B are orbitrary constant, thenthe differential equation is

1) $y_2 + 3y_1 + 2y = 0$ 2) $y_2 + 3y_1 - 2y = 0$

3) $y_2 - 3y_1 - 2y = 0$ 4) $y_2 - 3y + 2y = 0$

25. The complementary solution of $(D^4 + 2D^3 + D^2)y = 0$ is

1) $y = c_1 + c_2x + c_3e^x + c_4xe^x$

2) $y = c_1 + c_2x + c_3e^{-x} + c_4xe^{-x}$

3) $y = c_1 + c_2x + c_3e^{-x} + c_4xe^x$

4) $y = (c_1 + c_2x)e^x + (c_3 + c_4x)e^{-x}$

26. The particular solution of $(D^2 + 4)y = \sin 2x$ is

1) $\frac{-x\cos 2x}{4}$ 2) $\frac{-x\sin 2x}{4}$

3) $\frac{x\cos 2x}{4}$ 4) $\frac{x\sin 2x}{4}$

27. The solution of the differential equation $(x^2 - ay)dx = (ax - y^2)dy$ is

1) $x^3 - 3axy + y^3 + c$

2) $x^3 - 6axy + y^3 + c$

3) $x^3 + y^3 = c$ 4) $x^3 - y^3 = c$

28. The solution of $\frac{1}{D^2 + D + 1}x^2$

1) $x^2 + 2x + 4$ 2) $x^2 + 2x + 2$

3) $x^3 - 2x$ 4) $x^3 - 2x - 4$

29. The solution of $\frac{1}{D-\alpha}e^{ax}$ is

1) $(x-1)e^{ax}$ 2) $(x+1)e^{ax}$

3) xe^{ax} 4) xe^{-ax}

2011

30. The differential equation of the family of curves $y = Ae^x + Be^{-x}$ for different values of A & B is

1) $\frac{d^2y}{dx^2} = y$ 2) $\frac{d^2y}{dx^2} + y = 0$

3) $\frac{d^2y}{dx^2} + \frac{dy}{dx} = 0$

4) $\frac{dy}{dx} + p(x)y = q(x)$

31. Solution of the differential equation $\frac{dy}{dx} = \frac{y^2}{xy - x^2}$ is

1) $y = ce^{xy}$ 2) $ce^{y/x}$

3) $\log y = c$ 4) $e^{x-y} = y$

32. Solution of the differetial equation $\frac{dy}{dx}e^{x-y}(e^x - e^y)$ is

1) $e^y = e^x - 1 + ce^{-e^x}$ 2) $e^{y-x} = -1 + ce^{-e^x}$

3) $e^x + e^y = ce^{-e^x}$ 4) $e^x + e^y = c$

2012

33. The order of $x^3\frac{d^3y}{dx^3} + 2x^2\frac{d^2y}{dx^2} - 3y = x$ is

1) 1 2) 4 3) 3 4) 2

34. The degree of $\left[\frac{d^2y}{dx^2} + \left(\frac{dy}{dx}\right)^2\right]^{\frac{3}{2}} = a\frac{d^2y}{dx^2}$ is

1) 4 2) 2 3) 1 4) 3

35. The family of straight lines passing through the origin is represented by the differential equation

1) $ydx + xdy = 0$ 2) $ydx - xdy = 0$

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3) $xdx+ydy=0$ 4) $xdx-ydy=0$

36. The differential equation $\frac{dy}{dx}+\frac{ax+hy+g}{bx+by+f}=0$ is called
1) Hormogeneous 2) Exact
3) Linear 4) Legender

37. The solution of differential equation $\frac{dy}{dx}=e^{-x^2}-2xy$ is
1) $y.e^{-x^3}=x+c$ 2) $ye^{-x^3}=x+c$
3) $ye^{x^3}=x+c$ 4) $y=x+c$

38. The complenentary function of $\left(D^3+D^2+D+1\right)y=0$ is
1) $c_1\cos x+c_2\sin x+c_3e^{-x}$
2) $c_1\cos x+c_2\sin x+c_3e^{x}$
3) $C_1+C_2\cos x+C_3\sin x$
4) $\left(C_1,C_2,C_3x^2\right)e^x$

39. Particular integral of $\left(D-1\right)^4y=e^x$ is
1) x^4e^x 2) $\frac{x^4}{24}e^{-x}$ 3) $\frac{x^4}{12}e^{x}$ 4) $\frac{x^4}{24}e^{x}$

2013

40. The degree of the differential equation $\left(x^3y'''\right)^4-4x^2\left(y''\right)^8+6xy'-10y=\cos 4x$ is
1) 8 2) 3 3) 4 4) 1

41. The differential equation of the family of circlr with center at the origin is
1) $yy'+x=0$ 2) $xy+y'=0$
3) $xy-y'=0$ 4) $y''+x=0$

42. The solution of $\frac{x+y+1}{2x+2y+2}$ is
1) $2y=c$ 2) $x-2y=c$
3) $y=2y^2+c$ 4) $x^2+y^2=c^2$

43. The solution of $\frac{dy}{dx}+\frac{2y}{x}=\frac{2\cos 2x}{x^2}$ is
1) $xy^2=\cos 2x+c$ 2) $xy=4\sin 2x+c$
3) $xy=4\cos 2x+c$ 4) $x^2y=\sin 2x+c$

44. The solution of the equation $\left(D^2-1\right)^2y=0$ is
1) $y=c_1\cos x+c_2\sin x+c_3e^x+c_4e^{-x}$
2) $y=\left(c_1x+c_2\right)\sin x+\left(c_3e^x+c_4\right)\cos x$
3) $y=c_1+c_2x+c_3e^x+c_4e^{-x}$
4) $y=\left(c_1x+c_2\right)e^x+\left(c_3x+c_4\right)e^{-x}$

45. The paraticular integral of the differential equation $\left(D^4-1\right)y=4\sin x$ is
1) cos x 2) x cos x
3) x sin x 4) sin x

46. The particular integral of the differential equation $\left(D^2-4D+4\right)y=2e^x$ is
1) $2e^x$ 2) x^2e^{2x} 3) xe^{2x} 4) $2xe^{2x}$

2014

47. The differential equation formed by eliminating the arbitrary costants a and b in the relation $y=a\cos\left(nx+b\right)$ is
1) $\frac{d^2y}{dx^2}+n^2y=0$ 2) $\frac{d^3y}{dx^3}+x^3y=0$
3) $\frac{dy}{dx}+ny=0$ 4) $\frac{d^2y}{dx^2}-y=0$

48. The solution of $\frac{dy}{dx}=e^{x-y}$
1) $e^x-e^{-y}+c=0$ 2) $e^xe^{-y}+c$
3) $e^x+e^{-y}+c=0$ 4) $e^x-e^y+e^c=0$

49. The solution of the differential equation $\tan x\frac{dy}{dx}+y=\sec x$ is
1) $y\sin x-x=c$ 2) $y\cot x+x=c$
3) $y=\tan x+c$ 4) $y\,\mathrm{cosec}\,x=x+c$

