



Absolute Minds

Medical & IIT Academy

An initiative of Accord school

SET-1

Admission & Scholarship Test | IIT JEE

Duration: 3.0 Hrs.

Maximum Marks: 340

PAPER SCHEME:

- The paper contains 85 Objective Type Questions divided into four sections: Section-I, Section-II, Section-III, and Section-IV.
- Section-I contains 10 Multiple Choice Questions (1-10) based on IQ. Each question has 4 choices (1), (2), (3), and (4) out of which ONLY ONE CHOICE is correct.
- Section-II contains 25 Multiple Choice Questions (11-35) based on MATHEMATICS. Each question has 4 choices (1), (2), (3), and (4) out of which ONLY ONE CHOICE is correct.
- Section-III contains 25 Multiple Choice Questions (36-60) based on PHYSICS. Each question has 4 choices (1), (2), (3), and (4) out of which ONLY ONE CHOICE is correct.
- Section-IV contains 25 Multiple Choice Questions (61-85) based on CHEMISTRY. Each question has 4 choices (1), (2), (3), and (4) out of which ONLY ONE CHOICE is correct.

MARKING SCHEME:

- Section I, II, III and IV: For each question 4 marks will be awarded for correct answer and -1 (negative) marking for incorrect answer.

GENERAL INSTRUCTIONS

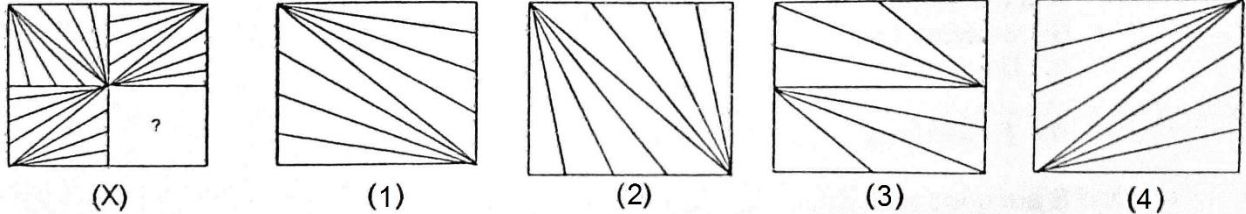
- For answering a question an ANSWER SHEET (OMR SHEET) is provided separately. Please fill your Name, Father's Name, Address, Mobile Number, Current school name, Roll Number, properly in the space provided in the ANSWER SHEET. IT IS YOUR OWN RESPONSIBILITY TO FILL THE OMR SHEET CORRECTLY.
- A blank space has been provided at the end of question booklet for rough work. You will not be provided with any supplement or rough sheet.
- The use of log tables, calculator and any other electronic device is strictly prohibited.
- Violating the examination room discipline will immediately lead to the cancellation of your paper and no excuses will be entertained.
- No one will be permitted to leave the examination hall before the end of the test.
- Please submit both the question paper and the answer sheet to the invigilator before leaving the examination hall.

SECTION-I

IQ

Directions (Question 1): In the given question, complete the missing portion of the given pattern by selecting from the given alternatives (1), (2), (3) and (4).

1.



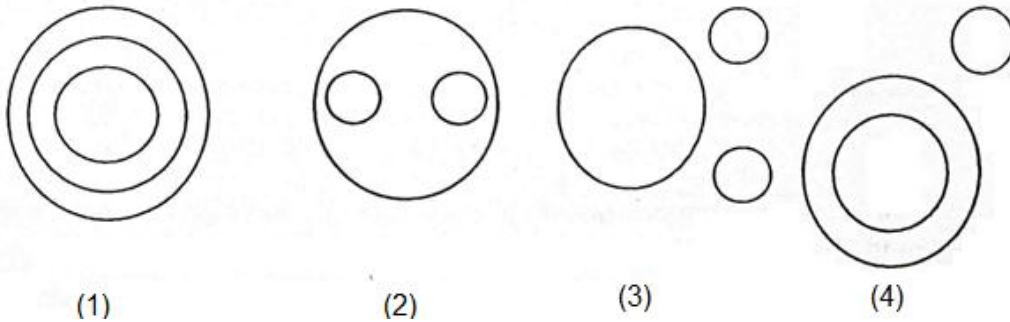
2. A man leaves for his office from his house. He walks towards East. After moving a distance of 20m, he turns south and walks 10m. Then he walks 35m towards the west and further 5 m towards the north. He then turns towards east and walks 15m. What is the straight distance (in metres) between this initial and final positions?

