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# JEE (MAIN) 2026

MEMORY BASED QUESTIONS & TEXT SOLUTION

SHIFT-1

**DATE & DAY:** 04<sup>th</sup> April 2026 & Saturday

**PAPER-1**

**Duration:** 3 Hrs.

**Time:** 09:00 – 12:00 IST

**SUBJECT: MATHEMATICS**

Selections in JEE (Advanced)/  
IIT-JEE Since 2002

**52979**

Classroom: 35901 | Distance: 17078

Selections in JEE (Main)/  
AIEEE Since 2009

**262693**

Classroom: 194471 | Distance: 68222

Selections in NEET (UG)/  
AIPMT/AIIMS Since 2012

**22733**

Classroom: 15409 | Distance: 7324

**Admission Open for 2026-27**

**Target:** JEE (Advanced) | JEE (Main) | NEET (UG) | PCCP (Class V to X)

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**PART : MATHEMATICS**

1. In an A.P. first term is  $\frac{10}{3}$  and first 30 terms are non-negative such that sum of first 30 terms =  $(T_{30})^3$ , then d is equal to

(where  $T_n$  is  $n^{\text{th}}$  term of A.P., and d is the common difference of A.P.)

- (1)  $\frac{3}{87}$                       (2)  $\frac{5}{87}$                       (3)  $\frac{7}{87}$                       (4)  $\frac{9}{87}$

**Ans. (2)**

**Sol.**  $a = \frac{10}{3} : S_{30} = (T_{30})^3$

$$\frac{30}{2} \left[ 2 \times \frac{10}{3} + 29d \right] = \left[ \frac{10}{3} + 29d \right]^3$$

$$15 \left( \frac{20}{3} + 29d \right) = \left( \frac{10}{3} + 29d \right)^3$$

$$15 \left( \frac{10}{3} + \frac{10}{3} + 29d \right) = \left( \frac{10}{3} + 29d \right)^3$$

By observation  $\frac{10}{3} + 29d = 5$

$$29d = 5 - \frac{10}{3} = \frac{5}{3}$$

$$d = \frac{5}{87}$$

2. If  $f(x)$  is a non-constant polynomial satisfying  $f(x) = f'(x)f''(x)$  and  $f(0) = 0$ .

Then the value of  $\int_0^2 f(x)dx + f'(2) + f''(2)$  is :

- (1)  $\frac{14}{9}$                       (2)  $\frac{14}{11}$                       (3)  $\frac{11}{14}$                       (4)  $\frac{9}{14}$

**Ans. (1)**

**Sol.**  $n = n - 1 + n - 2 \Rightarrow n = 3$

$$f(x) = ax^3 + bx^2 + cx$$

$$f(x) = f'(x)f''(x)$$

$$(ax^3 + bx^2 + cx) = (3ax^2 + 2bx + c)(6ax + 2b)$$

$$x^3 : a = 18a^2 \Rightarrow a = \frac{1}{18}$$

$$x^2 : b = 6ab + 12ab$$

$$x : c = 4b^2 + 6ac \Rightarrow \frac{2c}{3} = 4b^2 \Rightarrow b^2 = \frac{c}{6}$$

const :  $bc = 0 \Rightarrow b = c = 0$

$$\int_0^2 f(x)dx + f'(2) + f''(2)$$

$$\int_0^2 ax^3 dx + 12a + 12a = 4a + 24a = 28a = \frac{28}{18} = \frac{14}{9}$$

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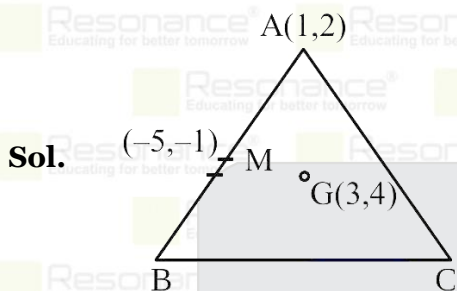
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3. Let in a  $\triangle ABC$ , given that  $A \equiv (1,2)$ , mid-point of  $AB$  is  $(-5, -1)$  and centroid is  $(3,4)$  then circumcentre is  $(\alpha, \beta)$ , then the value of  $21(\alpha + \beta)$  is :