50. The solution of the linear third order equation $\frac{d^3y}{dx^3}-7\frac{d^2y}{dx^2}16\frac{dy}{dx}-12y=0$
1) $y=c_1e^{3x}+c_2e^x+c_3e^{4x}$

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2) $y = c_1e^{3x} + c_2xe^{x} + c_3e^{4x}$

3) $y = c_1e^{2x} + c_2xe^{3x} + c_3e^{4x}$

4) $y = c_1e^{3x} + (c_2 + c_3x)e^{2x}$

51. If $y_1 = e^{x}$ and $y_2 = e^{-x}$ are two solution of the homogeneous differential equation, then

1) $y_3 = e^{2x}$ and $y_4 = e^{-2x}$ are also solutions of the equation

2) $y_3 = xe^{x}$ and $y_4 = xe^{-x}$ are also solutions of the equation

3) $y_3 = \cos x$ and $y_4 = \sin x$ are also solutions of the equation

4) $y_3 = \cos x$ and $y_4 = \sin x$ are also solutions of the equation

52. The particular integral of (P.I) of the equation

1) $xe^{2x} - 1$ 2) $xe^{2x} + 1$

3) $5xe^{2x} + 1$ 4) $xe^{2x} - 1$

53. The particular integral of $(D^2 + 16)y = 8\cos 4x$ is

1) $\cos 4x$ 2) $x\sin 4x$

3) $-\frac{1}{4}\sin 4x$ 4) $-\frac{1}{4}\cos 4x$

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54. The degree of the differential equation $\left(\frac{dy}{dx}\right)^3\left(\frac{d^2y}{dx^2}\right)^{3/2} + 5x = 0$ is

1) 3 2) 6 3) 1 4) 2

55. The differential equation formed by climinating the arbitrary constant a from $a^2y + ax + 8 = 0$ is

1) $8y_1^2 - xy_1 + y = 0$ 2) $8y_1^2 + xy_1 + y = 0$

3) $8y_1^2 - xy_1 - y = 0$ 4) $8y_1^2 + 2xy_1 - y = 0$

56. Solution of the equation $(1 + y^2)dx + (1 + x^2)dy = 0$ is

1) $\tan^{-1}x + \tan^{-1}y = c$

2) $\tan^{-1}x + \tan^{-1}y = 0$

3) $y + \frac{y^3}{3} + x + \frac{x^3}{3} = c$

4) $\sin^{-1}x + \sin^{-1}y = 0$

57. The solution of the differential equation $\frac{dy}{dx} + \frac{y}{x} = x^2$ under the condition that y = 1 when x = 1 is

1) $4xy = x^3 + 3$ 2) $4xy = x^4 + 3$

3) $4xy = y^3 + 3$ 4) $4xy = y^4 + 3$

58. The particular integral of $(D^2 + a^2)y = \cos ax$ is

1) $xe^{\frac{-x}{3}}$ 2) $e^{\frac{-x}{3}}$ 3) $-x^{\frac{-x}{3}}$ 4) $xe^{\frac{x}{3}}$

59. The complimentary function of $(D^2 + 4D + 5)y = 13e^{x}$ is

1) $e^{-2x}(c_1\cos x + c_2\sin x)$

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

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

4) $e^{-x}(c_1\cos 2x + c_2 2\sin x)$

60. The particular integral of $(D^2 - 2D + 1)y = \cosh x$ is

1) $\frac{x^2e^{x}}{4} + \frac{e^{-x}}{8}$ 2) $\frac{x^2e^{-x}}{4} + \frac{e^{-x}}{8}$

3) $\frac{x^2e^{x}}{4} - \frac{e^{-x}}{8}$ 4) $\frac{x^2e^{-x}}{4} - \frac{e^{-x}}{8}$

61. Differentail equation corresponding to $y = \sqrt{5x + c}$ is

1) $y^2 = 5x + c$ 2) $y = \frac{2.5}{\sqrt{5x + c}}$

3) $yy = 5$ 4) $yy = 2.5$

62. The differential equation $(y')^2 + 5y^{1/3} = x$ is

1) linear of order 1 and degree 2
2) non-linear of order 1and degree 2
3) linear of order 1 and degree 6
4) non-linear of order 1 and degree 6

63. The differential equation $(x + x^8 + ay^2)dx +$

$(y^8 - y + bxy)dy = 0$ is exact if

1) $b = a$ 2) $b = 2a$

3) $a = 1, b = 3$ 4) $b \neq 2a$

64. Complementary fucntion of $y'' + 4y = 0$ is

1) $\cos 2x + \sin 2x$ 2) $C_1 \cos 2x + C_2 \sin x$

3) $C_1 \cos x + C_2 \sin x$ 4) $C_1 \cos 4x + C_2 \sin 4x$

65. Integrating factor of differential equation $x^2 y' = 3x^2 - 2xy + 1$ is

1) x 2) $\frac{1}{x}$ 3) $\frac{1}{x^2}$ 4) x^2

66. Particular integral of $(D^2 + 4)y = \cos 2x$ is

1) $\frac{\sin 2x}{4}$ 2) $\frac{\cos 2x}{4}$

3) $\frac{x \sin 2x}{4}$ 4) $\frac{x \cos 2x}{4}$

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67. The particular integral of $(D^2 + 5D + 6)y = e^x$ is

1) $\frac{-e^{-x}}{12}$ 2) $\frac{e^{2x}}{12}$ 3) $\frac{e^x}{12}$ 4) $\frac{e^x}{6}$

68. Form the differential equation by eliminating the arbitrary constant a from $ay^2 = x^3$

1) $\frac{dy}{dx} = \frac{3y}{2x}$ 2) $\frac{dy}{dx} = \frac{2x}{3y}$

3) $\frac{dy}{dx} = \frac{x}{y}$ 4) $\frac{dy}{dx} = \frac{2y}{x}$

69. The solution of $\frac{dy}{dx} + y = e^{-x}$ is

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

3) $(x + c)e^x$ 4) $(x + c)e^{-2x}$

70. The complementary function of $(D^2 + 3D + 2)y = 8 \sin 5x$ is

1) $c_1 e^{-x} + c_2 e^{-2x}$ 2) $c_1 e^x + c_2 e^{2x}$

3) $c_1 e^{-x} + c_2 e^{2x}$ 4) $c_1 e^{2x} + c_2 e^{3x}$

71. The solution of exact differential equation $2xy\,dx + x^2 dy = 0$ is

1) $x^2 y^2 = c$ 2) $x^2 y = c$

3) $x^3 y = c$ 4) $x^3 y^3 = c$

72. Form the differential equation representing the family of curves $x^2 = 4ay$, where a is any arbitrary constant

1) $x\frac{dy}{dx} - 2y = 0$ 2) $x\frac{dy}{dx} + 2y = 0$

3) $x\frac{dy}{dx} - 6y = 0$ 4) $x\frac{dy}{dx} - y = 0$

73. The solution of $\frac{dy}{dx} + y \cot x = \cos x$ is

1) $y \sin x = \frac{-\cos 2x}{4} + c$

2) $y \sin x = \frac{\cos 2x}{4} + c$

3) $y \sin x = \frac{-\cos 5x}{4} + c$

4) $y \cos x = \frac{-\cos 2x}{4} + c$

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74. The differential equation $x\frac{dy}{dx} = y + x^2$, $x > 0$ satisfying $y(0) = 0$ has _____

