

**MATHEMATICS**

1) If  $2\sin^{-1}x = \sin^{-1}2x\sqrt{1-x^2}$  then  $x \in$  \_\_\_\_\_.

(A)  $\left[-\frac{1}{\sqrt{2}}, 1\right]$

(B)  $[0, 1]$

(C)  $\left[\frac{1}{\sqrt{2}}, 1\right]$

~~(D)~~  $\left[-\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}\right]$

2)  $\cos\left(\sin^{-1}\frac{1}{5} + \cos^{-1}x\right) = 0$  then  $x =$  \_\_\_\_\_.

(A) 1

~~(B)~~  $\frac{1}{5}$

(C) 0

(D) 5

3) Binary operation  $*$  on  $\mathbb{R}$  is given by  $a * b = \frac{a+b}{2}$ . Then  $*$  is \_\_\_\_\_.

(A) not commutative but associative

(B) commutative and associative

(C) commutative but not associative

(D) not commutative and not associative

(Space for Rough Work)

$$\frac{a+b}{2} = \frac{b+a}{2}$$



24) Let  $A = \{-1, -2, 3, 4\}$ . Number of all one-one functions from the set  $A$  to itself is \_\_\_\_\_.

→ (A) 24

(B) 16

(C) 4

✓(D) 256

5) If functions  $f$  and  $g$  are defined as:

$$f: \left[0, \frac{\pi}{2}\right] \rightarrow \mathbb{R}, \quad f(x) = \sin x \text{ and}$$

$$g: \left[0, \frac{\pi}{2}\right] \rightarrow \mathbb{R}, \quad g(x) = \cos x$$

then \_\_\_\_\_.

(A)  $f+g$  is one-one and  $fg$  is not one-one

(B)  $f+g$  is not one-one and  $fg$  is one-one

(C)  $f+g$  is not one-one and  $fg$  is not one-one

✓(D)  $f+g$  is one-one and  $fg$  is one-one

6) If  $y = 100e^{2x} + 200e^{-2x}$  and  $\frac{d^2y}{dx^2} = ay$  then  $a =$  \_\_\_\_\_.

✓(A) 4

(B) -4

(C) 2

(D) 0

(Space for Rough Work)

Function  $f : [1.2, 1.9] \rightarrow \mathbb{R}$ ,  $f(x) = [x]$ , where  $[x]$  denotes the greatest integer less than or equal to  $x$ . Then \_\_\_\_\_.

(A)  $f'(x) = 1$

(B)  $f$  is not differentiable

(C)  $f'(x) = 0$

(D)  $f$  is not continuous function

8) If  $x = \sqrt{10^{\sin^{-1}t}}$ ,  $y = \sqrt{10^{\cos^{-1}t}}$  then  $\frac{dy}{dx} =$  \_\_\_\_\_.

(A)  $-\frac{x}{y}$

(B)  $\frac{y}{x}$

(C) 0

(D)  $-\frac{y}{x}$

9) The interval in which  $y = x^2 e^{-x}$  is increasing is \_\_\_\_\_.

(A)  $(0, 2)$

(B)  $(-2, 0)$

(C)  $(2, \infty)$

(D)  $(-\infty, \infty)$

10) Equation of tangent line to  $16x^2 + 25y^2 = 1$ , which is parallel to Y-axis is \_\_\_\_\_

(A)  $5y - 1 = 0$

(B)  $5x - 1 = 0$

(C)  $4y + 1 = 0$

(D)  $4x - 1 = 0$



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$\Delta v / \Delta t$ 

11) A cylindrical tank of diameter  $d$  20 m is being filled with wheat at the rate of 314 cubic meter per hour. Then the depth of the wheat is increasing at the rate of \_\_\_\_\_.

(A) 0.5 m/h

(B) 0.1 m/h

(C) 1.1 m/h

(D) 1 m/h

12)  $\int e^{\sin x} \sin 2x \, dx = \underline{\hspace{2cm}} + C.$

(A)  $e^{\sin x} (\sin x + 1)$

(B)  $2e^{\sin x} (\sin x - 1)$

(C)  $2e^{\sin x} (\sin x + 1)$

(D)  $e^{\sin x} (\sin x - 1)$

13)  $\int \sqrt{\frac{\cos x - \cos^3 x}{1 - \cos^3 x}} \, dx = \underline{\hspace{2cm}} + C.$

