CUET (UG) – MATHEMATICS

Chapter Test - Integration and its Applications

General Instructions

1. Total Questions: **20**
2. Duration: **60 Minutes**
3. All questions are compulsory.
4. Each question carries **5 marks**.
5. For each correct answer: **+5 marks**.
6. For each incorrect answer: **-1 mark**.
7. No negative marking for unanswered questions.
8. Use of calculator or electronic devices is strictly prohibited.
9. Choose the most appropriate answer from the given options.

1. The value of the indefinite integral $\int \frac{dx}{x^2+2x+2}$ is:
   (A) $\tan^{-1}(x+1)+C$
   (B) $\log|x^2+2x+2|+C$
   (C) $\tan^{-1}(x)+C$
   (D) $\frac{1}{2}\tan^{-1}(x+1)+C$

2. The value of $\int e^x(\sin x+\cos x)dx$ is:
   (A) $e^x\cos x+C$
   (B) $e^x\sin x+C$
   (C) $-e^x\sin x+C$
   (D) $e^x(\sin x-\cos x)+C$

3. If $\int \frac{3x^2}{x^6+1}dx=\tan^{-1}(f(x))+C$, then $f(x)$ is:
   (A) x^2
   (B) $3x$
   (C) x^3
   (D) x^4

4. The value of the definite integral $\int_0^{\pi/2}\frac{\sqrt{\sin x}}{\sqrt{\sin x}+\sqrt{\cos x}}dx$ is:
   (A) π
   (B) $\pi/2$
   (C) $\pi/4$
   (D) 0

5. The area bounded by the curve $y=x^2$, the x-axis, and the lines $x=1$ and $x=2$ is:
   (A) 7/3 sq. units
   (B) 1/3 sq. units
   (C) 8/3 sq. units
   (D) 2 sq. units

6. The integral $\int \frac{dx}{x(1+\log x)^2}$ is equal to:
   (A) $\frac{-1}{1+\log x}+C$
   (B) $\log|1+\log x|+C$
   (C) $\frac{1}{1+\log x}+C$
   (D) $\frac{1}{x}+\log x+C$

7. The area of the region bounded by the curve $y=\cos x$ between $x=0$ and $x=\pi$ is:
   (A) 0 sq. units
   (B) 1 sq. units
   (C) 2 sq. units
   (D) 4 sq. units

8. The value of $\int_{-1}^{1}|x|dx$ is:
   (A) 0
   (B) 1
   (C) 2
   (D) 1/2

9. $\int \frac{\cos 2x}{(\sin x+\cos x)^2}dx$ is equal to:
   (A) $\log|\sin x+\cos x|+C$
   (B) $\log|\sin x-\cos x|+C$
   (C) $\frac{-1}{\sin x+\cos x}+C$
   (D) $\frac{1}{\sin x+\cos x}+C$

10. If $f(x) = \int_0^x t \sin t dt$, then $f'(x)$ is:
    (A) $x \cos x$
    (B) $\sin x + x \cos x$
    (C) $x \sin x$
    (D) $\sin x - x \cos x$

11. The area bounded by the circle $x^2 + y^2 = a^2$ is:
    (A) πa
    (B) $2\pi a$
    (C) πa^2
    (D) $\frac{1}{4}\pi a^2$

12. The value of $\int \frac{dx}{\sqrt{9-4x^2}}$ is:
    (A) $\frac{1}{3}\sin^{-1}(\frac{2x}{3}) + C$
    (B) $\frac{1}{2}\sin^{-1}(\frac{2x}{3}) + C$
    (C) $\sin^{-1}(\frac{2x}{3}) + C$
    (D) $\frac{1}{2}\sin^{-1}(\frac{x}{3}) + C$

13. $\int_0^\pi \sin^2 x dx$ is equal to:
    (A) $\pi/2$
    (B) π
    (C) 0
    (D) 2π

14. The area bounded by the curve $y = \log x$, the x-axis, and the ordinate $x = e$ is:
    (A) e sq. units
    (B) 1 sq. units
    (C) $e - 1$ sq. units
    (D) $1/e$ sq. units