(1) 305                      (2) 315                      (3) 351                      (4) 350

Ans. (2)



Now we can find the circumcenter of  $\triangle ABC$  as  $(-26,41)$   
 $\therefore$  Value of  $21(-26 + 41) = 315$

4. Let  $A$  is a matrix of order 3 such that  $|A| = -4$  then, the value of  $|\text{adj}(\text{adj}(2\text{adj}A)^{-1})|$  is
- (1)  $\frac{1}{2^{26}}$                       (2)  $\frac{1}{2^{27}}$                       (3)  $\frac{1}{2^{28}}$                       (4)  $\frac{1}{2^{29}}$

Ans. (3)

Sol.  $|\text{adj}(\text{adj}(2\text{adj}A)^{-1})|$

$$= |(2\text{adj}A)^{-1}|^4 = \frac{1}{|2\text{adj}A|^4} = \frac{1}{(2^3)^4 |\text{adj}A|^4} = \frac{1}{2^{12}(-4)^8} = \frac{1}{2^{28}}$$

5. If  $A = \frac{\sin 3^\circ}{\cos 9^\circ} + \frac{\sin 9^\circ}{\cos 27^\circ} + \frac{\sin 27^\circ}{\cos 81^\circ}$  and  $B = \tan 81^\circ - \tan 3^\circ$ , find  $\frac{B}{A}$
- (1) 2                      (2) 4                      (3) 6                      (4) 8

Ans. (1)

Sol. Consider  $E = \frac{\sin \theta}{\cos 3\theta} \Rightarrow E = \frac{2 \sin \theta \cos \theta}{2 \cos 3\theta \cos \theta}$   
 $\Rightarrow E = \frac{\sin 2\theta}{2 \cos 3\theta \cos \theta} \Rightarrow E = \frac{\sin(3\theta - \theta)}{2 \cos 3\theta \cos \theta}$

$$\Rightarrow E = \frac{1}{2} [\tan 3\theta - \tan \theta]$$

$$\therefore A = \frac{1}{2} [\tan 9^\circ - \tan 3^\circ + \tan 27^\circ - \tan 9^\circ + \tan 81^\circ - \tan 27^\circ]$$

$$\therefore A = \frac{1}{2} [\tan 81^\circ - \tan 3^\circ]$$

$$\therefore \frac{B}{A} = 2$$

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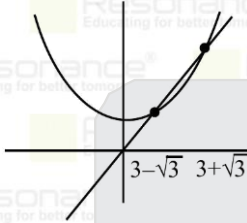
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6. If  $f(x) = \min\{2x^2 + 3, 6x\} + |x - 1|\cos\left(x^2 - \frac{1}{4}\right)$  then the number of points of non derivability of  $f(x)$  is/are  
 (1) 1 (2) 2 (3) 3 (4) 4

Ans. (3)

Sol.  $|x - 1|\cos\left(x^2 - \frac{1}{4}\right)$  is non derivable at  $x = 1$



for  $\min\{2x^2 + 3, 6x\}$

$$\therefore 2x^2 + 3 = 6x$$

$$\Rightarrow 2x^2 - 6x + 3 = 0$$

$$\Rightarrow x = 3 \pm \sqrt{3}$$

$\therefore$  2 points of non derivability for this part Hence there are three points of non derivability.