(A)  $-\frac{3}{2} \cos^{-1}(\cos^{3/2} x)$

(B)  $-\frac{2}{3} \cos^{-1}(\cos^{3/2} x)$

(C)  $\frac{3}{2} \cos^{-1}(\cos^{3/2} x)$

(D)  $\frac{2}{3} \cos^{-1}(\cos^{3/2} x)$

14)  $\int (x+1)(x+3)(x+2)^7 \, dx = \underline{\hspace{2cm}} + C.$

(A)  $\frac{(x+3)^{10}}{10} + \frac{(x+3)^8}{8}$

(B)  $\frac{(x+2)^{10}}{10} + \frac{(x+2)^8}{8}$

(C)  $\frac{(x+3)^{10}}{10} - \frac{(x+3)^8}{8}$

(D)  $\frac{(x+2)^{10}}{10} - \frac{(x+2)^8}{8}$

(Space for Rough Work)

15)  $\int \frac{x}{(x-1)(x-2)} dx = \underline{\hspace{2cm}} + C.$

(A)  $\log|(x-1)(x-2)|$

(B)  $\log\left|\frac{(x-2)^2}{x-1}\right|$

(C)  $\log\left|\left(\frac{x-1}{x-2}\right)^2\right|$

(D)  $\log\left|\frac{(x-1)^2}{x-2}\right|$

16)  $\int_{-\pi/4}^{\pi/4} \sin^2 x dx = \underline{\hspace{2cm}}.$   
*men*

(A)  $\frac{\pi}{4}$

(B)  $\frac{\pi}{4} - \frac{1}{2}$

(C)  $\frac{\pi}{4} - 1$

(D)  $\frac{\pi}{4} + \frac{1}{2}$

17)  $\int_{-\pi/2}^{\pi/2} (x^{13} + \cancel{x \cos x} + \cancel{\tan^{15} x} + 1) dx = \underline{\hspace{2cm}}.$

(A) 1

(B) 2

(C)  $\pi$

(D) 0

18) If  $f(a+b-x) = f(x)$  then  $\int_a^b x f(x) dx =$  \_\_\_\_\_.

(A)  $\frac{a+b}{2} \int_a^b f(x) dx$

(B)  $\frac{a+b}{2} \int_a^b f(b+x) dx$

(C)  $\frac{b-a}{2} \int_a^b f(x) dx$

(D)  $\frac{a+b}{2} \int_a^b f(b-x) dx$

19)  $\int_0^1 \tan^{-1}\left(\frac{2x-1}{1+x-x^2}\right) dx =$  \_\_\_\_\_.

(A)  $\frac{\pi}{4}$

(B) 0

(C) -1

(D) 1

20) The area of the region bounded by the two parabolas  $y = x^2$  and  $y^2 = x$  is \_\_\_\_\_.

(A)  $\frac{3}{4}$

(B) 3

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

(D)  $\frac{1}{3}$

21) The area of the parabola  $x^2 = 12y$  bounded by its latus rectum is \_\_\_\_\_.

(A) 3

(B)  $\frac{24}{3}$

(C) 24

(D)  $\frac{8}{3}$

22) The area of the region bounded by the curve  $y^2 = 4x$  and the line  $x = 3$  is \_\_\_\_\_.

(A)  $3\sqrt{3}$

(B)  $3\sqrt{8}$

(C) 8

(D)  $8\sqrt{3}$

23) If length of subnormal at any point of a curve is always constant then that curve represents a \_\_\_\_\_.

(A) Parabola

(B) Hyperbola

(C) Ellipse

(D) Rectangular hyperbola

24) The integrating factor of the differential equation  $x \frac{dy}{dx} - y = x^2$  is \_\_\_\_\_.

(A)  $e^{-x}$

(B)  $\frac{1}{x}$

(C)  $e^x$

(D)  $x$

- 25) If the vectors  $\hat{i} - \hat{j} + \hat{k}$ ,  $3\hat{i} + \hat{j} + 2\hat{k}$  and  $\hat{i} + \lambda\hat{j} - 3\hat{k}$  are coplanar then  $\lambda =$  \_\_\_\_\_.
- (A) 15 (B) -15  
(C) 5 (D)  $\frac{5}{3}$