1) infinitely many solutions
2) no solution
3) a unique solution
4) exactly two solutions

75. The differential equation $(axy^3 + y \cos x)dx + (x^2 y^2 + b \sin x)dy = 0$ is an exact differential equation for _____

1) $a = 1, b = \frac{3}{2}$ 2) $a = \frac{3}{2}, b = 1$

3) $a=\frac{2}{3}, b=1$ 4) $a=1, b=\frac{2}{3}$

76. If $\sin x$ is a solution of the differential equation $\frac{d^4y}{dx^4}+2\frac{d^3y}{dx^3}+6\frac{d^2y}{dx^2}+2\frac{dy}{dx}+5y=0$, then the general solution is _____

1) $y=c_1\sin x+c_2\cos x+e^{-x}(c_3\sin 2x+c_4\cos 2x)$

2) $y=c_1\sin x+c_2\cos x+c_3\sin 2x+c_4\cos 2x$

3) $y=c_1\sin x+c_2\cos x+c_3e^{-3x}+c_4e^{-2x}$

4) $y=c_1\sin x+c_2\cos x+c_3e^{3x}+c_4e^{2x}$

77. If $D=\frac{d}{dx}$, then $\frac{1}{D^2-4D+13}\left(6e^{2x}\sin 3x\right)$ is _____

1) $-xe^{2x}\cos 3x$ 2) $xe^{2x}\cos 3x$

3) $-xe^{2x}\sin 3x$ 4) $xe^{2x}\sin 3x$

78. The general solution of $\left(\frac{e^{-2\sqrt{x}}}{\sqrt{x}}-\frac{y}{\sqrt{x}}\right)\frac{dx}{dy}=1$ is _____

1) $y=e^{2\sqrt{x}}\left(2\sqrt{x}+c\right)$

2) $y=2\sqrt{x}\,e^{2\sqrt{x}}+c$

3) $y=2\sqrt{x}\,e^{-2\sqrt{x}}+c$

4) $y=e^{-2\sqrt{x}}\left(2\sqrt{x}+c\right)$

79. Let y be the solution of the differential equation $\frac{dy}{dx}+y=x$, $x\in\mathbb{R}$ and $y(-1)=0$, then $y(1)$ is equal to _____

1) $\frac{2}{e}-\frac{2}{e^2}$ 2) $2e^{-2}$ 3) $2-\frac{2}{e}$ 4) $2-2e$

80. If the substitution $x=X+h$, $y=Y+k$ transforms the differential equation $(y-x+1)dy-(y+x+2)dx=0$ into a homogeneous equation, then the value of (h,k) is

1) $\left(\frac{1}{2},\frac{3}{2}\right)$ 2) $\left(\frac{-1}{2},\frac{-3}{2}\right)$

3) $\left(\frac{3}{2},\frac{1}{2}\right)$ 4) $\left(\frac{-3}{2},\frac{-1}{2}\right)$

81. The general solution of $\frac{dy}{dx}-y=y^2(\sin x+\cos x)$ is _____

1) $y=\frac{1}{ce^x-\sin x}$ 2) $y=ce^{-x}-e^x\sin x$

3) $y=ce^{-x}-\sin x$ 4) $y=\frac{1}{ce^{-x}-\sin x}$

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82. The order and degree of the differential equation $y=x\frac{dy}{dx}+\frac{3}{\frac{dy}{dx}}$ is

1) 1, 2 2) 2, 1 3) 1, 1 4) 2, 2

83. The differential equation $y\frac{dy}{dx}+x=a$ represents

1) a set of circles whose centers are on the x-axis

2) a set of circles whose centers are on the y-axis

3) a set of parabola

4) a set of ellipses

84. Solution of $\frac{dy}{dx}+\sqrt{\frac{1-y^2}{1-x^w}}=0$ is

1) $\sin^{-1}x+\sin^{-1}y=c$

2) $\sin^{-1}x-\sin^{-1}y=c$

3) $\sinh^{-1}x+\sinh^{-1}y=c$

4) $\tan^{-1}x+\sin^{-1}y=c$

85. Particular solution of $\left(D^2-D-2\right)y=\sin 2x$ is

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1) $\frac{\cos 2x - 3\sin 2x}{20}$ 2) $\frac{\cos x}{2}$

3) $\frac{\sin x}{2}$ 4) $\frac{x\sin 2x}{8}$

86. The integrating factor of $y(xy + 2x^2y^2)dx + x(xy - x^2y^2) = 0$ is

1) $\frac{1}{3x^3y^3}$ 2) $\frac{1}{x^3}$ 3) $\frac{1}{y^3}$ 4) $\frac{3}{x^3y^3}$

87. If $y = Ae^x + Be^{2x}$, where A and B are arbitrary constants, then the differential equation is

1) $y_2 + 3y_1 + 2y = 0$ 2) $y_2 - 3y_1 - 2y = 0$

3) $y_2 + 3y_1 - 2y = 0$ 4) $y_2 - 3y_1 + 2y = 0$

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88. The orer of the differential equation corresponding to $y = Ae^x + Be^{3x} + Ce^{5x}$, where A, B, C are parameters is

1) 2 2) 3 3) 4 4) 6

89. The general solution of the differential equation $(xy + x^3y)dy - (1 + y^2)dx = 0$, is

1) $(1+x^2)(1+y^2) = Ce^{x^2}$

2) $(1+x^2)/(1+y^2) = Ce^{x^2}$

3) $(1+x^2)(1+y^2) = Cx^2$

4) $(1+x^2)/(1+y^2) = Cx^2$

90. The solution of the equation

$$xdy - \left(y - x\cos^2\frac{y}{x}\right)dx = 0,\ x > 0,\ y > 0$$

which passes through the point $\left(1, \frac{\pi}{4}\right)$ is

1) $\frac{4y}{\pi} - e^{1-\tan\left(\frac{y}{x}\right)}$ 2) $x = e^{1-\tan\left(\frac{y}{x}\right)}$

3) $x = e^{-\tan\left(\frac{y}{x}\right)}$ 4) $y = \frac{\pi e}{4} - e^{-\tan\left(\frac{y}{x}\right)}$

91. The differential equation of a family of all circles passing through the origin and having centres on the x-axis is

1) $y' = \frac{x^2 + y^2}{2xy}$ 2) $y' = \frac{2xy}{x^2 - y^2}$

3) $y' = \frac{y^2 - x^2}{2xy}$ 4) $y' = 2xy(x^2 + y^2)$

92. An integrating factor of the differential equation $(e^{-2\sqrt{x}} - y)dx - \sqrt{x}dy = 0$ is

1) $\frac{e^{-2\sqrt{x}}}{\sqrt{x}}$ 2) $e^{-2\sqrt{x}}$ 3) $\frac{e^{2\sqrt{x}}}{\sqrt{x}}$ 4) $e^{-2\sqrt{x}}$