1) 0 2) 5 3) 10 4) cannot be determined

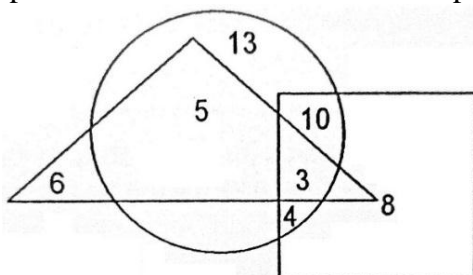
3. I am facing south. I turn right and walk 20m. Then I turn right again and walk 10m. Then I turn left and walk 10m and then turning right walk 20m. Then I turn right again and walk 60m. In which direction am I from the starting point?

1) North 2) North west 3) East 4) North east

Directions (Questions 4-6): Each of the questions below contains three elements. These three elements may or may not have some linkage. Each group of the elements may fit into one of the diagrams at (A), (B), (C) & (D). You have to indicate groups of elements in each of the questions fit into which of the diagrams given below. The letter indicating the diagram is the answer.

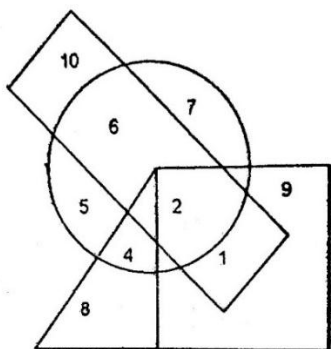


4. Vegetables, Potato, Cabbage
 5. Table, Chair, Furniture
 6. Week, Day, Year
 7. In the following diagram, the square represents women, triangle represents corporate managers and circle represents MBAs. Which numbered part represents- Women –MBA- Corporate Managers?



1) 3 2) 5 3) 8 4) 13

8. In the following figure, the boys who are athletes and disciplined are indicated by which number?



The triangle represents girls, the circle athletes, the rectangle boys and the square disciplined.

- 1) 1 2) 2 3) 6 4) 10
9. In a certain code language, '253' means 'books are old', '546' means 'man is old' and '378' means 'buy good books'. What stands for 'are' in that code?
- 1) 2 2) 4 3) 5 4) 6

Directions (Question 10): These questions are based on the following alphabet series.

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

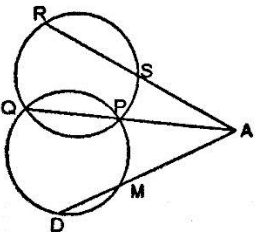
10. If the above alphabet is written in the reverse order, which will be the eight letter to the right of O?
- 1) F 2) G 3) V 4) W

SECTION-II

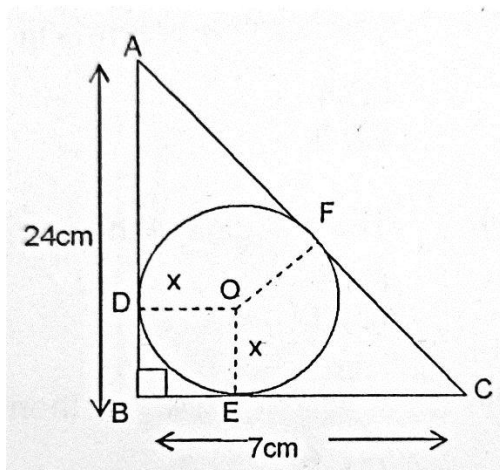
MATHS

11. The least number which is a perfect square and is divisible by each of 16, 20 and 24 is
- 1) 240 2) 1600
3) 2400 4) 3600
12. If n is an even natural number, then the largest natural number by which $n(n + 1)(n + 2)$ is divisible, is
- 1) 6 2) 8
3) 12 4) 24
13. A can do a piece of work in 24 days. If B is 60% more efficient than A, then the number of days required by B to do the twice as large as the earlier work is
- 1) 24 2) 36
3) 15 4) 30
14. If the n th term of an A.P is given by $a_n = 5n - 3$, then the sum of first 10 terms is
- 1) 225 2) 245
3) 255 4) 270
15. If the points A(4, 3) and B(x, 5) are on the circle with Centre O(2,3), then the value of x is
- 1) 0 2) 1
3) 2 4) 3

