

# CUET (UG) – MATHEMATICS

Chapter Test - Unit III: Calculus - Applications of Integrals

## 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.

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1. The area of the region bounded by the curve  $y^2 = 9x$ ,  $x = 2$ ,  $x = 4$  and the x-axis in the first quadrant is:
  - (A)  $8\sqrt{2} - 4\sqrt{2}$  sq. units
  - (B)  $16 - 4\sqrt{2}$  sq. units
  - (C)  $4(4 - \sqrt{2})$  sq. units
  - (D)  $12\sqrt{2}$  sq. units
2. The area of the region bounded by the circle  $x^2 + y^2 = 1$  and the line  $x + y = 1$  in the first quadrant is:
  - (A)  $\frac{\pi}{4} - \frac{1}{2}$  sq. units
  - (B)  $\frac{\pi}{4} - 1$  sq. units
  - (C)  $\pi - \frac{1}{2}$  sq. units
  - (D)  $\frac{\pi}{2} - \frac{1}{4}$  sq. units
3. Area of the region bounded by the parabola  $y = x^2$  and the line  $y = |x|$  is:
  - (A)  $1/6$  sq. unit
  - (B)  $1/3$  sq. unit
  - (C)  $2/3$  sq. unit
  - (D)  $1$  sq. unit
4. The area of the region bounded by  $y^2 = 4x$  and  $y = 2x$  is:
  - (A)  $2/3$  sq. unit
  - (B)  $1/3$  sq. unit
  - (C)  $1/4$  sq. unit
  - (D)  $3/4$  sq. unit
5. The area of the region bounded by the ellipse  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$  in the first quadrant is:
  - (A)  $\pi ab$  sq. units
  - (B)  $\frac{\pi ab}{2}$  sq. units
  - (C)  $\frac{\pi ab}{4}$  sq. units
  - (D)  $\frac{\pi ab}{8}$  sq. units
6. The area of the region bounded by  $y = \sqrt{3}x$ , the x-axis and the circle  $x^2 + y^2 = 4$  in the first quadrant is:
  - (A)  $\pi/3$  sq. units
  - (B)  $\pi/6$  sq. units
  - (C)  $\pi/2$  sq. units
  - (D)  $\pi/4$  sq. units
7. Area of the region bounded by the curve  $y = x^3$ , the line  $y = 8$  and the y-axis is:
  - (A)  $12$  sq. units
  - (B)  $10$  sq. units
  - (C)  $14$  sq. units
  - (D)  $16$  sq. units
8. The area of the region bounded by  $y^2 = 4x$  and the line  $x = 3$  is:
  - (A)  $8\sqrt{3}$  sq. units
  - (B)  $4\sqrt{3}$  sq. units
  - (C)  $12\sqrt{3}$  sq. units
  - (D)  $16\sqrt{3}$  sq. units
9. The area of the region bounded by the curve  $x = 2y - y^2$  and the y-axis is:
  - (A)  $2/3$  sq. unit
  - (B)  $4/3$  sq. units

- (C)  $1/3$  sq. unit  
(D)  $5/3$  sq. units
10. Area of the region bounded by the curves  $y = e^x$ ,  $y = e^{-x}$  and the line  $x = 1$  is:  
(A)  $e + \frac{1}{e} - 2$  sq. units  
(B)  $e - \frac{1}{e}$  sq. units  
(C)  $e + \frac{1}{e}$  sq. units  
(D)  $e - \frac{1}{e} - 2$  sq. units
11. The area of the region bounded by  $y^2 = x$  and  $x^2 = y$  is:  
(A)  $1/3$  sq. unit  
(B) 1 sq. unit  
(C)  $1/2$  sq. unit  
(D)  $2/3$  sq. unit
12. Area of the region bounded by the curve  $y = \sin 2x$  from  $x = 0$  to  $x = \pi/4$  is:  
(A)  $1/2$  sq. unit  
(B) 1 sq. unit  
(C) 2 sq. units  
(D)  $1/4$  sq. unit
13. The area of the region bounded by the parabola  $y^2 = 8x$  and its latus rectum is:  
(A)  $16/3$  sq. units  
(B)  $32/3$  sq. units  
(C)  $8/3$  sq. units  
(D)  $64/3$  sq. units
14. The area of the region bounded by  $x^2 = 4y$ ,  $y = 2$ ,  $y = 4$  and the y-axis in the first quadrant is:  
(A)  $\frac{8}{3}(2\sqrt{2} - 1)$  sq. units  
(B)  $\frac{4}{3}(8 - 2\sqrt{2})$  sq. units  
(C)  $8\sqrt{2}$  sq. units  
(D)  $4\sqrt{2}$  sq. units
15. Area of the region bounded by  $y = |x - 1|$  and  $y = 1$  is:  
(A) 1 sq. unit  
(B) 2 sq. units  
(C)  $1/2$  sq. unit  
(D)  $3/2$  sq. units
16. The area of the region bounded by  $x^2 + y^2 = 16$  and  $y^2 = 6x$  in the first quadrant is:  
(A)  $\frac{4\pi}{3} + \sqrt{3}$  sq. units  
(B)  $\frac{4\pi}{3} + \frac{4\sqrt{3}}{3}$  sq. units  
(C)  $\frac{8\pi}{3} + \frac{4\sqrt{3}}{3}$  sq. units  
(D)  $2\pi + \sqrt{3}$  sq. units
17. The area of the region bounded by  $y = x^2 + 2$ ,  $y = x$ ,  $x = 0$  and  $x = 3$  is:  
(A)  $21/2$  sq. units  
(B)  $15/2$  sq. units  
(C)  $27/2$  sq. units  
(D)  $9/2$  sq. units
18. Area of the region bounded by the curve  $y = \sqrt{a^2 - x^2}$  and the x-axis is:  
(A)  $\pi a^2$  sq. units

- (B)  $\frac{\pi a^2}{2}$  sq. units  
(C)  $\frac{\pi a^2}{4}$  sq. units  
(D)  $2\pi a^2$  sq. units
19. The area of the region bounded by the curve  $y = \tan x$ , x-axis and the line  $x = \pi/4$  is:  
(A)  $\log \sqrt{2}$  sq. units  
(B)  $\log 2$  sq. units  
(C)  $1/2 \log 2$  sq. units  
(D) Both (A) and (C)
20. Area of the region bounded by the parabola  $y^2 = 4x$  and the line  $y = x$  is:  
(A)  $8/3$  sq. units  
(B)  $4/3$  sq. units  
(C)  $2/3$  sq. units  
(D)  $16/3$  sq. units

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