7. If  $S = \left\{A: A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}, A^2 - 4A + 3I = \text{Null matrix}, a, b, c, d, \in \{0,1,2,3,4\} \text{ \& } \text{Tr}(A) = 4\right\}$

Then the number of element of set S is/are :

- (1) 19 (2) 18 (3) 17 (4) 15

Ans. (1)

Sol.  $ad - bc = 3; a + d = 4$

C-1  $a = 0, d = 4; bc = -3$  Not possible

C-2  $a = 1, d = 3; bc = 0$

↓

$$\text{No. of matrix} = 2 \times (5^2 - 4^2)$$

C-3  $a=2, ; bc=1$

↓

$$\text{No. of matrix} = 1$$

$$\text{Total} = 2 \times 9 + 1 = 19$$

8. If  $\int_{-2}^2 ([\sin x] + |x \sin x|) dx = 2 \sin 2 - 4 \cos 2 - \beta$  then the value of  $|\beta|$  where  $[\cdot]$  is GIF is  
 (1) 4 (2) 12 (3) 16 (4) 20

Ans. (2)

Sol.  $\int_{-2}^2 [\sin x] dx + 2 \int_0^2 x \sin x dx$

$$2(-2 \cos 2 + \sin 2) - 4$$

$$\text{So } \beta = 4$$

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9. The domain of  $f(x) = \cos^{-1}\left(\frac{4x+2[x]}{3}\right)$  (where  $[x]$  denotes greatest integer function) is

- (1)  $\left[-\frac{1}{4}, \frac{3}{4}\right]$       (2)  $\left[-\frac{3}{4}, \frac{1}{4}\right]$       (3)  $\left[-\frac{3}{4}, -\frac{1}{4}\right]$       (4)  $\left[\frac{1}{4}, \frac{3}{4}\right]$

Ans. (1)

Sol.  $-1 \leq \frac{4x+2[x]}{3} \leq 1$

$$4x + 3 + 2[x] \geq 0$$

$$4x + 2[x] - 3 \leq 0$$

$$2[x] \geq -4x - 3$$

$$2[x] \leq 3 - 4x$$

$$x \in \left[-\frac{1}{4}, \infty\right) \dots (1)$$

$$x \in \left(-\infty, \frac{3}{4}\right] \dots (2)$$

$$(1) \cap (2)$$

$$x \in \left[-\frac{1}{4}, \frac{3}{4}\right]$$

10. Let  $y = \tan^{-1}\left(\frac{3\cos x - 4\sin x}{4\cos x + 3\sin x}\right) + \tan^{-1}\left(\frac{x}{1+\sqrt{1+x^2}}\right)$ . Then the value of  $\frac{dy}{dx}$  at  $x = \frac{\sqrt{3}}{2}$  is :

- (1)  $-\frac{5}{7}$       (2)  $\frac{3}{7}$       (3)  $-\frac{3}{2}$       (4)  $\frac{5}{7}$

Ans. (1)

Sol.  $y = \tan^{-1}\left[\frac{\frac{3}{4} - \tan x}{1 + \frac{3}{4}\tan x}\right] + \tan^{-1}\left[\frac{x}{1+\sqrt{1+x^2}}\right]$

Put  $\tan^{-1} x = \theta$

$$\tan^{-1}\left[\frac{\tan \theta}{1 + \sec \theta}\right] = \tan^{-1}\frac{\sin \theta}{1 + \cos \theta}$$

$$\tan^{-1} \tan \frac{\theta}{2} = \frac{\theta}{2} = \frac{\tan^{-1} x}{2}$$

$$y = \tan^{-1} \frac{3}{4} - \tan^{-1}(\tan x) + \frac{\tan^{-1} x}{2}$$

$$y = \tan^{-1} \frac{3}{4} - x + \frac{\tan^{-1} x}{2}$$

$$\frac{dy}{dx} = -1 + \frac{1}{2(1+x^2)}$$

$$\frac{dy}{dx}\bigg|_{\frac{\sqrt{3}}{2}} = -1 + \frac{1}{2\left(1+\frac{3}{4}\right)} = -1 + \frac{2}{7} = -\frac{5}{7}$$

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11. If  $Z$  be a complex number such that  $|Z + 2| = |Z - 2|$  and  $\arg\left(\frac{Z-3}{Z+1}\right) = \frac{\pi}{4}$  then the value of  $|Z|^2$  is:  
 (1) 7 (2) 8 (3) 9 (4) 10

