

NEW STANDARD ACADEMY

Date : 30-06-2026

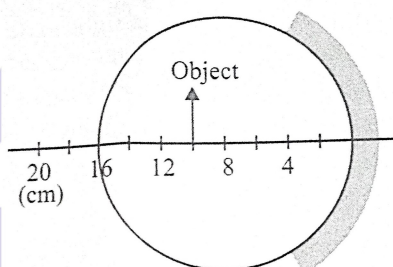
CLASS : 12TH JEE

Marks:300

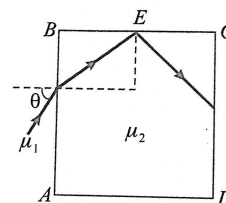
Time: 3 hours

PHYSICS

1. A spherical mirror is obtained as shown in the figure from a hollow glass sphere. If an object is positioned in front of the mirror, what will be the nature and magnification of the image of the object? (Figure drawn as schematic and not to scale)

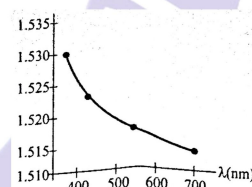


- (1) Inverted, real and magnified
 (2) Erect, virtual and magnified
 (3) Erect, virtual and unmagnified
 (4) Inverted, real and unmagnified
2. If the distance between object and its two times magnified virtual image produced by a curved mirror is 15 cm, the focal length of the mirror must be
- (1) 10/3cm (2) +10cm
 (3) -10cm (4) 15cm
3. A transparent cube of side d , made of a material of refractive index μ_2 , is immersed in a liquid of refractive index μ_1 ($\mu_1 < \mu_2$). A ray is incident on the face AB at an angle θ (shown in the figure). Total internal reflection takes place at point E on the face BC. The θ must satisfy



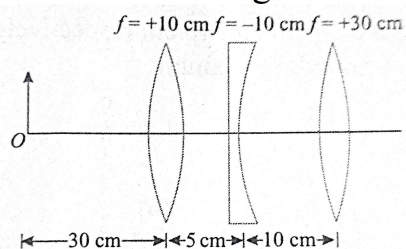
- (1) $\theta < \tan^{-1} \frac{\mu_1}{\mu_2}$
 (2) $\theta < \sin^{-1} \sqrt{\frac{\mu_2^2}{\mu_1^2} - 1}$
 (3) $\theta > \sin^{-1} \frac{\mu_1}{\mu_2}$
 (4) $\theta > \sin^{-1} \sqrt{\frac{\mu_2^2}{\mu_1^2} - 1}$

4. The variation of refractive index of a crown glass thin prism with wavelength of the incident light is shown. Which of the following graphs is the correct one, if D_m is the angle of minimum deviation?



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

5. Find the distance of the image from object O, formed by the combination of lenses in the figure:



- (1) 75 cm (2) 10 cm
(3) infinity (4) 20 cm
6. A microscope is focused on an object at the bottom of a bucket. If liquid with refractive index $\frac{5}{3}$ is poured inside the bucket, then microscope have to be raised by 30 cm to focus the object again. The height of the liquid in the bucket is
- (1) 75 cm (2) 50 cm
(3) 18 cm (4) 12 cm
7. An observer looks at a distant tree of height 10 m with a telescope of magnifying power of 20D. To the observer the tree appears
- (1) 10 times taller
(2) 10 times nearer
(3) 20 times taller
(4) 20 times nearer
8. A torque meter is calibrated to reference standards of mass, length and time each with 5% accuracy. After calibration, the measured torque with this torque meter will have net accuracy of
- (1) 15% (2) 25%
(3) 75% (4) 5%
9. The area of a square is 5.29 cm^2 . The area of such squares taking into account the significant figures is
- (1) 37 cm^2 (2) 37.0 cm^2
(3) 37.03 cm^2 (4) 37.03 cm^2
10. Match List-I with List-II

List I		List II	
A.	Spring constant	I.	(T^{-1})
B.	Angular speed	II.	(MT^{-2})
C.	Angular momentum	III.	(ML^2)
D.	Moment of Inertia	IV.	(ML^2T^{-1})

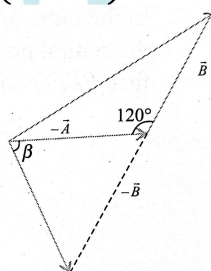
Choose the correct answer from the options given below:

