



RANKRIDGE IIT JEE/NEET JUNIOR COLLEGE (LONGTERM)

TELANGANA

STREAM: JRMPG
Time: 3 Hours

WTA-01

Date: 25-08-2025
Max Marks: 180

MATHEMATICS (ONE OR MORE CORRECT ANSWER TYPE)

Section-I This section contains **THERE (03)** questions.

- Each question has **FOUR** options (A), (B), (C) and (D). **ONE OR MORE THAN ONE** of these four option(s) is(are) correct answer(s).
- For each question, choose the option(s) corresponding to (all) the correct answer(s).
- Answer to each question will be evaluated according to the following marking scheme :

Full Marks :+4 ONLY if (all) the correct option(s) is(are) chosen;

Partial Marks: +3 If all the four options are correct but ONLY three options are chosen;

Partial Marks: +2 If three or more options are correct but ONLY two options are chosen, both of which are correct ;

Partial Marks: +1 If two or more options are correct but ONLY two options are chosen, and it is a correct option ;

Zero Marks : 0 If none of the options is chosen (i.e. the question is unanswered);

Negative Marks : -2 In all other cases.

1. The equation of the straight line passing through (4,3) and making intercepts on the co-ordinate axes whose sum is -1, is

(A) $\frac{x}{-2} + \frac{y}{1} = -1$ ~~(B) $\frac{x}{-2} + \frac{y}{1} = 1$~~

(C) $\frac{x}{2} + \frac{y}{3} = 1$ ~~(D) $\frac{x}{2} - \frac{y}{3} = 1$~~

2. The equation of a line that is parallel to, and a distance of four units from, the line

$y = \frac{3}{4}x + 6$, is

(A) $y = \frac{3x}{4} + 1$ (B) $y = \frac{3x}{4} - 1$

~~(C) $y = \frac{3x}{4} + 11$~~ (D) $y = \frac{3x}{4} + 2$

3. The points (1,3) & (5,1) are two opposite vertices of a rectangle. The other two vertices lie on the line $y = 2x + c$.

~~(A) Vertices are (2,0) & (4,4)~~

(B) Value of c is 4

(C) Vertices are (0,2) & (4,4)

~~(D) Vale of c is -4~~

(SINGLE CORRECT ANSWER TYPE)

Section-II This section contains **FOUR (04)** questions.

- Each question has **FOUR** options (A), (B), (C) and (D). **ONLY ONE** of these four options is the correct answer.

- For each question, choose the option corresponding to the correct answer.

- Answer to each question will be evaluated according to the following marking scheme:

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4. The point P (a,b) undergoes the following three transformations successively:-

(A) reflection about the line $y = x$

(B) translation through 2 units along the positive direction of x-axis

(C) rotation through angle $\pi/4$ about the origin in the anti-clockwise direction

If the co-ordinates of the final position of the

point p are $\left(-\frac{1}{\sqrt{2}}, \frac{7}{\sqrt{2}}\right)$, then the value of

$2a + b$ is equal to

~~(A) 13.~~

~~(B) 9~~

(C) 5

~~(D) 7~~

5. Let $C(\alpha, \beta)$ be the circumcenter of the triangle formed by the line $4x + 3y = 69$,

$4y - 3x = 17$ and $x + 7y = 61$. Then

$(\alpha - \beta)^2 + \alpha + \beta$ is equal to

(A) 18

~~(B) 17~~

(C) 15

~~(D) 16~~

6. Let R be the point (3,7) and let P and Q be two points on the line $x + y = 5$ such that PQR is an equilateral triangle. Then the area of ΔPQR is:

(A) $\frac{25}{4\sqrt{3}}$ (B) $\frac{25\sqrt{3}}{2}$
 (C) $\frac{25}{\sqrt{3}}$ (D) $\frac{25}{2\sqrt{3}}$

7. If the axes are rotated through an angle α , the new equation of $x \sin \alpha - y \cos \alpha = p$ is
 (A) $X = p$ (B) $Y = p$
 (C) $X + p = 0$ (D) $Y + p = 0$

(NON-NEGATIVE INTEGER.)

Section-III This section contains SIX (06) questions.

