GUJCET-ME-2025

Test Booklet No.

Test Booklet Set No. **03**

This booklet contains 16 pages.

DO NOT open this Test Booklet until you are asked to do so.

Important Instructions :

1) The Mathematics test consists of 40 questions. Each question carries **1** mark. For each correct response, the candidate will get **1** mark. For each incorrect response, ¼ mark will be deducted. The maximum marks are **40**.
2) This Test is of **1 hour** duration.
3) Use **Black Ball Point Pen only** for writing particulars on OMR Answer Sheet and marking answers by darkening the circle '●'.
4) Rough work is to be done on the space provided for this purpose in the Test Booklet only.
5) **On completion of the test, the candidate must handover the Answer Sheet to the Invigilator in the Room / Hall. The candidates are allowed to take away this Test Booklet with them.**
6) The Set No. for this Booklet is **03**. Make sure that the Set No. printed on the Answer Sheet is the same as that on this booklet. In case of discrepancy, the candidate should immediately report the matter to the Invigilator for replacement of both the Test Booklet and the Answer Sheet.
7) The candidate should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet.
8) Do not write your Seat No. anywhere else, except in the specified space in the Test Booklet / Answer Sheet.
9) Use of White fluid for correction is not permissible on the Answer Sheet.
10) Each candidate must show on demand his / her Admission Card to the Invigilator.
11) No candidate, without special permission of the Superintendent or Invigilator, should leave his / her seat.
12) Use of Simple (Manual) Calculator is permissible.
13) The candidate should not leave the Examination Hall without handing over their Answer Sheet to the Invigilator on duty and must sign the Attendance Sheet (Patrak - 01). Cases where a candidate has **not** signed the Attendance Sheet (Patrak - 01) will be deemed not to have handed over the Answer Sheet and will be dealt with as an unfair means case.
14) The candidates are governed by all Rules and Regulations of the Board with regard to their conduct in the Examination Hall. All cases of unfair means will be dealt with as per Rules and Regulations of the Board.
15) No part of the Test Booklet and Answer Sheet shall be detached under any circumstances.
16) The candidates will write the Correct Test Booklet Set No. as given in the Test Booklet / Answer

MATHEMATICS

1) The Cartesian equation of the line through the point $(5,-2,4)$ and which is parallel to the vector $3\hat{i}-2\hat{j}+8\hat{k}$ is _____

(A) $\frac{x-5}{3}=\frac{y+2}{-2}=\frac{z-4}{8}$

(B) $\frac{x+5}{-3}=\frac{y-2}{2}=\frac{z+4}{8}$

(C) $\frac{x+5}{3}=\frac{y-2}{-2}=\frac{z+4}{8}$

(D) $\frac{x-5}{-3}=\frac{y+2}{2}=\frac{z-4}{8}$

2) The shortest distance between the lines $\frac{x-1}{2}=\frac{y-2}{3}=\frac{z+4}{6}$ and $\frac{x-3}{2}=\frac{y-3}{3}=\frac{z+5}{6}$ is _____.

(A) $\sqrt{\frac{209}{49}}$

(B) $\sqrt{\frac{293}{49}}$

(C) $\sqrt{\frac{209}{7}}$

(D) $\sqrt{\frac{293}{7}}$

3) The angle between the pair of lines $\vec{r}=-3\hat{i}+\hat{j}+3\hat{k}+\lambda\left(3\hat{i}+5\hat{j}+4\hat{k}\right)$ and $\vec{r}=-\hat{i}+4\hat{j}+5\hat{k}+\mu\left(\hat{i}+\hat{j}+2\hat{k}\right)$ is _____

(A) $\sin^{-1}\left(\frac{8\sqrt{3}}{15}\right)$

(B) $\cos^{-1}\left(\frac{6\sqrt{2}}{15}\right)$

(C) $\cos^{-1}\left(\frac{8\sqrt{3}}{15}\right)$

(D) $\sin^{-1}\left(\frac{6\sqrt{2}}{15}\right)$

(Space for Rough Work)

4) The coordinates of the corner points of the bounded feasible region are (0, 0), (0, 40), (20, 40), (60, 20), (60, 0). The maximum of the objective function $z = 40x + 30y$ is _____.