- 26) Let the vectors  $\vec{a}$  and  $\vec{b}$  be such that  $|\vec{a}| = 3$  and  $|\vec{b}| = \frac{\sqrt{2}}{3}$ . If  $\vec{a} \times \vec{b}$  is a unit vector, then the angle between  $\vec{a}$  and  $\vec{b}$  is \_\_\_\_\_.
- (A)  $\frac{\pi}{2}$  (B)  $\frac{\pi}{4}$   
(C)  $\frac{\pi}{3}$  (D)  $\frac{\pi}{6}$

- 27) If  $\vec{a}$ ,  $\vec{b}$ ,  $\vec{c}$  are unit vectors such that  $\vec{a} + \vec{b} + \vec{c} = \vec{0}$  then  $\vec{a} \cdot \vec{b} + \vec{b} \cdot \vec{c} + \vec{c} \cdot \vec{a} =$  \_\_\_\_\_.
- (A)  $-\frac{1}{2}$  (B)  $\frac{3}{2}$   
(C)  $\frac{1}{2}$  (D)  $-\frac{3}{2}$

- 28) The angle between the line  $\frac{x+1}{2} = \frac{y}{3} = \frac{z-3}{6}$  and the plane  $10x + 2y - 11z = 3$  is \_\_\_\_\_.
- (A)  $\cos^{-1}\left(\frac{1}{8}\right)$  (B)  $\cos^{-1}\left(\frac{8}{21}\right)$   
(C)  $\sin^{-1}\left(\frac{8}{21}\right)$  (D)  $\sin^{-1}\left(\frac{1}{8}\right)$

(Space for Rough Work)

29) The area of a triangle having the points A(-1,1,1), B(1,2,3) and C(2,3,1) as its vertices is \_\_\_\_\_.

(A)  $\frac{\sqrt{19}}{2}$

(B)  $\frac{\sqrt{21}}{2}$

(C)  $\frac{19}{2}$

(D)  $\frac{21}{2}$

30) The lines  $\frac{1-x}{3} = \frac{7y-14}{2p} = \frac{z-3}{2}$  and  $\frac{7-7x}{3p} = \frac{y-5}{1} = \frac{6-z}{5}$  are at right angles then value of  $p$  is \_\_\_\_\_.

(A)  $\frac{11}{7}$

(B) 7

(C)  $\frac{70}{11}$

(D)  $\frac{7}{11}$

31) The mean number of heads in three tosses of a fair coin is \_\_\_\_\_.

(A) 3.5

(B) 0.5

(C) 15

(D) 1.5

32) If for Bernoulli distribution  $B\left(10, \frac{1}{2}\right)$ , it is given that  $P(X \leq 2) = m\left(\frac{1}{2}\right)^{10}$  then

$m =$  \_\_\_\_\_.

(A) 101

(B) 55

(C) 56

(D) 46

(Space for Rough Work)



33) Probability that A speaks truth is  $\frac{4}{5}$ . A coin is tossed. A reports that a head appears.

The probability that actually there was head is \_\_\_\_\_.

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

~~(B)~~  $\frac{4}{5}$

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

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

34) Corner points of the feasible region of objective function  $Z = 3x + 9y$  of a linear programming problem are  $(0, 10)$ ,  $(5, 5)$ ,  $(15, 15)$  and  $(0, 20)$ . Minimum value of Z is \_\_\_\_\_.

(A) 70

~~(B)~~ 90

(C) 50

~~(D)~~ 60

35) If  $A = \begin{bmatrix} \cos \theta & \sin \theta \\ -\sin \theta & \cos \theta \end{bmatrix}$  then  $A^3 =$  \_\_\_\_\_.

(A)  $\begin{bmatrix} \cos 3\theta & \sin 3\theta \\ -\cos 3\theta & \sin 3\theta \end{bmatrix}$

(B)  $\begin{bmatrix} -\cos 3\theta & \sin 3\theta \\ \sin 3\theta & \cos 3\theta \end{bmatrix}$

(C)  $\begin{bmatrix} \cos 3\theta & \sin 3\theta \\ -\sin 3\theta & \cos 3\theta \end{bmatrix}$

(D)  $\begin{bmatrix} \cos 3\theta & -\sin 3\theta \\ -\sin 3\theta & \cos 3\theta \end{bmatrix}$

(Space for Rough Work)

36) If  $A = \begin{bmatrix} 1 & -1 & 1 \\ 2 & 1 & -3 \\ 1 & 1 & 1 \end{bmatrix}$ ,  $10B = \begin{bmatrix} 4 & 2 & 2 \\ -5 & 0 & \alpha \\ 1 & -2 & 3 \end{bmatrix}$  and B is inverse of A then  $\alpha = \underline{\hspace{2cm}}$ .