- The answer to each question is a NON-NEGATIVE INTEGER.
- For each question, enter the correct integer corresponding to the answer using the mouse and the onscreen virtual numeric keypad in the place designated to enter the answer.
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8. When (0,0) shifted to (3,-3) the coordinates of P(5,5), Q(-2,4) and R(7,-7) in the new system are A,B,C then area of ΔABC is in square units 43
9. By translation of axes the equation $xy - x + 2y - 6 = 0$ changed as $XY = C$ then $C =$ 4
10. The acute angle θ through which the coordinate axes should be rotated for the point A(2,4) to attain the new abscissa 4 is given by $\tan \theta = \frac{k}{4}$ then $k =$ 3
11. If $a+b+c \neq 0$, $ax+by+c=0$, $bx+cy+a=0$, $cx+ay+b=0$ are concurrent then $\frac{a^2+b^2+c^2}{ab+bc+ca} =$ 1
12. If the lines $y = -3x + 4$, $ay = x + 10$ and $2y + bx + 9 = 0$ represent three consecutive sides of a rectangle then $ab =$ 18

13. If $2x + 3y + 5 = 0$, $kx + 6y + 7 = 0$ are parallel, then the value of $k =$ 4

(MATCHING TYPE)

Section-IV This section contains FOUR (04) Matching List Sets.

- Each set has ONE Multiple Choice Question.
- Each set has TWO lists : List-I and List-II.
- List-I has Four entries (A), (B), (C) and (D) and List-II has Five entries (I), (II), (III), (IV) and (V).
- FOUR options are given in each Multiple Choice Question based on List-I and List-II and ONLY ONE of these four options satisfies the condition asked in the Multiple Choice Question.
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14. Match Column-I and Column-II

	Column-I	Column-II
P.	If the lines $x + p = 0$, $y + 2 = 0$ and $3x + 2y + 5 = 0$ are concurrent then p is	1. $\frac{7}{\sqrt{20}}$
Q.	The distance between the parallel lines $x - 2y + 3 = 0$, $4y - 2x + 1 = 0$ is	2. 3
R.	The area of the triangle formed by the coordinate axes and the line $\frac{x}{2} + \frac{y}{3} = 1$ is	3. $\frac{1}{3}$
S.	Perpendicular distance from the origin to the line $3x + 4y - 25 = 0$	4. 5

	P	Q	R	S
(A)	3	1	2	4
(B)	3	2	1	4
(C)	2	1	3	4
(D)	2	3	4	1

15. Match Column-I and Column-II

	Column-I	Column-II
P.	Equation of the line passing through (1,3) and perpendicular to	1. $\frac{29}{4}$

	$2x - 3y + 4 = 0$ is If the slope of a line is $\frac{1}{\sqrt{3}}$ then its inclination is		2. $3x + 2y - 9 = 0$
R.	x-intercept of the line parallel to $4x + 7y = 9$ and passing through $(2,3)$ is	3.	$y + 5 = 0$
S.	Equation of the horizontal line passing through the point $(2,-5)$ is	4.	$\frac{\pi}{6}$

	P	Q	R	S
(A)	1	4	3	2
(B)	2	3	1	4
(C)	2	4	1	3
(D)	2	4	3	1

16. Observe the following list with respect to the line $ax + by + c = 0$

	List-I	List-II
A.	Perpendicular distance from $(0,0)$	1. $\frac{-c}{b}$
B.	X-intercept of the line	2. $\left(-\frac{c}{a}, -\frac{c}{b}\right)$
C.	Y-intercept of the line	3. $\frac{ c }{\sqrt{a^2 + b^2}}$
D.	Circumcentre of triangle OAB	4. $\left(\frac{-c}{2a}, \frac{-c}{2b}\right)$
		5. $\frac{-c}{a}$

Then the correct answer is

	A	B	C	D
(A)	3	5	1	2
(B)	3	5	1	4
(C)	3	4	1	5
(D)	1	2	3	4

17. Match Column-I and Column-II

	Column-I	Column-II
P.	Find the point to which the origin has to be shifted to eliminate x,y terms in the equation $4x^2 + 9y^2 - 8x + 36y + 4 = 0$	1. $(5, -3)$
Q.	If the point $(3, -2)$ transformed to $(-2, 1)$, when the origin is shifted to p, then p is	2. $(12, 1)$
R.	The image of the point $(-2, -7)$ under transformation $(x, y) \rightarrow (x - 2y, -3x + y)$ is	3. $(1, -3)$
S.	If the axes are rotated through an angle	4. $(1, -2)$