(A) 2000 (B) 3400

(C) 2400 (D) 3000

5) The maximum value of $z = 5x + 3y$ subject to constraints $3x + 5y \leq 15$, $x \geq 0$, $y \geq 0$ is :

(A) 10 (B) 25

(C) 0 (D) 9

6) Two events E and F are independent. If $P(E)=\frac{3}{5}$ and $P(F)=\frac{3}{10}$ then $P(E'/F)+P(F'/E)=$ _____.

(A) $\frac{1}{10}$ (B) $\frac{11}{10}$

(C) $\frac{9}{10}$ (D) $\frac{10}{11}$

(Space for Rough Work)

7) Let A and B be two events such that $P(A)=\frac{3}{8}$, $P(B)=\frac{5}{8}$ and $P(A \cup B)=\frac{3}{4}$. Then $P(A'|B)-P(A|B)=$ _____.

(A) $\frac{1}{5}$

(B) $\frac{3}{5}$

(C) $\frac{2}{5}$

(D) $\frac{4}{5}$

8) A man is known to speak truth 4 out of 5 times. He throws a die and reports that it is a six. The probability that actually there was a six is

(A) $\frac{5}{9}$

(B) $\frac{4}{9}$

(C) $\frac{5}{35}$

(D) $\frac{4}{35}$

9) Let $A=\{1,2,3\}$. Then number of relations containing $(1,2)$ which are symmetric and transitive but not reflexive is ____.