(A) 10

(B) 9

(C) 3

(D) 5

37) For real numbers  $x, y, z$  such that  $x \neq y \neq z$ ,  $\begin{vmatrix} x & x^2 & 1+x^3 \\ y & y^2 & 1+y^3 \\ z & z^2 & 1+z^3 \end{vmatrix} = 0$  and

$\begin{vmatrix} 1 & x & x^2 \\ 1 & y & y^2 \\ 1 & z & z^2 \end{vmatrix} \neq 0$  then  $xyz = \underline{\hspace{2cm}}$ .

(A) 2

(B) -1

(C) 0

(D) 1

(Space for Rough Work)



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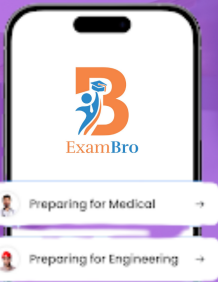


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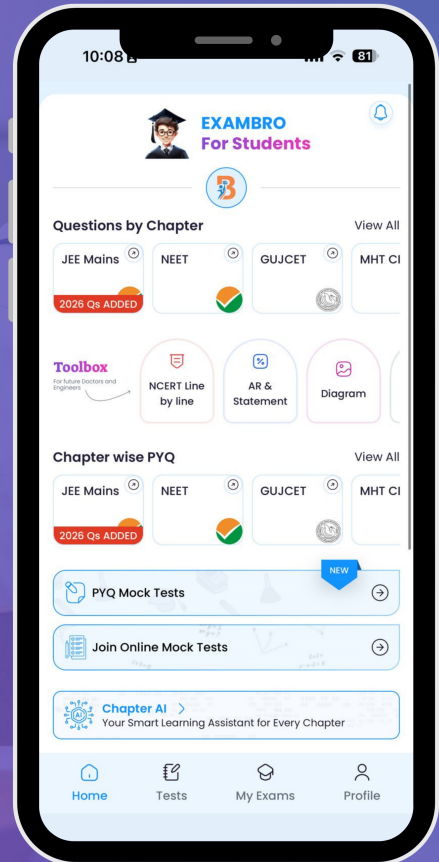
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- Chapter & Topic-Wise PYQs (Updated 2026)
- NCERT Line by Line MCQs.
- AR, Statement, Diagram Based Questions.
- Detailed Step-by-Step Solutions



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38) If  $a, b, c$  are measurements of sides of  $\triangle ABC$  and  $\begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix} = 0$  then

$$\sin^2 A + \sin^2 B + \sin^2 C = \underline{\hspace{2cm}}.$$

(A)  $\frac{13}{4}$

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

✓(C)  $\frac{15}{4}$

(D)  $\frac{11}{4}$

39) If  $A = \begin{bmatrix} 2 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 3 \end{bmatrix}$  then sum of all the elements of  $A^{-1} = \underline{\hspace{2cm}}.$

(A) 6

(B) -6

(C) 0

✓(D)  $\frac{11}{6}$

40) If  $\sin^{-1} a = \alpha + \beta, \sin^{-1} b = \alpha - \beta$  then  $\sin^2 \alpha + \cos^2 \beta = \underline{\hspace{2cm}}.$

✓(A)  $ab$

(B)  $1 - ab$

(C)  $ab - 1$

(D)  $1 + ab$

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(Space for Rough Work)



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✓ (A) 4

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(Space for Rough Work)

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(C)  $\frac{b-a}{2} \int_a^b f(x) dx$

(D)  $\frac{a+b}{2} \int_a^b f(b-x) dx$

19)  $\int_0^1 \tan^{-1} \left( \frac{2x-1}{1+x-x^2} \right) dx =$  \_\_\_\_\_.

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(A) Parabola

(B) Hyperbola

(C) Ellipse

(D) Rectangular hyperbola

24) The integrating factor of the differential equation  $x \frac{dy}{dx} - y = x^2$  is \_\_\_\_\_.