45°, the coordinates of the point $(2\sqrt{2}, -\sqrt{2})$ in the new system is		
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P	Q	R	S
(A)	4	2	1
(B)	4	1	2
(C)	2	4	1
(D)	4	2	1

$P \rightarrow 4$
 $Q \rightarrow 1$

PHYSICS
(ONE OR MORE CORRECT ANSWER TYPE)

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18. The maximum speed of a car on a curved path of radius 'r' and the coefficient of friction μ_k is

$$(A) v = \sqrt{\frac{\mu_k}{gr}} \quad (B) v = \sqrt{\mu_k gr}$$

$$(C) v = \sqrt{\frac{gr}{\mu_k}} \quad (D) v = \sqrt{\frac{1}{\mu_k gr}}$$

19. Suppose a disc is rotating counter clockwise in the plane of the paper then

(A) Its angular velocity vector will be perpendicular to the page pointing up out of the page

(B) Its angular velocity vector will be perpendicular to the page pointing inwards

(C) Its angular velocity vector acts along the tangent to the disc

20. (D) None of the above
A vehicle moves safe on rough, curved and unbanked road. Then
 (a) The direction of static friction is radially outwards
 (b) The direction of static friction is radially inwards
 (c) The direction of kinetic friction is tangential to curved path
 (d) Static friction does not exist
 (A) a & b are correct (B) c & d are correct
 (C) b & c are correct (D) a & c are correct

(SINGLE CORRECT ANSWER TYPE)

Section-II This section contains FOUR (04) questions.

- Each question has FOUR options (A), (B), (C) and (D). ONLY ONE of these four options is the correct answer.
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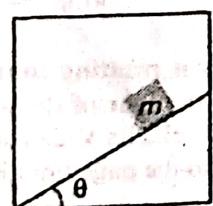
Zero Marks : 0 If none of the options is chosen (i.e. the question is unanswered);

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21. A block of weight 100N is lying on a rough horizontal surface. If coefficient of friction $\frac{1}{\sqrt{3}}$. The least possible force that can move the block is

(A) $\frac{100}{\sqrt{3}} N$ (B) $100\sqrt{3} N$
 (C) $50\sqrt{3} N$ (D) $50 N$

22. A block is sliding along inclined plane as shown in figure. In the acceleration of chamber is 'a' as shown in the figure. The time required to cover a distance L along inclined plane is



(A) $\sqrt{\frac{2L}{g \sin \theta - a \cos \theta}}$ (B) $\sqrt{\frac{2L}{g \sin \theta + a \sin \theta}}$

(C) $\sqrt{\frac{2L}{g \sin \theta + a \cos \theta}}$ (D) $\sqrt{\frac{2L}{g \sin \theta}}$

23. A particle of mass m is suspended from the ceiling through a string of length L. The particle moves in a horizontal circle of radius r. The speed of the particle is

(A) $\frac{rg}{\sqrt{L^2 - r^2}}$ (B) $\frac{r\sqrt{g}}{(L^2 - r^2)^{\frac{1}{4}}}$
 (C) $\frac{r\sqrt{g}}{(L^2 - r^2)^{\frac{1}{2}}}$ (D) $\frac{mgL}{(L^2 - r^2)^{\frac{1}{2}}}$

24. A car is moving in a circular horizontal track of radius 10m with a constant speed of 10 ms^{-1} . A plumb bob is suspended from the roof of the car by a string of length 1m. The angle made by the string with vertical is ($g = 10 \text{ ms}^{-2}$)

(A) 0° (B) 30°
 (C) 45° (D) 60°

(NON-NEGATIVE INTEGER.)

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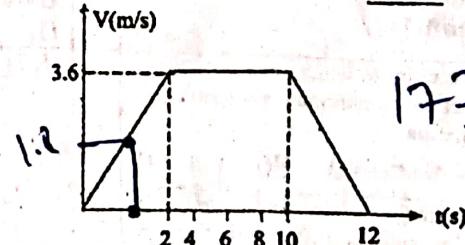
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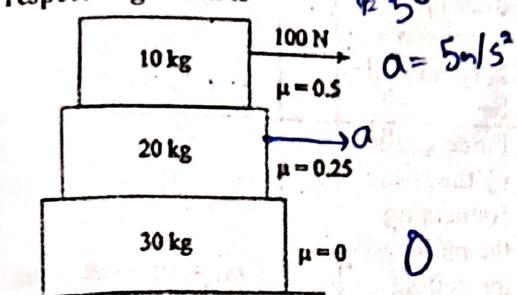
Full Marks : +4 If ONLY the correct integer is entered; **Zero Marks : 0** In all other cases.