93. Which of the following equations can be made exact by multiplying by x^2?

1) $\frac{dy}{dx} + \frac{2}{x}y = 4$ 2) $\frac{dy}{dx} + 3y = x$

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

94. A particular integral of $(D-2)^2 y = 8(e^{2x} + \sin 2x)$ is

1) $4x^2e^{2x} + \cos 2x$ 2) $x^2e^{2x} + \cos 2x$

3) $4xe^{2x} - \cos 2x$ 4) $4x^2e^x + \cos 2x$

95. The complementary function of $x^2\frac{d^2y}{dx^2} + 4x\frac{dy}{dx} + 2y = e^x$ is

1) $C_1e^{-x} + C_2e^{-2x}$ 2) $C_1x^{-1} + C_2x^{-2}$

3) $C_1e^x + C_2e^{2x}$ 4) $C_1x^1 + C_2x^2$

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96. The differential equation of the family of curves $y = Ae^{3x} + Be^{-2x}$, where A and B are arbitrary constants, is

1) $\frac{d^2y}{dx^2} - 5\frac{dy}{dx} + 6y = 0$

2) $\frac{d^2y}{dx^2} - \frac{dy}{dx} + 6y = 0$

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3) $\frac{d^2y}{dx^2}+\frac{dy}{dx}-6y=0$

4) $\frac{d^2y}{dx^2}-\frac{dy}{dx}-6y=0$

97. The general solution of the differential equation $\frac{dy}{dx}=e^{x+y}$ is

1) $e^x+e^y=c$ 2) $e^x-e^y=c$

3) $e^{x+y}+ce^y+1=0$ 4) $e^{x+y}=ce^y+1$

98. The general solution of the differential equation $\frac{dy}{dx}-\frac{3y}{x}=\frac{2y^2}{x^2}$ is

1) $y=cx^2(x+y)$ 2) $\frac{y}{x-y}=cx^2$

3) $y=cx(x+y)$ 4) $y=cx(x-y)$

99. The general solution of the differential equation $\frac{dy}{dx}-\frac{2y}{x}=x^2e^{2x}$ is

1) $2y=xe^{2x}+2cx^2$ 2) $2y=x^2e^{2x}+2cx^2$

3) $y=2x^2e^{2x}+cx^2$ 4) $y=x^2e^{2x}+cx$

100. The general solution of the differential equation $\frac{dy}{dx}+y\cot x=y^3\sin^2 x$ is

1) $2x^2y+\csc^2 x=cy$

2) $2xy^2+\sin^2 x=cy^2$

3) $2xy^2+\csc^2 x=cy^2$

4) $2xy+\csc^2 x=cy^2$

101. The particular integral of the differential equation $(D^2-3D+2)y=e^{3x}$ is

1) $\frac{1}{20}e^{3x}$ 2) $\frac{1}{16}e^{3x}$ 3) $\frac{1}{3}e^{3x}$ 4) $\frac{1}{2}e^{3x}$

102. The particular integral of the differential equation $(D^2+9)y=\sin 3x$ is

1) $-\frac{x\cos 3x}{6}$ 2) $\frac{x\cos 3x}{6}$

3) $-\frac{x\sin 3x}{6}$ 4) $\frac{x\sin 3x}{6}$

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103. If p and q respectively are order and degree of the differential equation $y^2\left(\frac{d^2y}{dx^2}\right)+3x\left(\frac{dy}{dx}\right)^{\frac{1}{3}}=\sin x-x^2y^2$ then $pq=$

1) 2 2) 6 3) 15 4) 12

104. The equation of the curve passing through the origin and satisfying the differential equation $\frac{dy}{dx}=\frac{x-y}{x+y}$ is

1) $x^2-y^2-2xy=0$ 2) $x^2-y^2+2xy=0$

3) $x^2+y^2-2xy=0$ 4) $x^2+y^2+2xy=0$

105. The solution of the differential equation $\frac{dy}{dx}-ky=0$, $y(0)=1$, approach zero as $x\to\infty$, when

1) $k=0$ 2) $k>0$

3) $k<0$ 4) k is any real number

106. The general solution of the differential equation $x\frac{dy}{dx}+y=x^3y^6$ is

1) $(5x^3-cx^5)=2$ 2) $(5x^5-cx^3)y^5=2$

3) $(5x^5+cx^3)y^5=2$ 4) $(5x^3+cx^5)y^5=2$

107. If the particular integral of $\frac{d^2y}{dx^2}-6\frac{dy}{dx}+13y=8e^{3x}\sin 2x$ is equal to $f(x)$ times the particular integral of $\frac{d^2y}{dx^2}+4y=\sin 2x$, then $f(x)=$

1) e^{2x} 2) $8e^{3x}$

3) $8\sin 2x$ 4) $8e^{3x}\sin 2x$

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108. The particular integral of $\frac{d^2y}{dx^2}+4y=-4\cos 2x$ is

1) $-x\sin 2x$ 2) $\frac{-x\sin 2x}{2}$

3) $\frac{-x\cos 2x}{2}$ 4) $-x\cos 2x$

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109. The degree of the differential equation $a^2\frac{d^2y}{dx^2}=\left[1+\left(\frac{dy}{dx}\right)^2\right]^{\frac{3}{2}}$ is

1) 2 2) 1 3) 3 4) 4

110. $\log\left(\frac{y}{x}\right)=cx$, where c is arbitrary constant is a solution of the differential equation

1) $\log\left(\frac{y}{x}\right)=\frac{x}{y}\frac{dy}{dx}-1$

2) $\log\left(\frac{x}{y}\right)=\frac{x}{y}\frac{dy}{dx}-1$

3) $\log\left(\frac{x}{y}\right)=\frac{x}{y}\frac{dy}{dx}+1$

4) $\frac{dy}{dx}=1+\log\left(\frac{y}{x}\right)$

111. The solution of the differential equation $\cos\theta dr-r\sin\theta d\theta=0$ is

1) $r\cos\theta=c$, c - arbitrary constant

2) $r\sin\theta=c$, c - arbitrary constant

3) $r\cos\theta+r\sin\theta=c$, c - arbitrary constant

4) $r^2\cos 2\theta=c$, c - arbitrary constant

112. The degree of $\left(\frac{d^2y}{dx^2}\right)^2+\left(\frac{dy}{dx}\right)^2=x\sin\frac{dy}{dx}$ is

1) 1 2) 2 3) 3 4) not defined

113. The complimentary function of the differential equation $\frac{d^2y}{dx^2}+4\frac{dy}{dx}-3y=e^{2x}$ is

1) $x=c_1e^{-y}+c_2e^{-3y}$, $c_1\cdot c_2$ – arbitrary constants

2) $y=c_1e^{-x}+c_2e^{-3x}$, $c_1\cdot c_2$ – arbitrary constants

3) $y=c_1e^{x}+c_2e^{3x}$, $c_1\cdot c_2$ – arbitrary constants

4) $x=c_1e^{y}+c_2e^{3y}$, $c_1\cdot c_2$ – arbitrary constants

114. The particular integral of $\left(D^2+4\right)y=\cos 2x$ is

1) $-\frac{1}{2}x\sin 2x$ 2) $\frac{1}{2}x\sin 2x$

3) $-\frac{1}{4}x\cos 2x$ 4) $\frac{1}{4}x\sin 2x$

115. The integrating factor of the equation $x^2ydx-\left(x^3+y^3\right)dy=0$ is

1) $-\frac{1}{x^4}$ 2) $\frac{1}{x^4}$ 3) $\frac{1}{y^4}$ 4) $-\frac{1}{y^4}$

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116. The order and degree of the differential equation $\frac{d^2y}{dx^2}=\left(1+\left(\frac{dy}{dx}\right)^2\right)^{\frac{1}{3}}$ is

