

CUET Mathematics Test - Set 26

Unit III: Calculus (Intermediate to Advanced)

General Instructions

1. Total Questions: **15**
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.

www.udgamwelfarefour.com

1. If $y = (x + \sqrt{x^2 + 1})^n$, then $(x^2 + 1)\frac{d^2y}{dx^2} + x\frac{dy}{dx}$ is equal to:
(A) n^2y
(B) $-n^2y$
(C) ny
(D) 0
2. The marginal cost of a product is given by $MC = 2xe^{0.2x}$. If the fixed cost is zero, the total cost function $C(x)$ is:
(A) $10xe^{0.2x} - 50e^{0.2x} + 50$
(B) $5xe^{0.2x} - 25e^{0.2x}$
(C) $10xe^{0.2x} + 50e^{0.2x}$
(D) $2e^{0.2x}(x - 5)$
3. A balloon is being inflated at the rate of 900 cubic centimeters per second. The rate at which the radius is increasing when the radius is 15 cm is:
(A) $1/\pi$ cm/s
(B) $2/\pi$ cm/s
(C) $9/4\pi$ cm/s
(D) $225/\pi$ cm/s
4. The function $f(x) = \frac{x}{\log x}$ is increasing in the interval:
(A) $(0, 1)$
(B) $(0, e)$
(C) (e, ∞)
(D) $(-\infty, e)$
5. The value of $\int_0^{\pi/2} \frac{\sqrt{\sin x}}{\sqrt{\sin x} + \sqrt{\cos x}} dx$ is:
(A) π
(B) $\pi/2$
(C) $\pi/4$
(D) 0
6. The demand function is $p = 25 - x^2$ and the supply function is $p = 2x + 1$. The equilibrium price p_0 is:
(A) 3
(B) 9
(C) 7
(D) 10
7. For the demand and supply functions in the previous question, the Consumer Surplus (CS) at equilibrium is:
(A) 9
(B) 18
(C) 27
(D) 36
8. The solution of the differential equation $\frac{dy}{dx} + y = e^{-x}$ with $y(0) = 0$ is:
(A) $y = xe^{-x}$
(B) $y = e^{-x}$
(C) $y = xe^x$
(D) $y = (x + 1)e^{-x}$
9. If the marginal revenue function is $MR = \frac{a}{(x+b)^2} - c$, the demand function p is:
(A) $\frac{a}{x(x+b)} - c$

- (B) $\frac{a}{b(x+b)} - c$
(C) $\frac{-a}{x+b} - cx$
(D) $\frac{a}{b(x+b)} + c$
10. The maximum area of a rectangle that can be inscribed in a circle of radius r is:
(A) r^2
(B) $2r^2$
(C) $\sqrt{2}r^2$
(D) $4r^2$
11. The value of $\int \frac{dx}{x^2+4x+13}$ is:
(A) $\frac{1}{3} \tan^{-1} \left(\frac{x+2}{3} \right) + C$
(B) $\tan^{-1} \left(\frac{x+2}{3} \right) + C$
(C) $\frac{1}{2} \tan^{-1} \left(\frac{x+2}{2} \right) + C$
(D) $\frac{1}{3} \log |x^2 + 4x + 13| + C$
12. If the rate of decay of a radioactive substance is 0.05 per year, the time taken for the substance to decay to 1/10th of its initial amount is:
(A) $20 \log 10$ years
(B) $10 \log 20$ years
(C) $5 \log 10$ years
(D) $0.05 \log 10$ years
13. The function $f(x) = x^x$ has a stationary point at x equal to:
(A) e
(B) $1/e$
(C) 1
(D) 0
14. The Producer Surplus (PS) for the supply function $p = \sqrt{x+9}$ when the market price is $p_0 = 5$ is:
(A) $2/3$
(B) $14/3$
(C) $16/3$
(D) $20/3$
15. The order and degree of the differential equation $\frac{d^2y}{dx^2} = \sqrt{1 + \left(\frac{dy}{dx}\right)^2}$ are:
(A) 2, 1
(B) 1, 2
(C) 2, 2
(D) 1, 1

www.udgamwelfarefoundation.com

**For Best Mathematics E-Books, Visit:
www.mathstudy.in**

www.udgamwelfarefoundation.com

MASTER MATH FASTER & SMARTER!

Your Ultimate Digital Math Companion for Every Exam & Every Dream

✓ CBSE • ICSE • ISC • JEE • SAT • CAT • CTET • CUET & More!

Why Choose MathStudy.in?



Latest Pattern E-Books



Complete Chapter PDFs



Competitive Edge Gunkes



Case Study Based Learning

**Instant Access,
Anytime**

**Unbelievably
Affordable!**

For Students:

Special Features

- ◆ ****Board-Specific**** – CBSE, ICSE, ISC, State Boards
- ◆ ****Exam-Focused**** – JEE, SAT, CAT, CTET, CUET, NTSE
- ◆ ****Grade-Wise**** – Class 6 to 12
- ◆ ****Bilingual Options**** – English & Hindi Medium Support
- ◆ ****Printable & Shareable**** – Use offline, anytime

How to Order:

Visit : <https://www.mathstudy.in>

Browse by Exam, Class, or Topic

Add to Cart & Checkout

Contact & Support:

✉ Email: admin@mathstudy.in

💬 WhatsApp Support Available : +91-+91 92118 65759



💡 Why Wait? Empower your learning journey, save time, and achieve your dreams!

🌐 Explore & Start Learning Today:

<https://www.mathstudy.in> – Premium eBooks for success

<https://www.udgamwelfarefoundation.com> – Free PDFs, practice tests, & guida

**MathStudy.in – Empowering Learners, Enabling Educators, Encouraging Excellence.
Digital Learning | Affordable Excellence | Trusted by Thousands**