25. A lift is going up, the total mass of the lift and the passengers is 1500 kg. The variation in the speed of lift is shown in fig. Then the tension in the rope at $t = 1$ s will be it as $100x$ then x is _____.

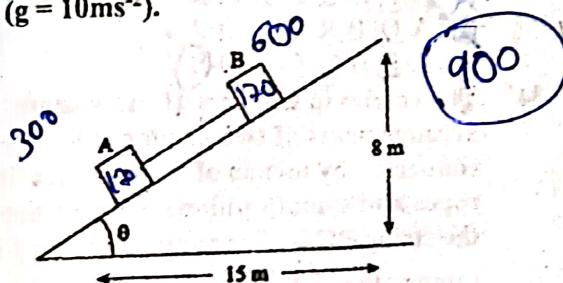


26. Three point masses each of mass m are joined together using a string to form an equilateral triangle of side a. The system is placed on a smooth horizontal surface and

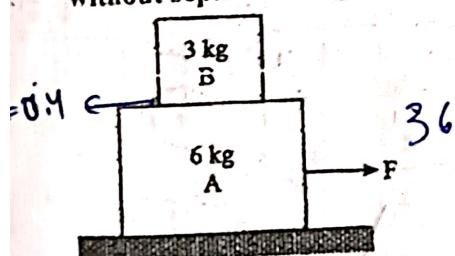
- rotated with a constant angular velocity ω about a vertical axis passing through the centroid. Then the tension in each string is N=?
7. Three blocks are kept as shown in figure. Acceleration of 20 kg block with respect to ground is



8. Blocks A and B shown in the figure are connected with a bar of negligible weight. A and B each has mass 170Kg, the coefficient of friction between A and the plane is 0.2 and that between B and the plane is 0.4. What is the total force of friction between the blocks and the plane ($g = 10 \text{ ms}^{-2}$)?



9. Two blocks A and B of masses 6 kg and 3 kg rest on a smooth horizontal surface as shown in the fig. If coefficient of friction between A and B is 0.4, the maximum horizontal force which can make them without separation is ____.



30. The minimum force required to move a body up on an inclined plane is three times the minimum force required to prevent it from sliding down the plane. If the coefficient of friction between the body

and the inclined plane is $\frac{1}{2\sqrt{3}}$, the angle of the inclined plane is 30° .

(MATCHING TYPE)
Section-IV This section contains FOUR (04) Matching List Sets.

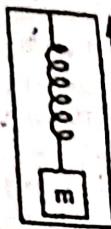
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31. Match the situation in column-I to the accelerations of blocks in the column-II (acceleration due to gravity is g and F is an additional force applied to one of the blocks?)

Column-I	Column-II
A.	P. $\frac{g}{5}$
B.	Q. $\frac{g}{3}$
C.	R. $\frac{g}{2}$
D.	S. $\frac{2g}{3}$
	T. Zero

- (A) A-R, B-T, C-R, D-P
 (B) A-P, B-T, C-R, D-P
 (C) A-Q, B-T, C-R, D-S
 (D) A-P, B-Q, C-R, D-P

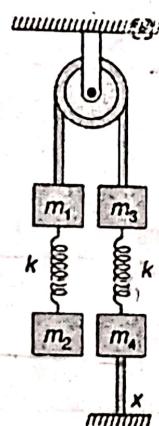
32. $m = 2\text{kg}$ is attached to the spring balance & lift is accelerating up with a_1 & down with accelerations a_2 respectively.



Column-I		Column-II	
A.	Reading of spring balance is 2.4 kg	P.	Lift is accelerating up with 2m/s^2
B.	Reading of spring balance is 1.2 kg	Q.	Lift is at rest
C.	Reading of spring balance is 2 kg	R.	Lift falls freely
D.	Reading of spring balance is zero	S.	Lift is accelerating down with 4m/s^2

- (A) A-P, B-Q, C-R, D-P
 (B) A-P, B-S, C-Q, D-R
 (C) A-P, B-Q, C-R, D-S
 (D) A-P, B-Q, C-R, D-S

33. The system shown in the figure is in equilibrium with all the springs and strings taut. All strings and springs are massless.