15. $\int \frac{e^{2x}-1}{e^{2x}+1} dx$ is equal to:
    (A) $\log|e^x + e^{-x}| + C$
    (B) $\log|e^{2x} + 1| + C$
    (C) $\log|e^x - e^{-x}| + C$
    (D) $x - \log|e^{2x} + 1| + C$

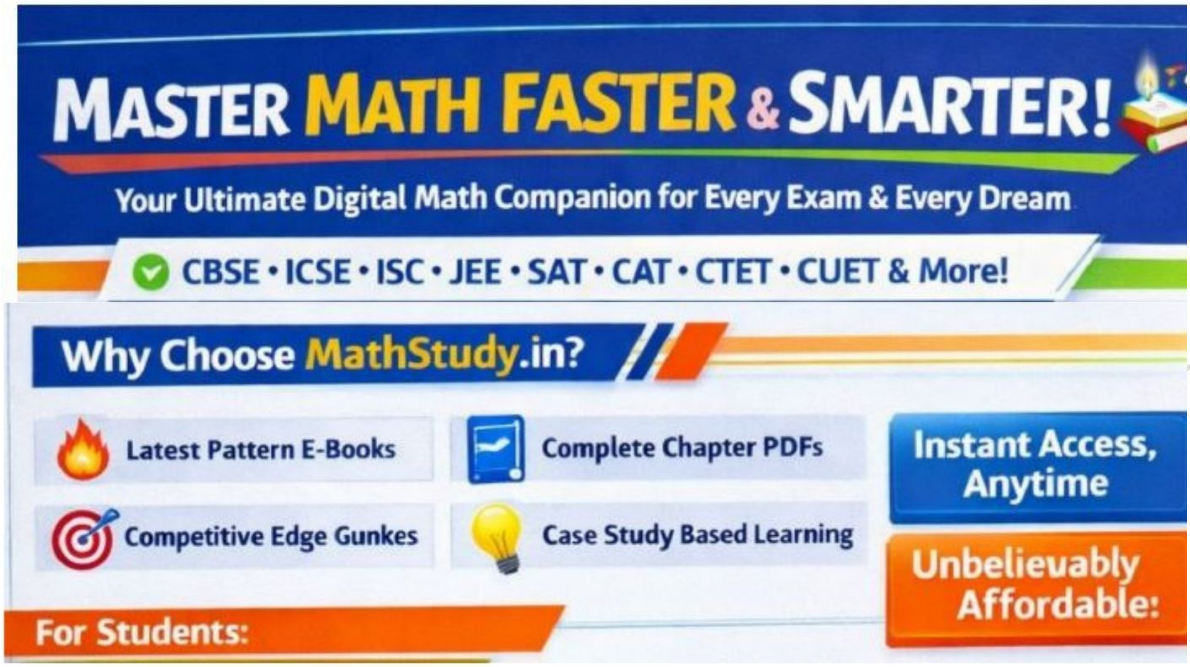
16. The value of $\int_2^3 \frac{x}{x^2+1} dx$ is:
    (A) $\log(2)$
    (B) $\log(5)$
    (C) $\frac{1}{2}\log(2)$
    (D) $\frac{1}{2}\log(2.5)$

17. The value of $\int \sec^3 x dx$ involves:
    (A) Only $\sec x \tan x$
    (B) Only $\log|\sec x + \tan x|$
    (C) Both $\sec x \tan x$ and $\log|\sec x + \tan x|$
    (D) Only $\tan^2 x$

18. The area bounded by the parabola $y^2 = 4x$ and the line $x = 3$ is:
    (A) $4\sqrt{3}$ sq. units
    (B) $8\sqrt{3}$ sq. units
    (C) $12\sqrt{3}$ sq. units
    (D) $16\sqrt{3}$ sq. units

19. $\int_0^1 \frac{dx}{1+x^2}$ is:
    (A) $\pi/4$
    (B) $\pi/2$
    (C) 1
    (D) π

20. The value of $\int \frac{\sin x}{1+\cos^2 x} dx$ is:
    (A) $\tan^{-1}(\cos x) + C$
    (B) $-\tan^{-1}(\cos x) + C$
    (C) $\log|1 + \cos^2 x| + C$
    (D) $\tan^{-1}(\sin x) + C$



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