(A)  $e^{-x}$

(B)  $\frac{1}{x}$

(C)  $e^x$

(D)  $x$



25) If the vectors  $\hat{i} - \hat{j} + \hat{k}$ ,  $3\hat{i} + \hat{j} + 2\hat{k}$  and  $\hat{i} + \lambda\hat{j} - 3\hat{k}$  are coplanar then

$\lambda = \underline{\hspace{2cm}}$   
 (A) 15

(B) -15

(C) 5

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

26) Let the vectors  $\vec{a}$  and  $\vec{b}$  be such that  $|\vec{a}| = 3$  and  $|\vec{b}| = \frac{\sqrt{2}}{3}$ . If  $\vec{a} \times \vec{b}$  is a unit vector, then the angle between  $\vec{a}$  and  $\vec{b}$  is \_\_\_\_\_.

(A)  $\frac{\pi}{2}$

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

(C)  $\frac{\pi}{3}$

(D)  $\frac{\pi}{6}$

27) If  $\vec{a}$ ,  $\vec{b}$ ,  $\vec{c}$  are unit vectors such that  $\vec{a} + \vec{b} + \vec{c} = \vec{0}$  then

$\vec{a} \cdot \vec{b} + \vec{b} \cdot \vec{c} + \vec{c} \cdot \vec{a} = \underline{\hspace{2cm}}$

(A)  $-\frac{1}{2}$

(B)  $\frac{3}{2}$

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

(D)  $-\frac{3}{2}$

28) The angle between the line  $\frac{x+1}{2} = \frac{y}{3} = \frac{z-3}{6}$  and the plane  $10x + 2y - 11z = 3$  is \_\_\_\_\_.

(A)  $\cos^{-1}\left(\frac{1}{8}\right)$

(B)  $\cos^{-1}\left(\frac{8}{21}\right)$

(C)  $\sin^{-1}\left(\frac{8}{21}\right)$

(D)  $\sin^{-1}\left(\frac{1}{8}\right)$

(Space for Rough Work)

29) The area of a triangle having the points A(-1,1,1), B(1,2,3) and C(2,3,1) as its vertices is \_\_\_\_\_.

(A)  $\frac{\sqrt{19}}{2}$

(B)  $\frac{\sqrt{21}}{2}$

(C)  $\frac{19}{2}$

(D)  $\frac{21}{2}$

30) The lines  $\frac{1-x}{3} = \frac{7y-14}{2p} = \frac{z-3}{2}$  and  $\frac{7-7x}{3p} = \frac{y-5}{1} = \frac{6-z}{5}$  are at right angles then value of  $p$  is \_\_\_\_\_.

(A)  $\frac{11}{7}$

(B) 7

(C)  $\frac{70}{11}$

(D)  $\frac{7}{11}$

31) The mean number of heads in three tosses of a fair coin is \_\_\_\_\_.

(A) 3.5

(B) 0.5

(C) 15

(D) 1.5

32) If for Bernoulli distribution  $B\left(10, \frac{1}{2}\right)$ , it is given that  $P(X \leq 2) = m\left(\frac{1}{2}\right)^{10}$  then

$m =$  \_\_\_\_\_.

(A) 101

(B) 55

(C) 56

(D) 46

(Space for Rough Work)



33) Probability that A speaks truth is  $\frac{4}{5}$ . A coin is tossed. A reports that a head appears.

The probability that actually there was head is \_\_\_\_\_.

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

~~(B)~~  $\frac{4}{5}$

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

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

34) Corner points of the feasible region of objective function  $Z = 3x + 9y$  of a linear programming problem are  $(0, 10)$ ,  $(5, 5)$ ,  $(15, 15)$  and  $(0, 20)$ . Minimum value of Z is \_\_\_\_\_.

(A) 70

~~(B)~~ 90

(C) 50

~~(D)~~ 60

35) If  $A = \begin{bmatrix} \cos \theta & \sin \theta \\ -\sin \theta & \cos \theta \end{bmatrix}$  then  $A^3 =$  \_\_\_\_\_.

(A)  $\begin{bmatrix} \cos 3\theta & \sin 3\theta \\ -\cos 3\theta & \sin 3\theta \end{bmatrix}$

(B)  $\begin{bmatrix} -\cos 3\theta & \sin 3\theta \\ \sin 3\theta & \cos 3\theta \end{bmatrix}$

(C)  $\begin{bmatrix} \cos 3\theta & \sin 3\theta \\ -\sin 3\theta & \cos 3\theta \end{bmatrix}$

(D)  $\begin{bmatrix} \cos 3\theta & -\sin 3\theta \\ -\sin 3\theta & \cos 3\theta \end{bmatrix}$

(Space for Rough Work)



36) If  $A = \begin{bmatrix} 1 & -1 & 1 \\ 2 & 1 & -3 \\ 1 & 1 & 1 \end{bmatrix}$ ,  $10B = \begin{bmatrix} 4 & 2 & 2 \\ -5 & 0 & \alpha \\ 1 & -2 & 3 \end{bmatrix}$  and B is inverse of A then  $\alpha = \underline{\hspace{2cm}}$ .