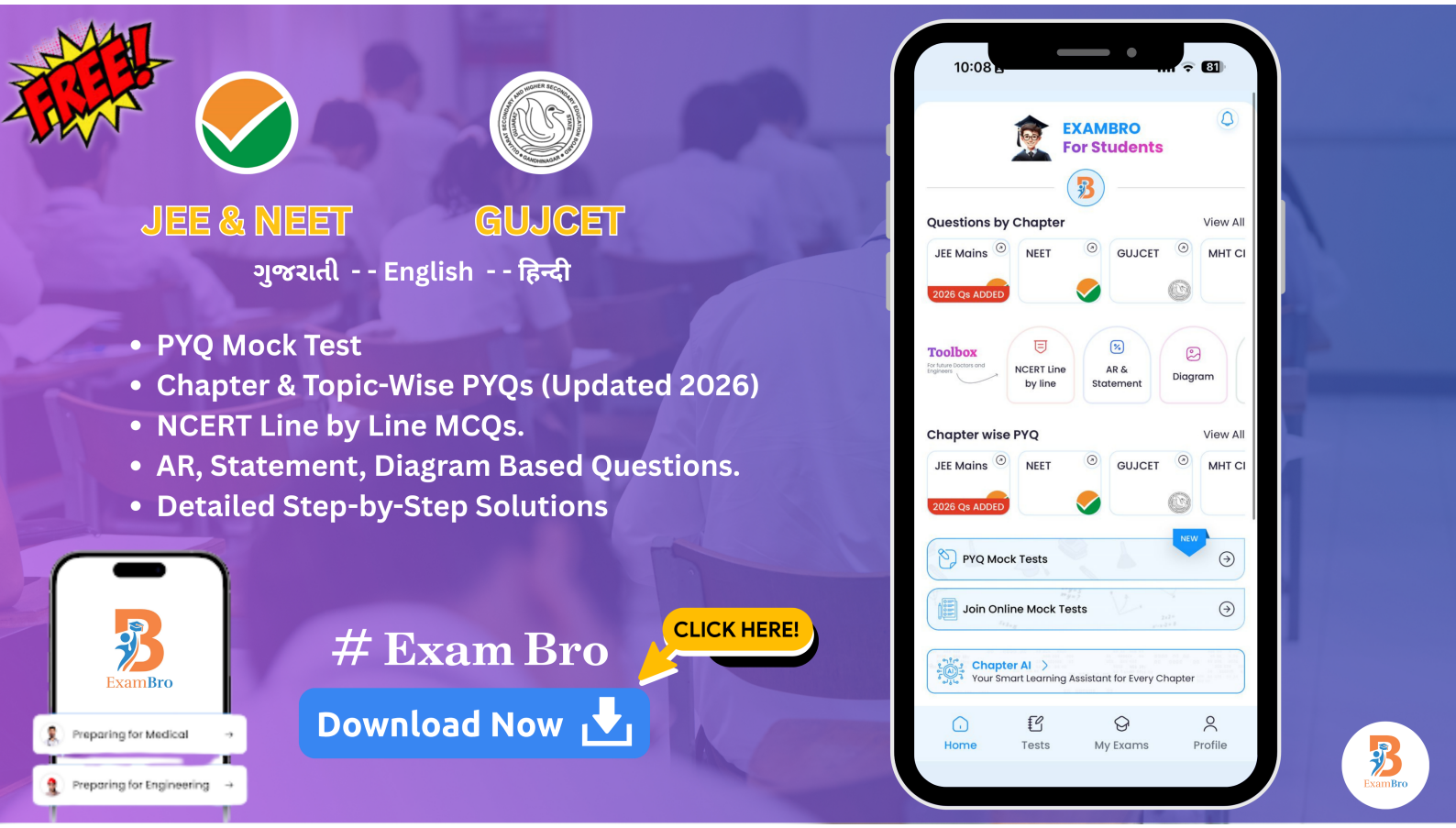
(A) 4

(B) 2

(C) 3

(D) 1

(Space for Rough Work)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10) Let $f: R \to R$ be defined as $f(x) = x^3$. Then f is _____.

(A) Neither one - one nor onto

(B) Many - one and onto

(C) One - one but not onto

(D) One - one and onto

11) $\tan^{-1}\left[\frac{\sqrt{2}}{\sqrt{3}}\cos\left(5\sin^{-1}\frac{1}{\sqrt{2}}\right)\right] =$ _____

(A) $-\pi/3$

(B) $\pi/3$

(C) $-\pi/6$

(D) $\pi/6$

12) If $y = 3\sin^{-1}x + \sin^{-1}(3x - 4x^3)$ for all $x \in \left[-\frac{1}{2}, \frac{1}{2}\right]$, then

(A) $-\pi \le y \le \pi$

(B) $-\pi/3 \le y \le \pi/3$

(C) $-\pi/2 \le y \le \pi/2$

(D) $-\pi/6 \le y \le \pi/6$

(Space for Rough Work)

13) The number of real solutions of the equation $\tan^{-1}\sqrt{x(x+1)}+\sin^{-1}\sqrt{x^2+x+1}=\frac{\pi}{2}$ is _____

(A) 1 (B) 3

(C) 2 (D) 4

14) $\begin{vmatrix}\cos^2\theta & -\sin^2\theta \\ \sin^2\theta & \cos^2\theta\end{vmatrix} =$ _____.

(A) $\frac{1}{2}-\frac{1}{2}\cos^2 2\theta$ (B) $\frac{1}{4}(3+\cos 4\theta)$

(C) $1+\frac{1}{2}\sin^2 2\theta$ (D) $1+2\sin^2\theta\cdot\cos^2\theta$

15) Let A be an invertible square matrix of order 3×3. Then $|(\text{adj}\,A)\cdot A|$ is _____.

(A) $3|A|$ (B) $|A|^2$

(C) $|A|^3$ (D) $|A|$

16) Find the area of a triangle given that midpoints of its sides are (2, 7), (1, 1) and (10, 8).

(A) $\frac{47}{4}$ (B) 47

(C) 94 (D) $\frac{47}{2}$

(Space for Rough Work)

17) If the matrix $\begin{bmatrix} x & x^2+3x & 5 \\ -2x-6 & x^2 & -4x-2 \\ 5 & x^2+2 & x^3 \end{bmatrix}$ is a symmetric matrix, then the value of x is _____.