1) 1, 6 2) 2, 3 3) 2, 2 4) 3, 2

117. $x=a\sin\left(\omega t+b\right)$ is a solution of

1) $\frac{dx}{dt}+\omega x=0$ 2) $\frac{d^2x}{dt^2}-\omega^2x=0$

3) $\frac{d^2x}{dt^2}+\omega^2x=0$ 4) $\frac{dx}{dt}-\omega x=0$

118. The solution of the differential equation $y-x\frac{dy}{dx}=a\left(y^2+\frac{dy}{dx}\right)$ is

1) $y=k\left(a+x\right)\left(ay-1\right)$

2) $y=k\left(a+x\right)\left(1-ay\right)$

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3) $y=k(ax+1)(y-1)$

4) $y=k(ax-1)(y^2-1)$

119. The solution of the differential equation $\frac{dy}{dx}=x^3-2xy$ satisfying the condition $y(1)=2$ is

1) $x^2+2y+1=4e^{1-x^2}$

2) $2y-x^2+1=4e^{1+x^2}$

3) $2y-x^2+1=4e^{1-x^2}$

4) $x^2-2y+1=4e^{1-x^2}$

120. The solution of $\frac{d^3y}{dx^3}+3\frac{d^2y}{dx^2}-4y=0$ is

1) $y=C_1e^{-x}+(C_2+C_3x)e^{2x}$

2) $y=C_1e^{x}+(C_2+C_3x)e^{-2x}$

3) $y=C_1e^{x}+C_2e^{-x}+C_3e^{2x}$

4) $y=C_1e^{-x}+e^{2x}(C_2\cos 2x+C_3\sin 2x)$

121. The particular integral of $\frac{d^2y}{dx^2}-3\frac{dy}{dx}+2y=(e^x+1)^2$ is

1) $xe^{2x}-2xe^{x}+\frac{1}{2}$ 2) $xe^{2x}-2xe^{x}-1$

3) $xe^{2x}+2xe^{x}+1$ 4) $xe^{2x}-2xe^{x}-\frac{1}{2}$

122. The particular integral of $\frac{d^3y}{dx^3}+2\frac{d^2y}{dx^2}+\frac{dy}{dx}=\sin 2x$ is

1) $\frac{1}{50}(3\cos 2x+4\sin 2x)$

2) $\frac{1}{50}(3\cos 2x+2\sin 2x)$

3) $\frac{1}{50}(3\cos 2x-4\sin 2x)$

4) $\frac{1}{50}(3\cos 2x-2\sin 2x)$

123. The particular integral of $\frac{d^2y}{dx^2}-y=x^2$ is

1) $-(x^2+2)$ 2) x^2-2

3) (x^2+2) 4) $2-x^2$

PREVIOUS ECET BITS KEY

1) 2	2) 4	3) 1	4) 2	5) 3
6) 1	7) 3	8) 2	9) 2	10) 3
11) 1	12) 2	13) 1	14) 4	15) 1
16) 4	17) 4	18) 1	19) 1	20) 3
21) 1	22) 1	23) 3	24) 4	25) 2
26) 1	27) 1	28) 3	29) 3	30) 1
31) 2	32) 1	33) 3	34) 2	35) 2
36) 2	37) 3	38) 1	39) 4	40) 3
41) 1	42) 2	43) 4	44) 4	45) 2
46) 1	47) 1	48) 4	49) 1	50) 4
51) 3	52) 1	53) 2	54) 1	55) 1
56) 1	57) 2	58) 1	59) 1	60) 1
61) 4	62) 4	63) 2	64) 2	65) 4
66) 3	67) 3	68) 1	69)1	70) 1
71) 2	72) 1	73) 1	74) 1	75) 3
76) 1	77) 1	78) 4	79) 2	80) 2
81) 4	82) 1	83) 1	84) 1	85) 1
86) 1	87) 4	88) 2	89) 3	90) 2
91) 3	92)	93) 1	94) 1	95) 2
96) 4	97) 3	98) 1	99) 2	100) 3
101) 4	102) 1	103) 2	104) 1	105) 3
106) 4	107) 2	108) 1	109) 4	110) 1
111) 3	112) 1	113) 1	114) 1	115) 4
116) 2	117) 3	118) 2	119) 3	120) 2
121) 1	122) 3	123) 1		

AREAS & VOLUME OF SOLIDS

2019 - AP ECET

1. The area enclosed between the curve $y^2=4ax$ and the line $x=2y$ is

1) $\frac{64}{5}$ sq. units 2) $\frac{64}{3}$ sq. units

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3) $\frac{65}{4}$ sq. units 4) $\frac{63}{4}$ sq. units

2019 - TS ECET

2. The area of the region bounded by the curves $y=2-x^2$ and $y=-x$ is _____

1) 1 2) $\frac{8}{19}$ 3) $\frac{35}{4}$ 4) $\frac{27}{6}$

3. The volume of the solid obtained by revolving the region bounded by the curves $y=x^3$, $y=8$ and $x=0$ abount the y-axis is _____

1) $\frac{96}{5}$ 2) $\frac{96\pi}{5}$ 3) $\frac{32\pi}{5}$ 4) $\frac{32}{5}$

2020 - AP ECET

4. The area enclosed by the curve $|x|+|y|=1$ is

1) 2 2) π 3) π^2 4) 1

5. $\int_a^b f(x)dx$ represents

1) the area bounded by the curve and the x-axis
2) the area bounded by the curve and the ordinates $x=a$, $x=b$
3) the area bounded by the curve, the x-axis and the ordinates $x=a$,
4) the area not bounded by the curve

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6. The area (in square units) of one of the curvilinear triangles bounded by $y=\sin x$, $y=\cos x$, $x=0$, $x=\frac{\pi}{2}$ a and x-axis is

1) $2\sqrt{2}$ 2) $2+2\sqrt{2}$
3) $2-2\sqrt{2}$ 4) $\sqrt{2}$

7. Let V_1 be the volume of the solid formed by the revolution of the part of the parabola $y^2=4ax$ cut off by the latus-rectum about the y-axis. Then $V_1=$