- (1) A-II, B-I, C-IV, D-III
(2) A-IV, B-I, C-III, D-II
(3) A-II, B-III, C-I, D-IV
(4) A-I, B-III, C-II, D-IV

11. Two forces having magnitude A and A/2 are perpendicular to each other. The magnitude of their resultant is

- (1) $(\sqrt{5} A)/4$ (2) $\frac{5A}{2}$
(3) $\frac{\sqrt{5}A^2}{2}$ (4) $\frac{\sqrt{5}A}{2}$

12. The angle between vector $(\vec{A})$ and $(\vec{A} - \vec{B})$ is



- (1) $\tan^{-1}\left(\frac{B \cos \theta}{A - B \sin \theta}\right)$
(2) $\tan^{-1}\left(\frac{\sqrt{3}B}{2A - B}\right)$
(3) $\tan^{-1}\left(\frac{-\frac{B}{2}}{A - B \frac{\sqrt{3}}{2}}\right)$
(4) $\tan^{-1}\left(\frac{A}{0.7B}\right)$

13. If $x = at + bt^2$ where x is the distance travelled by the body in kilometres while t is the time in seconds, then the units of b are

- (1) km/s (2) km - s
(3) km / s² (4) km - s²

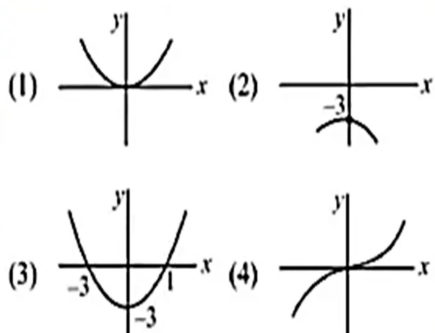
14. The dimensional formula for impulse is

- (1) MLT^{-2} (2) ML^2T^{-1}
(3) MLT^{-1} (4) M^2LT^{-1}

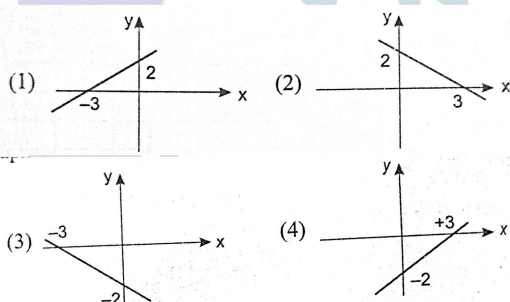
15. The potential energy of a particle varies with distance x as $U = \frac{Ax^{1/2}}{x^2+B}$ where A and B are constants. The dimensional formula for $A \times B$ is

- (1) $M^1 L^{7/2} T^{-2}$ (2) $M^1 L^{11/2} T^{-2}$
 (3) $M L^{5/2} T^{-2}$ (4) $M^1 L^{9/2} T^{-2}$

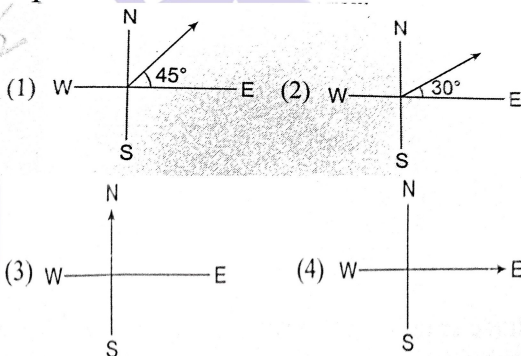
16. If $y = x^2 + 2x - 3$, $y-x$ graph is



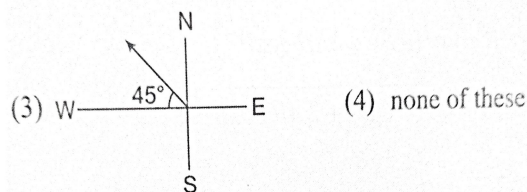
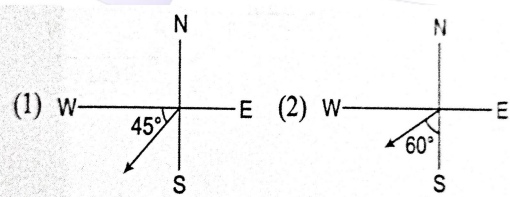
17. If equation of a straight line is given by $2x - 3y = 6$, then $y-x$ graph of the line should be



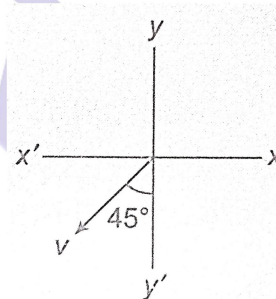
18. Represent the North - East direction.