16. If $b \tan \theta = a$, the value of $\frac{a \sin \theta - b \cos \theta}{a \sin \theta + b \cos \theta}$ is
- 1) $\frac{a-b}{a^2+b^2}$ 2) $\frac{a+b}{a^2+b^2}$
 3) $\frac{a^2+b^2}{a^2-b^2}$ 4) $\frac{a^2-b^2}{a^2+b^2}$
17. The length of a string between a kite and a point on the ground is 85 m. if the string makes an angle θ with level ground such that $\tan \theta = \frac{15}{8}$, then the height of kite is
- 1) 75 m 2) 78.05 m
 3) 226 m 4) None of these
18. In two concentric circles, if chords are drawn in the outer circle which touch the inner circle, then
- 1) All chords are of different lengths. 2) All chords are of same length
 3) Only parallel chords are of same length. 4) Only perpendicular chords are of same length
19. If a circular grass of 35 m in radius has a path 7 m. wide running around it on the outside, then the area of the path is
- 1) 1450 m^2 2) 1576 m^2
 3) 1694 m^2 4) 3368 m^2
20. Tickets numbered from 1 to 20 are mixed up together and then a ticket is drawn at random, then the probability that the ticket has a number which is a multiple of 3 or 7 is:
- 1) $\frac{2}{5}$ 2) $\frac{3}{5}$
 3) $\frac{4}{5}$ 4) $\frac{1}{5}$
21. ABCD is a parallelogram, E is the mid-point of AB and CE bisects $\angle BCD$. Then $\angle DEC$ is
- 1) 60° 2) 90°
 3) 100° 4) 120°
22. $\sqrt{\sqrt{50} + \sqrt{48}} = k(\sqrt{3} + \sqrt{2})$, then k=
- 1) $2^{1/2}$ 2) 2
 3) $2^{1/4}$ 4) None
23. The number of trailing zeroes in the product $2^{10} \times 3^{12} \times 5^{15} \times 10^{18}$ is
- 1) 10 2) 15
 3) 18 4) 28
24. If $\sin x + \sin^2 x = 1$, then the value $\cos^2 x + \cos^4 x$ is
- 1) 1 2) 2
 3) 0 4) -1
25. $\frac{\tan \theta}{\sec \theta - 1} + \frac{\tan \theta}{\sec \theta + 1}$ is equal to
- 1) $\operatorname{cosec} \theta$ 2) $2 \operatorname{cosec} \theta$
 3) $\sec \theta$ 4) $2 \sec \theta$

26. The value of $\cos^2 5^\circ + \cos^2 10^\circ + \cos^2 15^\circ + \dots + \cos^2 90^\circ$ is
 1) 0
 2) $8\frac{1}{2}$
 3) 10
 4) $2\frac{1}{2}$
27. The sum of the roots of the equation $4x^2 + 5 - 8x = 0$ is equal to
 1) -2
 2) -5
 3) $-\frac{5}{4}$
 4) None of these
28. As the number of sides of a polygon increases from 3 to n, the sum of the exterior angles formed by extending each side in succession
 1) increases
 2) decreases
 3) remains constant
 4) becomes (n-3) straight angles
29. $\frac{2^{n+4} - 2(2^n)}{2(2^{n+3})}$ when simplified is
 1) $2^{n+1} - \frac{1}{8}$
 2) $1 - 2^n$
 3) $1 + 2^n$
 4) $\frac{7}{8}$
30. In the given figure AMD, APQ and ASR are secants of given circle. If AM=6cm, MD=4cm and AS=5cm then RS=
- 
- 1) 5 cm
 2) 7 cm
 3) 4.8 cm
 4) 7.5 cm
31. nth term of the A.P. 9, 13, 17, 21, 25, is
 1) $4n+5$
 2) $4n-5$
 3) $4n+1$
 4) $4n-1$
32. If $\sec A + \tan A = x$, then $\tan A =$
 1) $\frac{2}{x}$
 2) $\frac{1}{2}x$
 3) $\frac{x^2 - 1}{2x}$
 4) $\frac{2x}{x^2 - 1}$
33. If $x^4 + x^3 + x^2 + x + 1 = 0$, then find the value of x^5
 1) $\sqrt{2}$
 2) -1
 3) 1
 4) 2