1) $\frac{2\pi a^3}{5}$ 2) $\frac{4\pi a^3}{5}$ 3) $\frac{8\pi a^3}{5}$ 4) πa^3

8. The root mean square value of the sine function $f(t)=A\sin t$ on $[0,2\pi]$ is

1) $A\sqrt{2}$ 2) $\frac{A}{\sqrt{2}}$ 3) A 4) $2A$

9. The approximate value of $\int_0^4 f(x)dx$, from the following table as sum of areas of 4 trapeziums is

x	0	1	2	3	4
$f(x)$	1	0.5	0.2	0.1	0.05884

1) 1.31212 2) 1.32942
3) 1.33212 4) 1.32121

2021 -AP ECET

10. The area enclosed between the x-axis and the curve $y=(x-2)^2-9$ is

1) 54 2) $\frac{320}{3}$ 3) 36 4) $\frac{124}{3}$

11. The volume formed when the area bounded by the parabola $y^2=8x$, the x-axis nd the ordinates at $x=0$ and $x=2$ rotates about the x-axis is (in cubic units)

1) 4π 2) 8π 3) 32π 4) 16π

12. Mean value of $\frac{1}{4+x^2}$ on $[-2,2]$ is

1) $\frac{\pi}{4}$ 2) $\frac{\pi}{8}$ 3) $\frac{\pi}{32}$ 4) $\frac{\pi}{16}$

13. Root Mean Square value of $\sqrt{9-2x^2}$ over the range $x=0$ to $x=3$ is

1) $\sqrt{3}$ 2) 3 3) $\sqrt{6}$ 4) 9

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14. The area bounded by the curve $y=(x-1)(x-2)(x-3)$ and x-axis lying

between $x=1$ and $x=3$ is

1) $\frac{5}{2}$ 2) $\frac{11}{2}$ 3) $\frac{1}{2}$ 4) $\frac{7}{4}$

15. The area of the region bounded by the curves $y=\sin x$ and $y=\cos x$, x-axis $x=0$ and $x=\frac{\pi}{2}$ is

1) twice the area between $y=(\sin x-\cos x)$, x-axis, $x=0$ and $x=\frac{\pi}{4}$

2) equal to the area between $y=\sin x$, x-axis, $x=0$ and $x=\frac{\pi}{4}$

3) equal to the area between $y=(\sin x+\cos x)$, x-axis, $x=0$ and $x=\frac{\pi}{2}$

4) twice the area between $y=\sin x$, x-axis, $x=0$ and $x=\frac{\pi}{4}$

16. The value of a function f at different points are given in the following table

x	0	1	2	3	4	5	6
$f(x)$	0	1	1.4114	1.732	2	2.236	2.449

The approximate value of $\int_0^6 f(x)\,dx =$

1) 8.516 2) 9.716 3) 9.125 4) 9.203

17. The area of the region enclosed by the curve $y=x\sin x$ and the x-axis between $x=0$ and $x=2\pi$ is _____ sq. units

1) 2π 2) 3π 3) 4π 4) $\frac{3\pi}{4}$

18. The volume generated by the rotation of the area bounded by the curve $y=e^x\sin x$, the x-axis and the lines $x=0$, $x=\pi$ about x-axis is _____ cu. units

1) $\frac{\pi}{6}(e^{2\pi}-1)$ 2) $\frac{\pi}{8}(e^{2\pi}-1)$

3) $\frac{\pi}{8}(e^{\pi}-1)$ 4) $\frac{\pi}{8}(e^{2\pi}+1)$

19. The mean value of the function $f(x)=\frac{2}{e^x+1}$ on the interval $[0,2]$ is

1) $\log\left(\frac{2}{e^2+1}\right)$ 2) $1+\log\left(\frac{2}{e^2+1}\right)$

3) $2+\log\left(\frac{2}{e^2+1}\right)$ 4) $2+\log(e^2+1)$

20. The values of abscissa (x) and ordinates (y) of a curve are as follows

x	2.0	2.5	3.0	3.5	4.0
y	5.00	7.25	10.00	13.25	17.00

then the area under the curve (round off to two decimal places) is

1) 20.45 2) 20.47 3) 20.67 4) 20.57

PREVIOUS ECET BITS KEY

01) 2	02) 4	03) 2	04) 1	05) 3
06) 3	07) 2	08) 2	09) 2	10) 3
11) 4	12) 4	13) 1	14) 3	15) 4
16) 2	17) 1	18) 2	19) 3	20) 3

LAPLACE TRANSFORMS

2019 - TS ECET

1. The Laplace transform of the function $f(t)=\begin{cases}\sin t, & \text{for } 0\le t\le\pi\\ 0, & \text{for } t>\pi\end{cases}$ is _____

1) $\frac{1}{(1+s^2)}$ for all $s>0$

2) $\frac{1}{(1+s^2)}$ for all $s<\pi$

3) $\frac{(1+e^{-\pi s})}{(1+s^2)}$ for all $s>0$

4) $\frac{e^{-\pi s}}{(1+s^2)}$ for all $s>0$

2. The inverse Laplace transform $\frac{5}{s}-\frac{3e^{-3s}}{s}-\frac{2e^{-7s}}{s}$ is _____

1) $f(x)=\begin{cases}5, & 0<x<3\\ 0, & 3<x<7\\ 2, & x>7\end{cases}$

2) $f(x)=\begin{cases}5, & 0<x<7\\ 2, & x>7\end{cases}$

3) $f(x)=\begin{cases}5, & 0<x<3\\ 2, & 3<x<7\\ 0, & x>7\end{cases}$

4) $f(x)=\begin{cases}5, & 0<x<7\\ 0, & x>7\end{cases}$

3. The Laplace transform of a function $f(x)$ is $F(s)=\frac{1}{s^3+2s^2+2s}$ then $\lim_{x\to 0} f(x)=$

1) 0 2) 3 3) ∞ 4) $\frac{1}{2}$

4. The Laplace transform of the solution of the differential equation $\frac{dy}{dx}-2y=e^{5x}$ with the initial condition $y(0)=3$ is _____

1) $\frac{1}{3(s-2)}+\frac{1}{3(s-5)}$

2) $\frac{8}{3(s-2)}+\frac{1}{s-5}$

3) $\frac{8}{3(s-2)}+\frac{1}{3(s-5)}$

4) $\frac{8}{s-2}+\frac{1}{3(s-5)}$

5. If $L(y(x))=Y(s)$ and $y(x)=x^3+\int_0^x \sin(x-t)y(t)\,dt$ then $\frac{1}{6}Y(s)=$ _____

1) $\left(\frac{1}{s^4}+\frac{1}{s^6}\right)$ 2) $\left(\frac{1}{s^3}+\frac{1}{s^5}\right)$

3) $\left(\frac{1}{s^3}+\frac{1}{s^7}\right)$ 4) $\left(\frac{1}{s}+\frac{1}{s^3}\right)$

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6. Let $f(t)=t^2e^{-3t}$, $t\geq 0$. Then the Laplace transform of f is