19. Represent direction along South - west

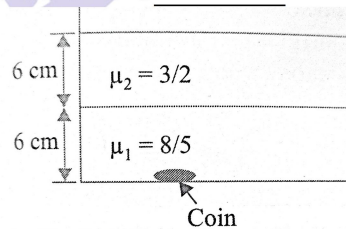


20. The velocity of a particle is v as shown in the figure. The magnitude of velocity is $2\sqrt{2} \text{ m s}^{-1}$. Find the x -component and y -component of velocity

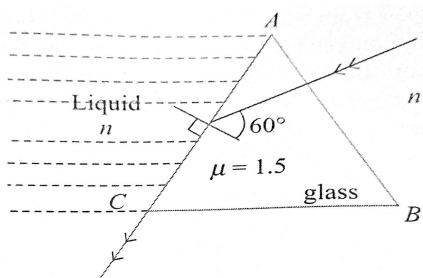


- (1) $v_x = -2 \text{ m s}^{-1}$ and $v_y = 2 \text{ m s}^{-1}$
 (2) $v_x = 2 \text{ m s}^{-1}$ and $v_y = -2 \text{ m s}^{-1}$
 (3) $v_x = -2 \text{ m s}^{-1}$ and $v_y = -2 \text{ m s}^{-1}$
 (4) none of the above

21. Two immiscible liquids of refractive indices $\frac{8}{5}$ and $\frac{3}{2}$ respectively are put in a beaker as shown in the figure. The height of each column is 6 cm. A coin is placed at the bottom of the beaker. For near normal vision, the apparent depth of the coin is α cm. The value of α is _____



22. In the given figure, the face AC of the equilateral prism is immersed in a liquid of refractive index ' n '. For incident angle 60° at the side AC, the refracted light beam just grazes along face AC. The refractive index of the liquid $n = \frac{\sqrt{x}}{4}$. The value of x is _____.



23. The resistance $R = V/I$ where $V = (50 \pm 2)V$ and $I = (20 \pm 0.2) A$. The percentage error in R is 'x' %. The value of 'x' to the nearest integer is _____

24. A vector has magnitude same as that of $\vec{A} = 3\hat{i} + 4\hat{j}$ and is parallel to $\vec{B} = 4\hat{i} + 3\hat{j}$. The x and y components of this vector in first quadrant are x and 3 respectively where x _____

25. For $z = a^2 x^3 y^{1/2}$ where 'a' is a constant. If percentage error in measurement of 'x' and 'y' are 4% and 12%, respectively, then the percentage error for 'z' will be _____ %

CHEMISTRY

26. 1 Faraday of electricity is passed through the solution containing 1 mole each on $AgNO_3$, $CuSO_4$, $AlCl_3$, and $SiCl_4$. Elements are discharged at the cathode. Number of moles of Ag, Cu, Al and Si formed will be in the ratio of
(1) 1:1:1:1 (2) 1:2:3:4
(3) 6:4:3:1 (4) 12:6:4:3

27. Electrolysis products in gaseous state at cathode and anode are same when reactant is

- (1) aq NaCl (2) aq $NaNO_3$
(3) aq NaH (4) aq Na_2SO_4

28. Which pair of electrolysis could be distinguished by the products of electrolysis using inert electrodes?

- (1) 1 M $CuSO_4$, 1 M $CuCl_2$
(2) 1M KCl, 1 M KI
(3) 1 M $AgNO_3$, 1 M $CuSO_4$
(4) 1M $CuBr_2$, 1 M NiBr

29. 0.1 M H_2SO_4 solution is diluted to 0.01 M H_2SO_4 . Hence, its molar conductivity will be

- (1) 100 times (2) 10 th times
(3) 10 times (4) 1000 times

30. At 298 K, given specific conductance of saturated $AgCl$ solution = $3.41 \times 10^{-6} \Omega^{-1} cm^{-1}$ and that of water used = $1.60 \times 10^{-6} \Omega^{-1} cm^{-1}$. Equivalent conductance of saturated $AgCl$ solution = $138.3 \Omega^{-1} cm^{-2} equiv^{-1}$. Thus, solubility product (K_{sp}) of $AgCl$ is
(1) 1.81×10^{-6} (2) 1.31×10^{-5}
(3) 1.72×10^{-10} (4) 1.72×10^{-8}