(A) -2 (B) 3, 2

(C) -3 (D) $-3, -2$

18) If $A=\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$, then $(A+I)^3+(A-I)^3=$ _____.

(A) 8A (B) 8I

(C) 6A (D) 6I

19) For matrix $A=\begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}$, if $A^2-2I=KA$ then $K=$ ___.

(A) -5 (B) 5

(C) -7 (D) 7

20) $\frac{d}{dx}\left(5^{\log x}\right)=$ _____

(A) $\log 5 \cdot x^{\log(5e)}$ (B) $\log_x 5 \cdot 5^{\log x}$

(C) $\log 5 \cdot x^{\log\left(\frac{5}{e}\right)}$ (D) $\log 5 \cdot 5^{\log x}$

(Space for Rough Work)

21) If $x = a\cos\theta, y = a\sin\theta$, then $\frac{d^2y}{dx^2} =$ _____ $(a \neq 0; \theta \neq k\pi, k \in z)$

(A) $-\frac{1}{a}\text{cosec}^3\theta$

(B) $-\frac{1}{a}\text{cosec}^2\theta \cdot \sec\theta$

(C) $\frac{1}{a}\cot^3\theta$

(D) $\text{cosec}^2\theta$

22) $\frac{d}{dx}\left[3\sin(60° - x°) - 4\cos^3(30° + x°)\right]$ = _____.

(A) $-\frac{\pi}{60}\sin(3x°)$

(B) $\frac{\pi}{60}\sin(3x°)$

(C) $\frac{\pi}{60}\cos(3x°)$

(D) $-\frac{\pi}{60}\cos(3x°)$

23) If $f(x) = \begin{cases} \frac{x^3 + x^2 - 16x + 20}{(x-2)^2}, & x \neq 2 \\ k, & x = 2 \end{cases}$ is continuous at $x = 2$ then $k =$ _____.

(A) -7

(B) 7

(C) -5

(D) 5

(Space for Rough Work)

24) The total cost $C(x)$ in Rupees, associated with the production of x units of an item is given by $C(x) = 0.05x^3 - 0.2x^2 + 3x + 500$. The marginal cost, where $x = 3$ is _____ (in Ruppes)

(A) 3.15 (B) 30.15

(C) 3.015 (D) 30.015

25) The function $f(x) = \tan x - 4x$ is strictly decreasing on _____.

(A) $\left(-\frac{\pi}{2}, \frac{\pi}{3}\right)$ (B) $\left(-\frac{\pi}{3}, \pi\right)$

(C) $\left(-\frac{\pi}{3}, \frac{\pi}{3}\right)$ (D) $\left(-\frac{\pi}{3}, \frac{\pi}{2}\right)$

26) The absolute minimum value of the function $f(x) = x^3 - 18x^2 + 96x$, $x \in [0, 9]$ is _____.

(A) -160 (B) 0

(C) -135 (D) 126

27) If $\int \frac{3e^x - 5e^{-x}}{4e^x + 5e^{-x}} dx = px + q \cdot \log\left|4e^x + 5e^{-x}\right| + C$, then

(A) $p = 1/8, q = -7/8$ (B) $p = 1/8, q = 7/8$

(C) $p = -1/8, q = -7/8$ (D) $p = -1/8, q = 7/8$

(Space for Rough Work)

28) $\int e^{\tan^{-1}x}\left(\frac{1+x+x^2}{1+x^2}\right)dx = \_\_\_\_\_ + C$

(A) $\frac{e^{\tan^{-1}x}}{x}$

(B) $\frac{1+x^2}{x}\cdot e^{\tan^{-1}x}$

(C) $x\cdot e^{\tan^{-1}x}$

(D) $\frac{x\cdot e^{\tan^{-1}x}}{1+x^2}$

29) $\int_0^{\pi/4}\sqrt{1+\sin 2x}\,dx = \_\_\_\_\_$

(A) 2

(B) 1

(C) $\frac{1}{2}$

(D) 0

30) $\int\frac{dx}{\sqrt{4x-9x^2}} = \_\_\_\_\_ + C$

(A) $\frac{1}{3}\sin^{-1}\left(\frac{9x-2}{2}\right)$

(B) $\frac{1}{9}\sin^{-1}\left(\frac{3x-2}{2}\right)$

(C) $\frac{1}{9}\sin^{-1}\left(\frac{2x-3}{3}\right)$

(D) $\frac{1}{2}\sin^{-1}\left(\frac{9x-3}{2}\right)$

(Space for Rough Work)

31) If $\int \tan^{-1} x\,dx = Ax \cdot \tan^{-1} x + B\log(1+x^2) + C$ then, A + B = _____.