1) $\frac{2}{(s+3)^3}$ 2) $\frac{2}{(s-3)^3}$

3) $\frac{3}{(s+3)^3}$ 4) $\frac{-3}{(s+3)^3}$

7. Let $f(t)=t\sin t$, $t\geq 0$, then the Laplace transform of f is

1) $\frac{2s}{(1+s^2)^2}$ 2) $\frac{2s}{(1+s^2)^3}$

3) $\frac{-2s}{(1+s^2)^2}$ 4) $\frac{-2s}{(1+s^2)^3}$

8. The inverse Laplace transform of $\frac{3}{s^2-9}$ is

1) e^{3t} 2) e^{-3t} 3) $\cos 3t$ 4) $\sinh 3t$

9. The inverse Laplace transform of $\frac{1}{s^2(s^2+1)}$ is

1) $t-\sin t$ 2) $t+\sin t$
3) $2t-\sin t$ 4) $2t+\sin t$

10. If $\frac{dx}{dt}+3x=0$, $x(0)=1$ and $X(s)$ is Laplace

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transform of $x(t)$, then $\frac{d}{ds}X(s) =$

1) $\frac{1}{(s-3)^2}$ 2) $\frac{-1}{(s+3)^2}$

3) $\frac{1}{s+3}$ 4) $\frac{-1}{s-3}$

11. If $X(s)$ is Laplace transform of $x(t)$ and $t\frac{dx}{dt}+x(t)=\sin t$, then $\frac{d}{ds}X(s) =$

1) $\frac{1}{s^2+1}$ 2) $\frac{1}{s(s^2+1)}$

3) $\frac{s}{s^2+1}$ 4) $-\frac{s}{s^2+1}$

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12. The Laplace transform of the function $f(t)=|t-1|+|t+1|$, $t\geq 0$ is

1) $\frac{2}{s}(s+e^{-s})$ 2) $\frac{2}{s^2}(s+e^{-s})$

3) $\frac{2}{s^2}(s-e^{-s})$ 4) $\frac{2}{s}(s-e^{-s})$

13. If $L\{F(t)\}=\frac{2s+5}{s^2+2s-3}$ then $L\{F(2t)\} =$

1) $\frac{2s+10}{s^2+4s-12}$ 2) $\frac{2s+10}{s^2+4s+12}$

3) $\frac{2s+10}{s^2+6s-12}$ 4) $\frac{s+5}{s^2+4s-12}$

14. The Laplace transform of

$$f(t)=\begin{cases}0, & 0<t\leq 1\\ (t-1), & 1<t<2\\ 1, & t\geq 2\end{cases}$$

1) $\frac{e^{-s}+e^{-2s}}{s^2}$ 2) $\frac{e^{-s}-e^{-2s}}{s}$

3) $\frac{e^{-s}-e^{-2s}}{s^2}$ 4) $\frac{e^{-2s}-e^{-2s}}{s^2}$

15. $L^{-1}\left\{\frac{3s+1}{(s+1)^4}\right\}=e^{-t}F(t)$ then $F(1) =$

1) $\frac{1}{6}$ 2) $\frac{1}{3}$ 3) $\frac{7}{6}$ 4) $\frac{5}{6}$

16. If $L(f(t))=\left\{\frac{1}{(s+4)^{\frac{5}{2}}}\right\}$, then $f(t)$ is

1) $\frac{4}{3\sqrt{\pi}}e^{-4t}t^{\frac{3}{2}}$ 2) $\frac{4}{3\sqrt{\pi}}t^{\frac{3}{2}}$

3) $\frac{4}{3\sqrt{\pi}}e^{4t}t^{\frac{3}{2}}$ 4) $\frac{4}{3\sqrt{\pi}}e^{-4t}t^{\frac{5}{2}}$

17. If $y=y(t)$ satisfies the differential equation $y'''+2y''-y'-2y=0$ together with the conditions $y(0)=y'(0)=0$, $y''(0)=3$, then the Laplace transform of $y(t)$ is equal to

1) $\frac{3}{(s^2-1)(s-2)}$ 2) $\frac{3}{(s^2-1)(s+2)}$

3) $\frac{3}{(s^2+1)(s+2)}$ 4) $\frac{3}{(s^2+1)(s-2)}$

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18. $L\left\{\left(e^{3t}-e^{-3t}\right)^2\right\} =$

1) $\frac{2s}{s^2-36}+\frac{2}{s}$ 2) $\frac{s}{s^2-36}-\frac{1}{s}$

3) $\frac{2s}{s^2-36}-\frac{2}{s}$ 4) $\frac{s}{s^2-36}+\frac{1}{s}$

19. Which of the following is FALSE

1) $L\{te^t\}=\frac{1}{(s-1)^2}$

2) If $L\{f(t)\}=F(s)$ then

$L\{f(at)\}=\frac{1}{a}F\left(\frac{s}{a}\right)$

3) If $L\{f(t)\}=F(s)$ then

$L\{e^{at}f(t)\}=F(s+a)$

4) If $L\{f(t)\}=F(s)$ then

$L\{f(t-T)\}=e^{-st}F(s)$

20. $L\{te^{-t}\sin 3t\}=$

1) $\frac{6s}{s^2+2s+10}$ 2) $\frac{6(s+1)}{(s^2+2s+10)^2}$

3) $\frac{6(s-1)}{s^2+2s+10}$ 4) $\frac{6(s-1)}{(s^2+2s+10)^2}$

21. $L\left\{\frac{\cos 2t-\cos 3t}{t}\right\}=$

1) $\sqrt{\log\left(\frac{s^2+9}{s^2+4}\right)}$ 2) $e^{\frac{s^2+9}{s^2+4}}$

3) $\log\left(\frac{s^2+9}{s^2+4}\right)$ 4) $\log\sqrt{\frac{s^2+9}{s^2+4}}$

22. $L^{-1}\left\{\frac{2s+3}{s^2+2s+2}\right\}=$

1) $e^{-t}(2\cos t+\sin t)$ 2) $e^{-t}(2\sin t+\cos t)$

3) $e^{t}(2\cos t+\sin t)$ 4) $e^{t}(2\sin t+\cos t)$

23. $L^{-1}\left\{\frac{1}{(s+1)(s^2+2s+2)}\right\}=$

1) $e^{t}(1+\cos t)$ 2) $e^{t}(1-\cos t)$

3) $e^{-t}(1+\cos t)$ 4) $e^{-t}(1-\cos t)$

24. Consider the differential equation $\frac{d^2y}{dt^2}+2\frac{dy}{dt}+y(t)=0$ with $y(0)=-2$ and $y'(0)=0$. The Laplace transform of $y(t)$ is

1) $\frac{-2(2+s)}{(s+1)^2}$ 2) $\frac{2(2+s)}{(s+1)^2}$

3) $\frac{(2+s)}{(s+1)^2}$ 4) $\frac{-(3+2s)}{(s+1)^2}$

PREVIOUS ECET BITS KEY

01) 3	02) 3	03) 1	04) 3	05) 1
06) 1	07) 1	08) 4	09) 1	10) 2
11) 2	12) 2	13) 1	14) 3	15) 3
16) 1	17) 2	18) 3	19) 3	20) 2
21) 4	22) 3	23) 4	24) 1	

FOURIER SERIES

2019 - TS ECET

1. For $x>0$, $\int_0^\infty \frac{\sin xt}{t}dt$ is _____

1) 0 2) $\frac{\pi}{2x}$ 3) $\frac{1}{x}$ 4) $\frac{\pi}{2}$

2. If $f(x)=\frac{1}{2}a_0+\sum_{n=1}^{\infty}(a_n\cos nx+b_n\sin nx)$ is the Fourier series of the function $f(x)=\begin{cases}0, & -\pi\le x<0\\ \pi, & 0\le x\le\pi\end{cases}$ then, which of the following is TRUE?