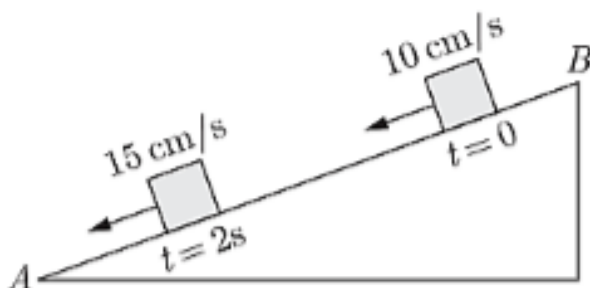
34. ABC is a right angled triangle (as shown) with $BC=7\text{cm}$ and $AB=24\text{cm}$. A circle with centre O is inscribed in $\triangle ABC$. The radius of the circle is



- 1) 1 cm
2) 2 cm
3) 3 cm
4) 4 cm
35. If $\tan A + \cot A = 4$, then $\tan^4 A + \cot^4 A$ is
- 1) 196
2) 194
3) 192
4) 190

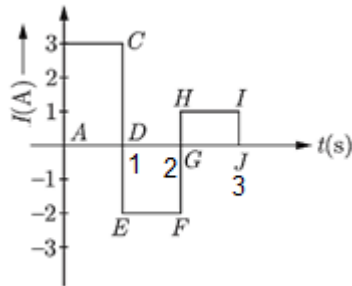
SECTION-III PHYSICS

36. An object is sliding down an inclined plane. The velocity changes at a constant rate from 10 cm/s to 15 cm/s in two seconds. What is its acceleration?

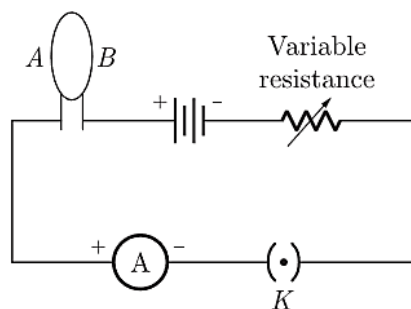


- 1) 1.8 cm/s^2
2) 2.4 cm/s^2
3) 2.8 cm/s^2
4) 2.5 cm/s^2
37. A convex lens A of focal length 20 cm and a concave lens B of focal length 5 cm are kept along the same axis with a distance d between them. If a parallel beam of light falling on A leaves B as a parallel beam, then the distance d in cm will be_____.
- 1) 25
2) 15
3) 30
4) 50
38. Identify the correct statement(s).
1. To accelerate the motion of an object, a balanced force is required.
 2. Balanced forces do not change the state of rest or of motion of an object.
 3. Balanced forces do not produce any acceleration, they can change the shape or size of the body.
- 1) 2 and 3
2) 1 and 2
3) 1 and 3
4) None of these

38. The clear sky appears blue because:
- 1) Blue light gets absorbed in the atmosphere
 - 2) ultraviolet radiations are absorbed in the atmosphere
 - 3) violet and blue lights get scattered more than lights of all other colours by the atmosphere.
 - 4) light of all other colours is scattered more than the violet and blue colour lights by the atmosphere
40. Potential energy of a person is maximum when:
- 1) person is sitting on the ground
 - 2) person is sitting on a chair
 - 3) person is lying on the ground
 - 4) person is standing
41. The current flowing through a wire of resistance 2Ω varies with time as shown in figure alongside. The amount of heat produced (in J) in 3 s would be