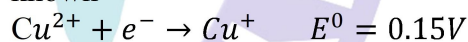
31. The resistivity of aluminium is $2.824 \times 10^{-8} \Omega m$. Thus, conductance across a piece of aluminium wire, that is 2.0 mm in diameter and 1.00 m long is (assume current = 1.25 A)

- (1) 111.0 S (2) 1.11 S
(3) 0.111 S (4) 1111 S

32. One mole of Ag_2CO_3 is strongly heated in an open vessel. Residue will be

- (1) 1 mole of Ag_2O (2) 2 moles of Ag
(3) 1 mole of Ag_2O and 1 mole of CO_2
(4) 2 moles of Ag, 0.5 mole of O_2 and 1 mole of CO_2

33. If for the half-cell reactions, E^0 values are known



Predict which exists in aqueous solution?

- (1) Copper (I) sulphate
(2) Copper (II) sulphate
(3) Both (1) and (2)
(4) None of these

34. In the following batteries, alkaline electrolytes are used

- I. Mercury
II. Nickel-Cadmium
III. Modified Leclanche cell

Cell potential is found to be independent of $[OH^-]$ in

- (1) I, II, III (2) I, II
(3) II, III (4) Only III

35. Rusting of iron or corrosion of active metal is initiated by

- (1) cathodic reaction when oxygen gas which is dissolved in H_2O , is reduced to OH^-
(2) acid rain which oxidises metal to metal ion
(3) Both (1) and (2)

- (4) none of the above
36. Some statement(s) about dry-cell batteries are
 (1) Anode is a zinc metal and cathode is inert graphite in a paste of MnO_2 and C-black
 (II) Electrolyte is a moist paste of NH_4Cl and ZnCl_2
 (III) Oxidation product is Zn^{2+} and reduction product is Mn_2O_3
 Select the correct statement(S).
 (1) I, II and III (2) I and II
 (3) I and III (4) II and III
37. The standard electrode potential for the two electrode A^+/A and B^+/B are respectively 0.5 V and 0.75 V. The emf of the given cell $\text{A}|\text{A}^+ (a=1)||\text{B}^+ (a=1)|\text{B}$ will be
 (1) 1.25 V (2) -1.25 V
 (3) -0.25 V (4) 0.25 V
38. The reference electrode is made by using
 (1) ZnCl_2 (2) CuSO_4
 (3) HgCl_2 (4) Hg_2Cl_2
39. Which of the following statement is true for the electrochemical Daniel cell?
 (1) Electrons flow from copper electrode to zinc electrode
 (2) Current flows from zinc electrode to copper electrode
 (3) Cations moves toward copper electrode which is cathode
 (4) Cations move to word zinc electrode
40. Which of the following statements are true for an fuel cells
 (1) They run till the reactants are active
 (2) They are free from pollution
 (3) They are more efficient
 (4) All of the above
41. Degree of ionisation of a solution depends upon
 (1) Temperature
 (2) Nature of the electrolyte
 (3) Nature of the solvent
 (4) None of these
42. Electrolysis of molten anhydrous calcium chloride produces
 (1) Calcium (2) Phosphorus
 (3) Sulphur (4) Sodium
43. Given standard electrode potentials
 $\text{Fe}^{2+} + 2\text{e}^- \rightarrow \text{Fe} \quad E^\circ = -0.44\text{V}$
 $\text{Fe}^{3+} + 3\text{e}^- \rightarrow \text{Fe} \quad E^\circ = -0.036\text{V}$
 The standard electrode potential (E°) for $\text{Fe}^{3+} + \text{e}^- \rightarrow \text{Fe}^{2+}$
 (1) + 0.772V (3) + 0.417V
 (2) -0.772 V (4) -0.414 V
44. The required charge for one equivalent weight of silver deposite on cathode is
 (1) $9.65 \times 10^7 \text{ C}$ (2) $9.65 \times 10^4 \text{ C}$
 (3) $9.65 \times 10^3 \text{ C}$ (4) $9.65 \times 10^5 \text{ C}$
45. The number of Faradays needed to reduce 4 gram equivalents of Cu^{++} to Cu metal will be
 (1) 1 (2) 2
 (3) 1/2 (4) 4
46. Three faradays electricity was passed through an aqueous solution of iron (II) bromide. The weight of iron metal (at. wt. = 56) deposited at the cathode (in gm) is
 (1) 56 (2) 84
 (3) 112 (4) 168
47. A silver cup is plated with silver by passing 965 coulombs of electricity, the amount of silver deposited is
 (1) 9.89 g (2) 107.87 g
 (3) 1.0787 g (4) 1.002 g
48. 4 g of copper was dissolved in concentrated nitric acid. The copper nitrate solution on strong heating gave 5 g of its oxide. The equivalent weight of copper is
 (1) 23 (2) 32
 (3) 12 (4) 20
49. The amount of silver deposited by passing 241.25 coulomb of current through silver nitrate solution is
 (1) 2.7 g (2) 2.7 mg
 (3) 0.27 g (4) 0.54 g
50. Charge required to liberate 11.5 g sodium is
 (1) 0.5 F (2) 0.1 F
 (3) 1.5 F (4) 96500 coulombs