(A) -1

(B) $1/2$

(C) 1

(D) $-1/2$

32) The area bounded by the curve $y = \sin x$ between $x = -\pi/2$ and $x = \pi/2$ is _____.

(A) 4

(B) 2

(C) 3

(D) 1

33) Area of the region bounded by the curve $x^2 = 4y$ and the line $y = 3$ is

(A) $4\sqrt{3}$

(B) $2\sqrt{3}$

(C) $\sqrt{3}$

(D) $3\sqrt{3}$

34) Area of the region bounded by the curve $y = x^3$, x-axis and the ordinates $x = -1$ and $x = 2$ is

(A) $17/4$

(B) $19/4$

(C) $15/4$

(D) $9/4$

(Space for Rough Work)

35) The degree of the differential equation $\left(1+\frac{dy}{dx}\right)^{\frac{1}{2}}=\left(\frac{d^2y}{dx^2}\right)^{\frac{1}{3}}$ is _____

(A) 4

(B) 2

3

(C) 3

(D) 1

36) The general solution of the differential equation $\frac{dy}{dx}=e^{y-x}$ is _____.

(A) $e^{-x}-e^{-y}=c$

(B) $e^{x}-e^{y}=c$

(C) $e^{-x}-e^{y}=c$

(D) $e^{x}-e^{-y}=c$

37) The Integrating Factor of the differential equation

$x\cdot\frac{dy}{dx}+2y=x^2, (x\neq 0)$ is _____

(A) $\frac{1}{x^2}$

(B) e^{-x}

(C) e^{-y}

(D) x^2

(Space for Rough Work)

38) $\hat{i}\cdot\left(\hat{k}\times\hat{j}\right)+\hat{j}\cdot\left(\hat{i}\times\hat{k}\right)+\hat{k}\cdot\left(\hat{i}\times\hat{j}\right)=$ _____.

(A) -3

(B) 1

(C) -1

(D) 0

39) A unit vector perpendicular to each of the vectors $\left(\vec{a}+\vec{b}\right)$ and $\left(\vec{a}-\vec{b}\right)$ is _____, where $\vec{a}=\hat{i}+\hat{j}+\hat{k}$ and $\vec{b}=\hat{i}+2\hat{j}+3\hat{k}$

(A) $-\frac{1}{\sqrt{6}}\hat{i}+\frac{2}{\sqrt{6}}\hat{j}-\frac{1}{\sqrt{6}}\hat{k}$

(B) $-\frac{1}{\sqrt{12}}\hat{i}+\frac{2}{\sqrt{12}}\hat{j}-\frac{1}{\sqrt{12}}\hat{k}$

(C) $\frac{1}{\sqrt{12}}\hat{i}+\frac{2}{\sqrt{12}}\hat{j}-\frac{1}{\sqrt{12}}\hat{k}$

(D) $\frac{1}{\sqrt{6}}\hat{i}+\frac{2}{\sqrt{6}}\hat{j}+\frac{1}{\sqrt{6}}\hat{k}$

40) Area of a rectangle having vertices A, B, C and D with position vectors $-\hat{i}+\frac{1}{2}\hat{j}+4\hat{k}$, $\hat{i}+\frac{1}{2}\hat{j}+4\hat{k}$, $\hat{i}-\frac{1}{2}\hat{j}+4\hat{k}$ and $-\hat{i}-\frac{1}{2}\hat{j}+4\hat{k}$, respectively is _____.