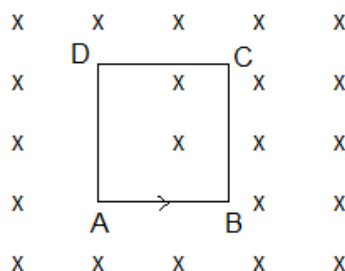


- 1) 2 J
2) 16 J
3) 28 J
4) 8.3 J
42. Which of the following statements is/are correct?
1. Mass of an object is the measure of its inertia.
2. Heavier the object smaller is the inertia.
3. The mass of an object is variable.
- 1) Only 1
2) 1 and 3
3) 2 and 3
4) 1 and 2
43. A circular loop placed in a plane perpendicular to the plane of paper carries a current when the key is ON. The current as seen from points A and B (in the plane of paper and on the axis of the coil) is anti-clockwise and clockwise respectively. The magnetic field lines point from B to A. The N-pole of the resultant magnet is on the face close to



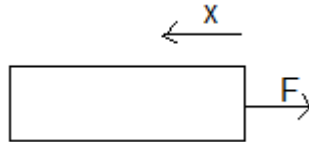
- 1) A
 - 2) B
 - 3) A if the current is small, and B if the current is large
 - 4) B if the current is small and A if the current is large
44. **Assertion:** Waves produced by a motor boat sailing in water are both longitudinal and transverse in nature.
- Reason:** The longitudinal and transverse waves cannot be produced simultaneously.
- 1) Both assertion and reason are true and reason is the correct explanation of assertion.
 - 2) Both assertion and reason are true but reason is not the correct explanation of assertion.
 - 3) Assertion is true but reason is false.
 - 4) Assertion is false but reason is true.

45. Which environmental hazard is not contributed by the combustion of fossil fuels?
 1) Acid rain
 2) Greenhouse effect
 3) Destruction of wildlife habitat
 4) Air pollution
46. The resistivity of a conductor in the form of a wire does not depend on its:
 1) Length
 2) Diameter
 3) Mass
 4) Temperature
47. A lens has a power of $+0.5D$. it is
 1) A convex lens of focal length 5m.
 2) A convex lens of focal length 5 cm.
 3) A convex lens of focal length 2m.
 4) A concave lens of focal length 5m.
48. A square loop is placed inside a magnetic field as shown in figure then force on side AB of the loop will be towards.



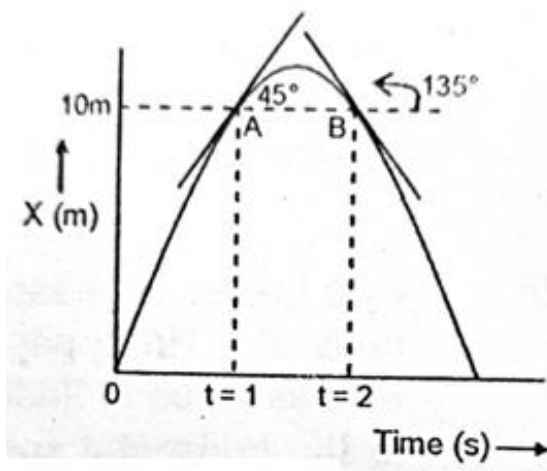
- 1) Left
 2) Right
 3) Upward
 4) Downward
49. A satellite A of mass m is at a distance r from the centre of the earth and another satellite B of mass $2m$ is at a distance $2r$ from the earth's centre. Their time periods are in the ratio
 1) 1:2
 2) 1:4
 3) 1:16
 4) $1:2\sqrt{2}$
50. The power of a motor pump is 2kW. How much water per minute the pump can raise to a height of 10m? (Given $g=10\text{ms}^{-2}$)
 1) 20kg
 2) 2000kg
 3) 12kg
 4) 1200kg
51. If light crosses a glass slab of refractive index 1.5 in 3×10^{-8} millisecond then thickness of the glass slab is (given that speed of light in vacuum = 3×10^8 m/s)
 1) 6 cm
 2) 3 cm
 3) 6 mm
 4) 4 mm
52. If R_1 and R_2 be the resistances of the filaments of 60 W and 200 W bulbs respectively, operating at 220 V, then :
 1) $R_1 = R_2$
 2) $R_1 > R_2$
 3) $R_1 < R_2$
 4) $R \geq R_2$
53. A block is kept on the floor of an elevator at rest. The elevator starts descending with an acceleration of 12ms^{-2} . Find the displacement of the block during the first 0.2 s after the elevator starts (As seen by a person on the ground). Take $g=10\text{m/s}^2$
 1) 20cm
 2) 20m
 3) 2m
 4) 0.02m