Ans. (3)

Sol.  $|Z + 2| = |Z - 2|$

$$\Rightarrow x = 0$$

$$\arg\frac{Z-3}{Z+1} = \frac{\pi}{4}$$

$$\arg\frac{(x+iy)-3}{(x+iy)+1} = \frac{\pi}{4}$$

$$x = 0$$

$$\arg\frac{(-3+iy)(1-iy)}{1+y^2} = \frac{\pi}{4}$$

$$\Rightarrow \frac{-3+y^2}{y+3} = 1$$

$$y^2 - y - 6 = 0$$

$$y = 3, -2$$

$$Z = 3i, -2i$$

$$\Rightarrow |Z|^2 = 9 \text{ or } 4$$

12. If coefficient of  $x^3$  in  $(1+x)^3 + (1+x)^4 + \dots + (1+x)^{99} + (1+kx)^{100}$  is  $\binom{100}{3}\left(\frac{101}{4} - 43n\right)$  then the value of  $(k^3 + 43n)$  is :

(1) 1

(2) 2

(3) 3

(4) 4

Ans. (1)

Sol.  ${}^3C_3 + {}^4C_3 + {}^5C_3 + \dots + {}^{99}C_3 + {}^{100}C_3 k^3 = \binom{100}{3}\left(\frac{101}{4} - 43n\right)$

$${}^{100}C_4 + {}^{100}C_3 k^3 = \binom{101}{4} - 43n$$

$${}^{100}C_4 + {}^{100}C_3 k^3 = {}^{101}C_4 - {}^{100}C_3 \cdot 43n$$

$${}^{100}C_3(43n + k^3) = {}^{101}C_4 - {}^{100}C_4$$

$${}^{100}C_3(43n + k^3) = {}^{100}C_3$$

$$k^3 + 43n = 1$$

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13. Consider the differential equation  $\frac{dy}{dx} = (x^2 + x + 1)(y^2 - y + 1)$ . If  $y(0) = \frac{1}{2}$  then the value of  $2(y(1)) - 1$  is
- (1)  $\sqrt{3} \tan\left(\frac{11\sqrt{3}}{12}\right)$  (2)  $\sqrt{3} \tan\left(\frac{12\sqrt{3}}{17}\right)$   
 (3)  $\sqrt{2} \tan\left(\frac{11\sqrt{3}}{12}\right)$  (4)  $\sqrt{2} \tan\left(\frac{12\sqrt{3}}{11}\right)$

Ans. (1)

Sol.  $\frac{dy}{y^2 - y + 1} = (x^2 + x + 1)dx$

$$\frac{dy}{\left(y - \frac{1}{2}\right)^2 + \left(\frac{\sqrt{3}}{2}\right)^2} = (x^2 + x + 1)dx$$

$$\frac{2}{\sqrt{3}} \tan^{-1} \left( \frac{y - \frac{1}{2}}{\frac{\sqrt{3}}{2}} \right) = \frac{x^3}{3} + \frac{x^2}{2} + x + C$$

$$\frac{2}{\sqrt{3}} \tan^{-1} \left( \frac{2y - 1}{\sqrt{3}} \right) = \frac{x^3}{3} + \frac{x^2}{2} + x + C$$

$$y(0) = \frac{1}{2} \Rightarrow 0 = 0 + 0 + 0 + C \Rightarrow C = 0$$

$$\frac{2}{\sqrt{3}} \tan^{-1} \left( \frac{2y - 1}{\sqrt{3}} \right) = \frac{x^3}{3} + \frac{x^2}{2} + x$$

put  $x = 1$

$$\frac{2}{\sqrt{3}} \tan^{-1} \left( \frac{2y - 1}{\sqrt{3}} \right) = \frac{1}{3} + \frac{1}{2} + 1 = \frac{2 + 3 + 6}{6} = \frac{11}{6}$$

$$\tan^{-1} \left( \frac{2y - 1}{\sqrt{3}} \right) = \frac{11\sqrt{3}}{12}$$

$$\frac{2y - 1}{\sqrt{3}} = \tan\left(\frac{11\sqrt{3}}{12}\right) \Rightarrow 2y(1) - 1 = \sqrt{3} \tan\left(\frac{11\sqrt{3}}{12}\right)$$