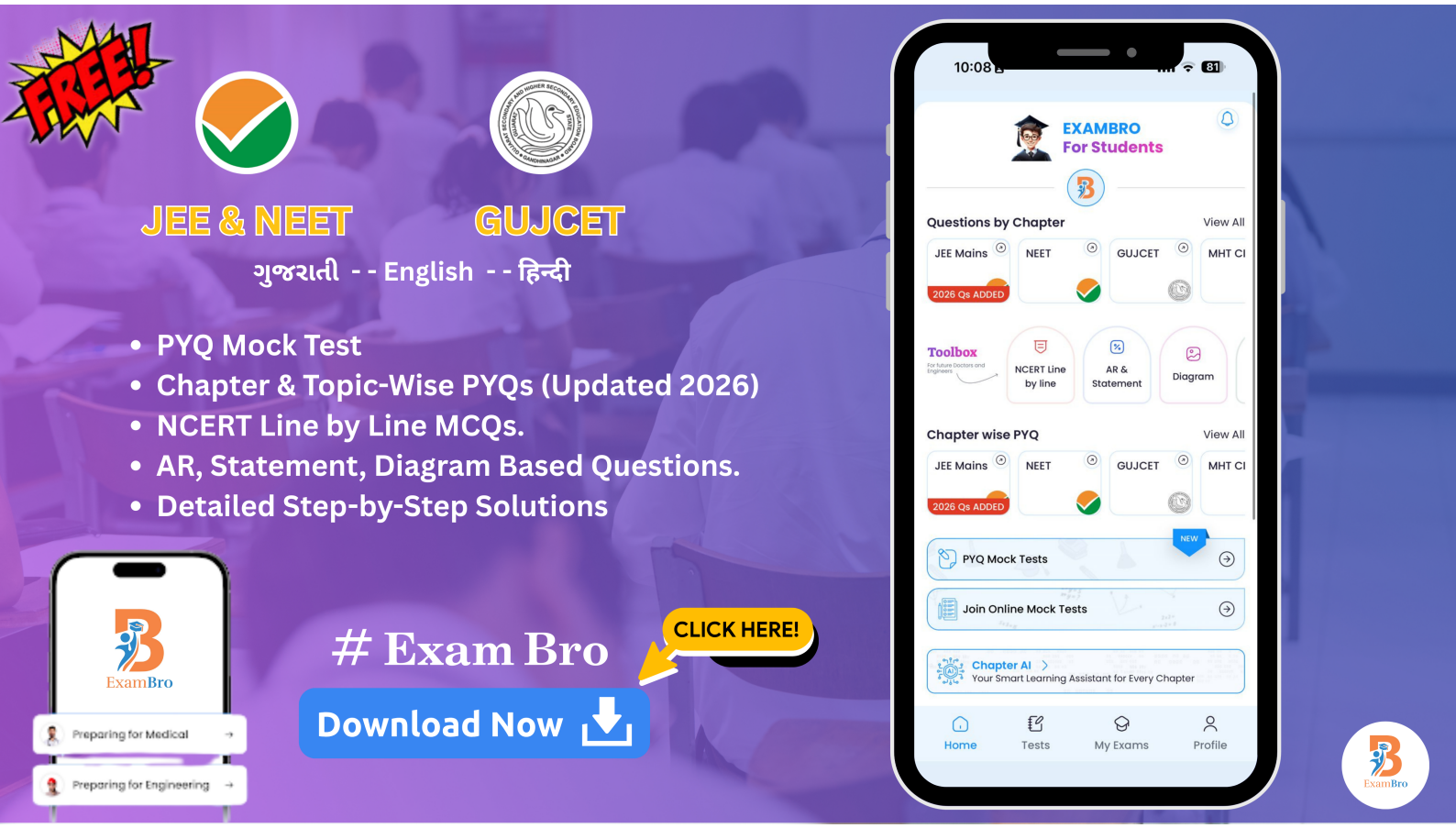
(A) 4

(B) 1

(C) 2

(D) $\frac{1}{2}$

(Space for Rough Work)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