1) $a_n=0$, for all $n\ge 0$

2) $a_0=\frac{\pi}{2}$ and $a_n=0$, for all $n\ge 1$

3) $b_n\neq 0$, for all $n\ge 1$

4) $a_o=\pi$ and $a_n=0$, for all $n\ge 1$

3. A function $f(x)$ is such that $f(x+2\pi)=f(x)$ and $f(x)=x$, $-\pi\le x\le\pi$. The Fourier series of $f(x)$ is _____

1) $2\left(\sin x-\frac{1}{2}\sin 2x+\frac{1}{3}\sin 3x-.....\right)$

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2) $2\left(\sin x+\frac{1}{2}\sin 2x+\frac{1}{3}\sin 3x+.....\right)$

3) $2\left(\cos x-\frac{1}{2}\cos 2x+\frac{1}{3}\cos 3x-.....\right)$

4) $2\left(\cos x+\frac{1}{2}\cos 2x+\frac{1}{3}\cos 3x+.....\right)$

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4. The Fourier series of $f(x)=x^2$ in $-\pi\le x\le\pi$, is

1) $f(x)=\frac{\pi^2}{3}+4\sum_{n=1}^{\infty}\frac{(-1)^n}{n^2}\cos(nx)$

2) $f(x)=\frac{2\pi^2}{3}+4\sum_{n=1}^{\infty}\frac{(-1)^n}{n^2}\cos(nx)$

3) $f(x)=\frac{\pi^2}{3}+\sum_{n=1}^{\infty}\frac{(-1)^n}{n^2}\cos(nx)$

4) $f(x)=\frac{\pi^2}{3}+4\sum_{n=1}^{\infty}\frac{(-1)^n}{n}\cos(nx)$

5. The Fourier series of the function $f(x)=2x+1$, in $-\pi\le x\le\pi$, is

1) $1+4\sum_{n=1}^{\infty}\frac{(-1)^n}{n^2}\sin(nx)$

2) $1+4\sum_{n=1}^{\infty}\frac{(-1)^n}{n^2}\cos(nx)$

3) $1-4\sum_{n=1}^{\infty}\frac{(-1)^n}{n^2}\cos(nx)$

4) $1-4\sum_{n=1}^{\infty}\frac{(-1)^n}{n^2}\sin(nx)$

2021 - TS ECET

6. If $f(t)=\sin t+(\sin 2t-\sin t)u(t-\pi)+(\sin 3t-\sin 2t)u(t-2\pi)$ where $u(t-a)$ is a unit step function, then $f(t)$ when $\pi\le t\le 2\pi$ is

1) $\sin t$ 2) $\sin 2t$
3) $\sin 3t$ 4) $\sin t+\sin 2t$

7. Let $f(x)=e^{2x}$ in $(-\pi,\pi)$ and $f(x+2\pi)=f(x)$, $\forall x$. If the Fourier series expansion of the function is $f(x)=\sum_{n=0}^{\infty}(a_n\cos nx+b_n\sin nx)$ then $a_0=$

1) $\frac{\sinh 2\pi}{8\pi}$ 2) $\frac{\sinh 2\pi}{\pi}$
3) $\frac{\sinh 2\pi}{4\pi}$ 4) $\frac{\sinh 2\pi}{2\pi}$

8. If $f(x)=\begin{cases}0, & \text{if } -\pi\le x\le 0\\ \sin x, & \text{if } 0\le x\le\pi\end{cases}$, $f(x+2\pi)=f(x)$, $\forall x$ and $f(x)=\sum_{n=0}^{\infty}(a_n\cos nx+b_n\sin nx)$, then $b_1+b_2+b_3=$

1) 0 2) -1 3) $\frac{1}{2}$ 4) $\frac{1}{4}$

9. If $f(x)$ is periodic function defined on $-p\le x\le p$ then the coefficient of $\cos\frac{n\pi x}{p}$ in the Fourier series expansion of $f(x)$ is

1) $\frac{1}{p}\int_{-p}^{p}f(x)\cos nx\,dx$

2) $\frac{1}{2p}\int_{-p}^{p}f(x)\cos\frac{nx}{p}dx$

3) $\frac{2}{p}\int_{0}^{p}f(x)\cos\frac{n\pi x}{p}dx$

4) $\frac{1}{p}\int_{-p}^{p}f(x)\cos\frac{n\pi x}{p}dx$

10. If $f(x)=|\cos x|$, $x\in(-\pi,\pi)$ and

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$f(x)=\sum_{n=0}^{\infty}(a_n\cos nx+b_n\sin nx)$, then $a_0+b_1=$

1) $\frac{-4}{\pi^2}$ 2) $\frac{2}{\pi}$ 3) $\frac{4}{\pi}$ 4) $\frac{-2}{\pi^2}$

11. The Fourier series expansion of $f(x)=|x|$ over $(-\pi,\pi)$, the value of Fourier coefficient $a_1=$

1) $\frac{2}{\pi}$ 2) $\frac{4}{\pi}$ 3) $-\frac{2}{\pi}$ 4) $-\frac{4}{\pi}$

12. If $f(x)=x\sin x$, $0<x<2\pi$ and Fourier series of $f(x)$ is given by $f(x)=\frac{a_0}{2}+\sum_{n=1}^{\infty}(a_n\cos nx+b_n\sin nx)$ then $b_1=$

1) 1 2) 0 3) -1 4) π

13. If $f(x)=\begin{cases}x, & \text{when } 0<x<\frac{\pi}{2}\\ \pi-x, & \text{when } \frac{\pi}{2}<x<\pi\end{cases}$ and the Fourier series expansion of $f(x)$ is given by $f(x)=\sum_{n=1}^{\infty}b_n\sin nx$ then the value of $b_2=$

1) π 2) 0 3) $-\pi$ 4) -1

14. If $f(x)=e^{-x}$ then the value of "a_0" in the Fourier series expansion of $f(x)$ in the interval $(-1,1)$

1) $\frac{e^2-1}{e}$ 2) $\frac{e^2+1}{e}$ 3) $\frac{1-e^2}{e}$ 4) $\frac{1}{e}$

PREVIOUS ECET BITS KEY

01) 4	02) 4	03) 1	04) 2	05) 4
06) 2	07) 4	08) 3	09) 4	10) 2
11) 4	12) 4	13) 2	14) 1	

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