14. If  $\vec{a}_R = \tan \theta_R \hat{i} + \hat{j}$  &  $\vec{b}_R = \hat{i} - \cot \theta_R \hat{k}$  where  $\theta_R = \frac{2^{R-1}\pi}{2^{N+1}}$  then the value of  $\frac{\sum_{R=1}^N |\vec{a}_R|^2}{\sum_{R=1}^N |\vec{b}_R|^2}$  is
- (1) 1 (2) 2 (3) 3 (4) 4

Ans. (1)

Sol.  $|a_R|^2 = \sec^2 \theta_R$   $|b_R|^2 = \operatorname{cosec}^2 \theta_R$

$$S = \frac{\sec^2 \frac{\pi}{2^{N+1}} + \sec^2 \frac{2\pi}{2^{N+1}} \dots + \sec^2 \frac{2^{N-1}\pi}{2^{N+1}}}{\operatorname{cosec}^2 \frac{\pi}{2^{N+1}} + \operatorname{cosec}^2 \frac{2\pi}{2^{N+1}} \dots + \operatorname{cosec}^2 \frac{2^{N-1}\pi}{2^{N+1}}}$$

$$S = \frac{\sec^2 \frac{\pi}{2^{N+1}} + \sec^2 \frac{2\pi}{2^{N+1}} \dots + \sec^2 \frac{2^{N-1}\pi}{2^{N+1}}}{\sec^2 \frac{2^{N-1}\pi}{2^{N+1}} + \dots + \sec^2 \frac{\pi}{2^{N+1}}} = 1$$

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15. Let mean and median of 9 observations 8,13, a, 17, 21,51,103, b, 67 are 40 and 21 respectively where  $a > b$ . If mean deviation about median is 26 then  $2a$  is :-

(1) 130                      (2) 131                      (3) 51                      (4) 40

Ans. (2)

Sol.  $\frac{8+13+a+17+21+51+103+b+67}{9} = 40$

$a + b + 280 = 360 \Rightarrow a + b = 80$  (1)

8,13,17, b, 21,51, a, 67,103 ( $a > b$ )

Mean deviation =  $\frac{\sum |x_i - M|}{n}$

$\Rightarrow \frac{\sum |x_i - 21|}{9} = 26$

$\Rightarrow \frac{1}{9} (13 + 8 + 4 + 21 - b + 0 + 30 + a - 21 + 46 + 82) = 26$

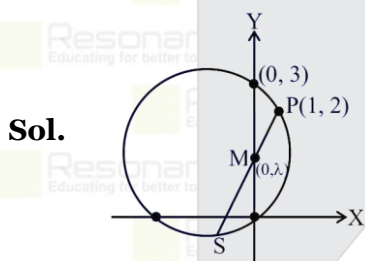
$\Rightarrow a - b = 51$  (2)

(1) + (2)  $\Rightarrow 2a = 131$

16. A circle  $x^2 + y^2 + x - 3y = 0$  passes through  $P(1,2)$  if 2 chords (PS & PR) drawn from P are bisected by y - axis, then mid point of RS is  $(\alpha, \beta)$ , find  $6(\alpha + \beta)$

(1) 3                      (2) 5                      (3) 4                      (4) 7