(A) 10

(B) 9

(C) 3

(D) 5

37) For real numbers  $x, y, z$  such that  $x \neq y \neq z$ ,  $\begin{vmatrix} x & x^2 & 1+x^3 \\ y & y^2 & 1+y^3 \\ z & z^2 & 1+z^3 \end{vmatrix} = 0$  and

$\begin{vmatrix} 1 & x & x^2 \\ 1 & y & y^2 \\ 1 & z & z^2 \end{vmatrix} \neq 0$  then  $xyz = \underline{\hspace{2cm}}$ .

(A) 2

(B) -1

(C) 0

(D) 1

(Space for Rough Work)



38) If  $a, b, c$  are measurements of sides of  $\Delta ABC$  and  $\begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix} = 0$  then

$$\sin^2 A + \sin^2 B + \sin^2 C = \underline{\hspace{2cm}}.$$

(A)  $\frac{13}{4}$

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

✓(C)  $\frac{15}{4}$

(D)  $\frac{11}{4}$

39) If  $A = \begin{bmatrix} 2 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 3 \end{bmatrix}$  then sum of all the elements of  $A^{-1} = \underline{\hspace{2cm}}.$

(A) 6

(B) -6

(C) 0

✓(D)  $\frac{11}{6}$

40) If  $\sin^{-1} a = \alpha + \beta, \sin^{-1} b = \alpha - \beta$  then  $\sin^2 \alpha + \cos^2 \beta = \underline{\hspace{2cm}}.$

✓(A)  $ab$

(B)  $1 - ab$

(C)  $ab - 1$

(D)  $1 + ab$

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(Space for Rough Work)



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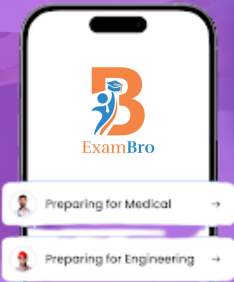


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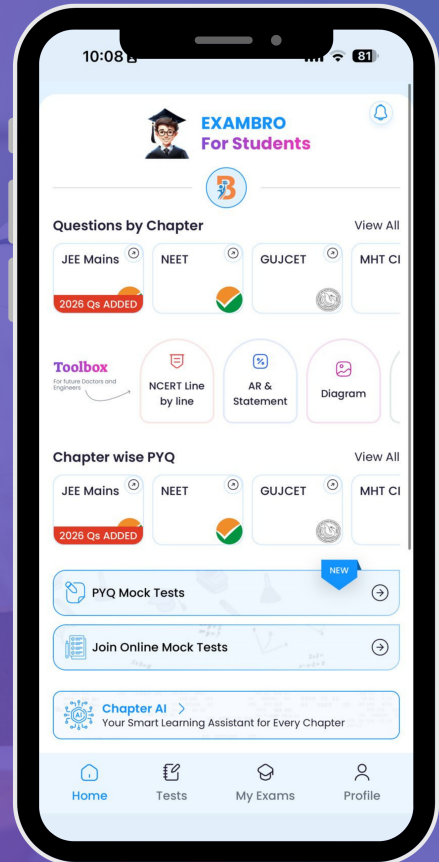
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<b>MATHS (ENG) SET - 08</b>			
<b>Question No.</b>	<b>Answer</b>	<b>Question No.</b>	<b>Answer</b>
1	D	21	C
2	B	22	D
3	C	23	A
4	A	24	B
5	C	25	A
6	A	26	B
7	C	27	D
8	D	28	C
9	A	29	B
10	D	30	C
11	D	31	D
12	B	32	C
13	D	33	B
14	D	34	D
15	B	35	C
16	B	36	D
17	C	37	B
18	A	38	B
19	B	39	D
20	D	40	D



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8	D	28	C
9	A	29	B
10	D	30	C
11	D	31	D
12	B	32	C
13	D	33	B
14	D	34	D
15	B	35	C
16	B	36	D
17	C	37	B
18	A	38	B
19	B	39	D
20	D	40	D