CBT CLASS XII MATHS SEPTEMBER-2024

GENERAL INSTRUCTION :

CHAPTER: INTEGRATION AND APPLICATION OF INTEGRATION

Sr.No	Question	Marks
	Case Study 1 **Antiderivatives: The Antiderivative of a function is the inverse of the derivative of the function. Antiderivative is also called the Integral of a function. Suppose the derivative of a function i.e. d/dx[f(x)+c] is F(x) then the antiderivative of [F(x)] or $\int$ F(x) = f(x) + c.** **On the basis of above information answer the following Questions**	
1	Antiderivative of sin2x is (a) (-cos2x)/2 + c (b) (cos 2x)/2 + c (c) (2cos2x)/2 + c (d) (-2cos2x)/2 +c	1
2	Antiderivative of 1/x + 4x + sinx is (a) logx + $2x^2$ + cosx + c (b) logx + $4x^2$ - cosx +c (c) logx + $2x^2$ - cosx + c (d) logx - $2x^2$ - cosx +c	1
3	Antiderivative of $(3x+4)^2$ is (a) $(3x +4)^3/3$ + c (b) $(3x +4)^3/ 6$ + c (c) $(3x +4)^3/9$ + c (d) $-(3x +4)^3/3$ + c	1
4	If f'(x) = $4x^3 – 3/x^4$ and f(2) = 0 ,value of f(x). (a) $x^4 + 1/x^3 + 129/8$ (b) $x^4 + 1/x^3 – 129/8$ (c) $x^4 - 1/x^3 – 129/8$ (d) $x^3 + 1/x^3 – 129/8$	1
	Case Study 2 We know that in integration by parts $\int f \cdot g \, dx \ = \ f \int g \, dx \ - \ \int \left(\frac{d}{dx} f \times \int g \, dx \right) dx \ + \ C$ Here f is first function and g be the second function and First function decide on the Basis of ILATE i.e. I for Inverse Trigonometric function L tends Logarithmic function, A tends Algebraic function, T for trigonometric function, and E for Exponential function. On the basis of above information give the answer of following questions	
5	Integration of e^x(sin x + cos x) is (a) e^x sin x + c (b) - e^x sin x + c (c) e^x cos x + c (d) $-e^x$ cos x +c	1
6	Integration of log x is (a) x log x + x +c (b) log x + x +c (c) log x - x +c (d) x log x - x +c	1
7	Integration of tan^{-1}x is (a) x tan^{-1}x + c (b) x tan^{-1}x – $(x^2 +1)/2$ + c (c) x tan^{-1}x – log $(x^2 +1)/2$ +c (d) x tan^{-1}x + log $(x^2 +1)/2$ +c	1
8	Integration of x^3e^x is (a) $x^3e^x + 3x^2e^x + 6xe^x + 6e^x$ + c (b) $x^3e^x - 3x^2e^x + 6xe^x - 6 e^x$ + c (c) $x^3e^x - 3x^2e^x$ ` $6xe^x + 6e^x$ + c   (d) $x^3e^x - 3x^2e^x$ ` $6xe^x$ - 6 e^x + c	1

	Directions: (Q.9 – Q.10) Each of these questions contains two statements: Assertion (A) and Reason (R). Each of these questions also has four alternative choices, any one of which is the correct answer . You have to select one of the options (a) , (b) , (c) and (d) given below : (a) A is true , R is true and R is a correct explanation for A (b) A is true , R is true and R is not a correct explanation for Assertion (c) A is true and R is false (d) A is false and R is true	
9	**Assertion:** $\int_{-a}^{a} x^5\, dx = 0$ **Reason:** $\int_{-a}^{a} f(x)\, dx = 0$ if $f(-x) = -f(x)$ i.e. $f(x)$ is odd function	1
10	**Assertion:** Area of circle is πr^2 **Reason:** Area bounded by the circle $x^2 + y^2 = r^2$ in first quadrant is $\pi r^2 /4$	1

Answer Key

Ans1	**(a)**
Feedback	*Option (a) is correct, Antiderivative of sin2x is (-cos2x)/2 + c*
Ans2	**(c)**
Feedback	*Option (c) is correct, Antiderivative of $1/x + 4x + sinx$ is $logx + 2x^2$ - cosx + c*
Ans3	**(c)**
Feedback	*Option (c) is correct, Antiderivative of $(3x+4)2$ is $(3x +4)^3/9$ + c*
Ans4	**(b)**
Feedback	*Option (b) is correct, Since by integrating $f'(x) = 4x^3 – 3/x^4$ we get is $f(x) = x^4 + 1/x^3$ +c, and when we put x =2 in f(x) so, c = -129/8*
Ans5	*(a)*
Feedback	*Option (a) is correct, $\int e^x(sin\,x + cos\,x)\, dx$ is $e^x sin\,x + c$, This can also find with $\int e^x [f(x) + f'(x)]\, dx = e^x f(x) + c$*
Ans6	**(d)**
Feedback	*Option (d) is correct, Integration of log x is x log x – x + c by using by parts of integration*
Ans7	**(c)**
Feedback	*Option (c) is correct, Integration of $tan^{-1}x$ is $x\,tan^{-1}x – log\,(x^2 +1)/2$ +c by using by parts of integration*
Ans8	**(b)**
Feedback	*Option (b) is correct, Integration of $x^3 e^x$ is $x^3 e^x$ - $3x^2 e^x$ + $6x e^x$ - $6\,e^x$ + c by using by parts of*
Ans9	*(a)*
Feedback	*Option (a) is correct, A is true , R is true and R is a correct explanation for A*
Ans10	**(b)**
Feedback	*Option (b) is correct, A is true , R is true and R is not a correct explanation for A*