Column-I		Column-II	
A.	Tension in the string X connected to m_4 is	P.	$2(m_1 + m_2)g$
B.	Tension in the spring between m_3 and m_4 immediately after the	Q.	$(m_1 + m_2 - m_3 - m_4)g$

	string X is cut is		
C.	Acceleration of the mass m_4 immediately after the lower thread X is cut will be	R.	$(m_1 + m_2 - m_3)g$
D.	Force applied by the string connecting the pulley to the ceiling immediately after the lower thread X is cut will be	S.	$\left(\frac{m_1 + m_2 - m_3 - m_4}{m_4}\right)g$

- (A) A-P, B-Q, C-R, D-P
 (B) A-P, B-S, C-Q, D-R
 (C) A-Q, B-R, C-S, D-P
 (D) A-P, B-Q, C-R, D-S
34. The entries in Column-II show some arrangements of two or more blocks connected by means of light inextensible ropes and smooth pulleys. The tension in the string PQ is $T = \eta mg$. Column-I lists some value of η . Match appropriate options (neglect friction)

Column-I		Column-II	
A.	$\eta = \frac{1}{2}$	P.	
B.	$\eta = \frac{4}{3}$	Q.	
C.	$\eta = \frac{8}{3}$	R.	

the onscreen virtual numeric keypad in the place designated to enter the answer.

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42. The bond order Cl-O bond on ClO_3^- is 'X'. Then '3X' is 6.

43. The molecules in which bond order is fractional CO_2 , CO_3^{2-} , O_3 , N_2 , N_2^+ .

44. The number of species involved in sp^3d hybridisation are XeF_2 , SCl_4 , PCl_5 , SF_6 , ClF_3 , ICl_2 , XeF_4 , XeOF_2 .

45. In face centred cubic lattice, a unit cell is shared equally by how many unit cells?

46. Bond order of CO molecule 3.

47. The number of electrons present in anti bonding molecular orbitals in O_2^+ 5.

(MATCHING TYPE)

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48. Matching type questions:

	List-I		List-II
A.	NO	P.	1.5
B.	CO	Q.	2.0
C.	O_2^-	R.	2.5
D.	O_2^+	S.	3.0

~~(A)-R; B-S; C-P; D-Q~~

- (B) A-Q; B-P; C-R; D-S
 (C) A-P; B-Q; C-R; D-S
 (D) A-Q; B-S; C-P; D-Q

49.

	Column-1 Molecule	Column-2 Hybridisation	Column-3 Shape
1.	SCl_2	A. sp^3	P. Linear
2.	BF_3	B. sp^3d	Q. Angular
3.	H_2O	C. sp^2	R. Triangular
4.	XeF_2	D. Sp	S. Tetrahedra

The correct combination is

- (A) 1 \rightarrow C \rightarrow R (B) 2 \rightarrow D \rightarrow Q
~~(C) 3 \rightarrow A \rightarrow Q~~ (D) 4 \rightarrow B \rightarrow R

50. Match List-I and List-II

	List-I		List-II
A.	BrF_3	I.	sp^3
B.	IF_5	II.	sp^3d
C.	NO_3^-	III.	sp^3d^2
D.	BF_4^-	IV.	sp^2

~~(A) A-II, B-III, C-IV, D-I~~

~~(B) A-III, B-II, C-I, D-IV~~

~~(C) A-I, B-II, C-III, D-IV~~

~~(D) A-IV, B-III, C-II, D-I~~

51. Match List-I with List-II.

	List-I (Species)		List-II (Shape)
A.	XeF_6	I.	See-saw
B.	SCl_4	II.	Distorted octahedral
C.	CH_4	III.	Bent-T-shape
D.	ClF_3	IV.	Tetrahedral

Choose the correct answer from the options given below.

~~(A) II; (B) I; (C) IV; (D) III~~

~~(B) (A)-IV; (B)-I, (C)-II, (D)-III~~

~~(C) (A)-IV; (B)-III; (C)-II; (D)-I~~

~~(D) (A)-II; (B)-I; (C)-III; (D)-IV~~

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