MATHS

51. Let Z be the set of integers if $A = \{x \in \mathbb{Z} : 2^{(z+2)}(x^2 - 5x + 6) = 1\}$ and $B = \{x \in \mathbb{Z} : -3 < 2x - 1 < 9\}$, then the number of subsets of the set $A \times B$ is
 (1) 2^{18} (2) 2^{10}
 (3) 2^{15} (4) 2^{12}
52. If $A = \{x \in \mathbb{R} : |x| < 2\}$ and $B = \{x \in \mathbb{R} : |x - 2| \geq 3\}$; then
 (1) $B - A = \mathbb{R} - (-2, 5)$
 (2) $A \cap B = (-2, -1)$
 (3) $A \cup B = \mathbb{R} - (2, 5)$
 (4) $A - B = [-1, 2)$
53. Let $a, b \in \mathbb{C}$. Let α, β be the roots of the equation $x^2 + ax + b = 0$ If $\beta - \alpha = \sqrt{11}$

and $\beta^2 - \alpha^2 = 3i\sqrt{11}$ then $(\beta^3 - \alpha^3)^2$ is equal to:

- (a) 160 (b) 176
(c) 194 (d) 187

54. Let $A = \{X \text{ in } \mathbb{R} : |x + 1| < 2\}$ and $B = \{x \in \mathbb{R} : |x - 1| \geq 2\}$ Then which one of the following statement is NOT true?

- (1) $A - B = (-1, 1)$
(2) $B - A = \mathbb{R} - (-3, 1)$
(3) $A \cap B = (-3, 1)$
(4) $B = \mathbb{R} - [1, 3]$

55. The number of integral solutions x of

$$\log_{\left(x+\frac{7}{2}\right)}\left(\frac{x-7}{2x-3}\right)^2 \geq 0 \text{ is}$$

- (1) 7 (2) 6
(3) 5 (4) 8

56. The domain of the function

$$f(x) = \frac{\cos^{-1}\left(\frac{x^2-5x+6}{x^2-9}\right)}{\log_e(x^2-3x+2)} \text{ is}$$

- (1) $(-\infty, 1) \cup (2, \infty)$
(2) $(2, \infty)$
(3) $(-1/2, 1) \cup (2, \infty)$
(4) $[-1/2, 1) \cup (2, \infty) - \left\{\frac{3+\sqrt{5}}{2}, \frac{3-\sqrt{5}}{2}\right\}$

57. Considering only the principal values of the inverse trigonometric functions, the domain

$$\text{of the function } f(x) = \cos^{-1}\left(\frac{x^2-4x+2}{x^2+3}\right) \text{ is}$$

- (1) $(-\infty, 1/4]$ (2) $[-1/4, \infty)$
(3) $(-1/3, \infty)$ (4) $(-\infty, 1/3]$

58. Let $[]$ denote the greatest integer $\leq t$. Then the equation in x, $[x]^2 + 2[x+2] - 7 = 0$ has

- (1) no integral solution
(2) exactly four integral solutions
(3) exactly two solutions
(4) infinitely many solutions

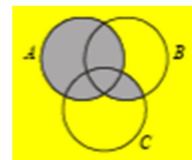
59. $\sin^{-1}\left(\sin\frac{2\pi}{3}\right)\cos^{-1}\left(\cos\frac{7\pi}{3}\right) + \tan\left(\tan\frac{3\pi}{4}\right)$

- (1) $\frac{11\pi}{12}$ (2) $\frac{17\pi}{12}$
(3) $\frac{31\pi}{12}$ (4) $\frac{3\pi}{4}$