Ans. (1)



chord PS bisected by y-axis

at point  $M(0, \lambda)$

$\therefore S(-1, 2\lambda - 2)$

Which satisfy equation of circle

$\Rightarrow (-1)^2 + (2\lambda - 2)^2 - 1 - 3(2\lambda - 2) = 0$

$\Rightarrow \lambda = 1$  &  $\lambda = \frac{5}{2}$

Therefore two such chord PS & PR will exist

When  $\lambda = 1 \Rightarrow S(-1, 0)$

When  $\lambda = \frac{5}{2} \Rightarrow R(-1, 3)$

$\therefore$  Mid point of R & S will be  $(-1, \frac{3}{2})$

$\therefore \alpha = -1, \beta = \frac{3}{2}$

$\therefore 6(\alpha + \beta) = 3$

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17. Let  $A = \{1,2,3,4,5\}$  and  $B = \{a,b,c\}$  then total number of functions from A to B which are not onto are

- (1) 84 (2) 93 (3) 100 (4) 54

Ans. (2)

Sol. Total into function =  $3 \times 2^5 - 3$

18. Find number of ways of arranging 4 Boys & 3 Girls such that all girls are not together :

- (1) 4430 (2) 4445 (3) 4320 (4) 4431

Ans. (3)

Sol. 4B, 3G

Total - when all girls are together

$$\square - [5 \times 3]$$

$$7 \times 6 [5 - [5 \times 3]$$

$$6 \times 5 \times 6 = 36 \times 120 = 4320$$

19. If Latus rectum of parabola  $y^2 = 4kx$  and ellipse  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$  coincide then the value of  $e^2 + 2\sqrt{2}$  is, where e is eccentricity of ellipse

- (1) 2 (2) 3 (3) 4 (4) 3/2

Ans. (2)

Sol.  $LRx = ae$  &  $x = k$

$$k = ae \frac{b^2}{a} = 2k$$

$$b^2 = 2a^2e$$

$$\frac{b^2}{a^2} = 2e$$

$$e^2 = 1 - \frac{b^2}{a^2} = 1 - 2e$$

$$e^2 + 2e - 1 = 0$$

$$e = \sqrt{2} - 1$$

$$e^2 = 3 - 2\sqrt{2}$$

$$e^2 + 2\sqrt{2} = 3$$

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20. If  $L_1: x - y = 0$ ,  $L_2: y = -3x$ ,  $L_3$  is obtuse angle bisector of  $L_1$  &  $L_2$  and  $L_4$  is  $x + 3 = 0$ .

A is point of intersection of  $L_4$  &  $L_1$

B is point of intersection of  $L_4$  &  $L_2$

C is point of intersection of  $L_4$  &  $L_3$

Then the value of  $\frac{(BC)^2}{(AC)^2}$

- (1) 4 (2) 5 (3) 6 (4) 7

Ans. (2)

Sol.  $L_3: \frac{x-y}{\sqrt{2}} = \frac{y+3x}{\sqrt{10}}$

$$\Rightarrow L_3: x - y = \frac{y + 3x}{\sqrt{5}}$$

Pt. A (-3, -3)

B (-3, 9)

C  $\left(-3, \frac{3(3-\sqrt{5})}{1+\sqrt{5}}\right)$

$$BC = \left| \frac{9 - 3\sqrt{5} - 9 - 9\sqrt{5}}{1 + \sqrt{5}} \right| = \frac{12\sqrt{5}}{1 + \sqrt{5}}$$

$$AC = \left| \frac{9 - 3\sqrt{5} + 3 + 3\sqrt{5}}{1 + \sqrt{5}} \right| = \frac{12}{1 + \sqrt{5}}$$

$$\frac{BC}{AC} = \sqrt{5}$$

$$\Rightarrow \frac{BC^2}{AC^2} = 5$$

21. If a coin is tossed 8 times and probability of getting exactly 3 heads in first 6 tosses and exactly 2 tails in last 5 tosses is p then 64 p is

Ans. (7)

Sol. -----

HHH TTT -- ×

---      ---      --  
2H, 1 T      1H, 2 T      2H      →       $3 \times 3 = 9$

---      ---      --  
1H, 2 T      2H, 1 T      1 T, 1H      →       $3 \times 3 \times 2 = 18$

-----  
3 T      3H      2 T      →      1

Now,  $p = \frac{28}{2^8} = \frac{7}{64}$

∴  $64p = 7$

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