60. If x, y, z are in A.P. and $\tan^{-1}(x) \tan^{-1}(y)$ and $\tan^{-1}(z)$ are also in A.P., then

- (1) $x = y = z$ (2) $2x = 3y = 6z$
(3) $6x = 3y = 2z$ (4) $6x = 4y = 3z$

61. The shaded portion in the given Venn diagram represents:



- (1) $A \cup (B \cup C)$
(2) $A \cup (B \cap C)$
(3) $(A \cap B) \cap C$
(4) $(A \cap B) \cup C$

62. Let $A = \{1, 2, 3, \dots, 10\}$ $B = \{2, 3, 5, 7\}$ then the number of subsets C of A such that B triangle C = {2} is:

- (1) 2^4 (2) 2^5
(3) 2^{4-1} (4) none of these

63. If $A = \{1, 3, 5, 7, 9, 11, 13, 15, 17\}$ $B = \{2, 4, \dots, 18\}$ and N is the universal set, then $A' \cup ((A \cup B) \cap B')$ is:

- (1) A (2) N
(3) B (4) none of these

64. 67 If $A = \{x : x \text{ is a prime number and } x \leq 8\}$, $B = \{x : x^2 - 10x + 24 = 0\}$ and Z be the universal set under consideration, then $n(A' \cup ((A \cup B) \cap B')) =$

- (1) 0 (3) 2
(2) 1 (4) none of these

65. From 50 students taking examination in Mathematics physics and Chemistry each of the students has passed in at least one of the subject 37 passed Mathematics 24 physics and 43 chemistry Atmost 19 passed mathematics and physics atmost 29 mathematics and chemistry atmost 20 physics and chemistry then the, largest numbers that could have passed all three examinations, are

- (1) 12 (2) 14
(3) 15 (4) 16

66. The domain of the function

$$f(x) = \sqrt{e^{\sin^{-1}(\log_9 x^2)}} \text{ is}$$

- (1) $1/3 \leq x \leq 3$
(2) $[-3, -1/3] \cup [1/3, 3]$
(3) $-3 \leq x \leq -1/3$
(4) none of these

67. A mapping $f : \mathbb{N} \rightarrow \mathbb{N}$ where N is the set of natural numbers is defined as

$$f(n) = \begin{cases} n^2 & \text{for no odd} \\ 2n + 1, & \text{for } n \text{ even} \end{cases} \text{ for } n \in \mathbb{N}.$$

- Then f is
(1) surjective but not injective
(2) injective but not surjective
(3) bijective
(4) neither injective nor surjective

68. If $f: \mathbb{R} \rightarrow \mathbb{S}$ defined by $f(x) = \sin x - \sqrt{3} \cos x + 1$ is onto, then the interval of $\mathbb{S}$ is:

- (1) $[0, 1]$ (2) $[-1, 1]$
(3) $[0, 3]$ (4) $[-1, 3]$

69. Let $f(x) = \sec^{-1}[1 + \cos^2 x]$, where $[\]$ denotes the greatest integer function. Then, the range of $f(x)$ is:

- (1) $[1, 2]$ (2) $[0, 2]$
(3) $\{\sec^{-1}1, \sec^{-1}2\}$ (4) none of these

70. 73. A function $f(x)$ given by

$$f(x) = \begin{cases} -x^2 \sin \frac{\pi x}{2}, & \text{if } |x| \leq 1 \\ x|x|, & \text{if } |x| \geq 1 \end{cases}$$

- (1) an even function (2) an odd function
(3) a periodic function (4) none of these

71. If of the function $f(x) = \sec^{-1}$

$\left(\frac{2x}{5x+3}\right)$ is $[\alpha\beta) \cup (\gamma\delta]$ then $|3\alpha + 10(\beta + \gamma) + 21\delta|$ is equal to _____

72. . The value of $((\log_2 9)^2)^{\frac{1}{\log_2(\log_2 9)}} \times$

$(\sqrt{7})^{\frac{1}{\log_4 7}}$ is _____

73. Let $A = \{(x, y) \in \mathbb{R} \times \mathbb{R} : |x + y| \geq 3\}$ and $B = \{(x, y) : (x+|y|) \geq 3\}$. If $C = (x, y) \in A \cap B : x = 0 \text{ or } y = 0\}$, then $\sum_{(x,y) \in C} |x + y|$ _____

74. The sum of the squares of the roots of $|x - 2|^2 + |x - 2| - 2|0|$ and the squares of the roots of $x^2 - 2|x - 3| - 5 = 0$ is _____

75. The sum of all the roots of the equation $|x^2 - 8x + 15| - 2x + 7 = 0$ is _____

76.