54. A heavy uniform rope of length l is pulled by a constant force F as shown in the figure. The tension in the rope at a distance x from the end where the force F is applied is



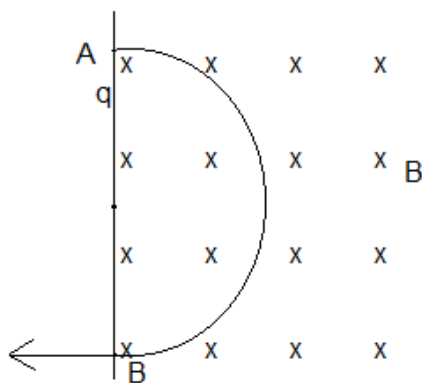
- 1) F
- 2) $\frac{x}{l}F$
- 3) $F\left(1+\frac{x}{l}\right)$
- 4) $F\left(1-\frac{x}{l}\right)$

55. The displacement time curve of a particle moving along a straight line is shown. Tangent at A and B make angles of 45° and 135° with the positive X-axis respectively. The average acceleration of the particle during $t=1$, $t=2$ is



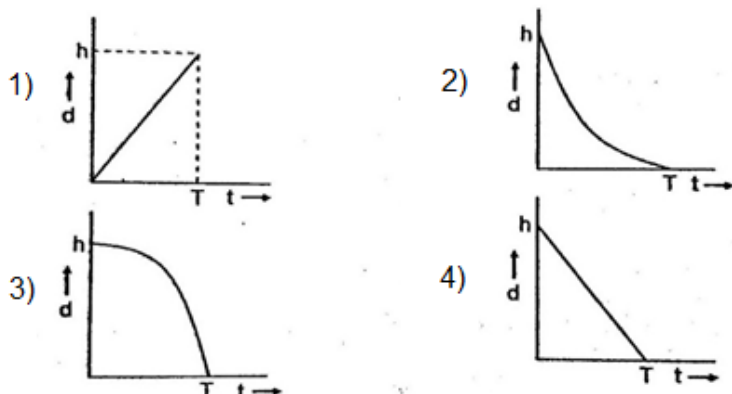
- 1) $-2m/s^2$
- 2) $1m/s^2$
- 3) $-1m/s^2$
- 4) zero

56. Find out time taken by the charge in going from A to B



- $$\begin{array}{ll} 1) \frac{2\pi m}{qB} & 2) \frac{\pi m}{qB} \\ 3) \frac{\pi m}{2qB} & 4) \frac{\pi m}{4qB} \end{array}$$

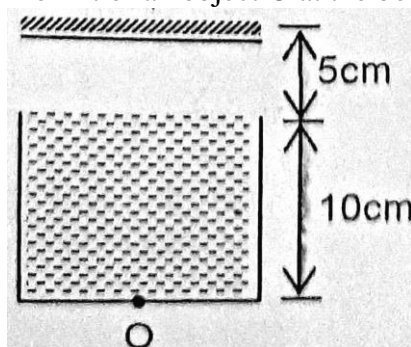
57. A body A is thrown vertically upward with an initial velocity. Simultaneously, a second body B falls from rest from the height h in the same vertical direction, calling the instant at which they collide as $t=T$, the variation of the instantaneous distance d between A and B during the interval $0 \leq t \leq T$ will be correctly shown in the graph.



58. Six identical particles each of mass 'm' are arranged at the corners of a regular hexagon of side length 'L'. If the mass of one of the particle is doubled, the shift in the centre of mass is

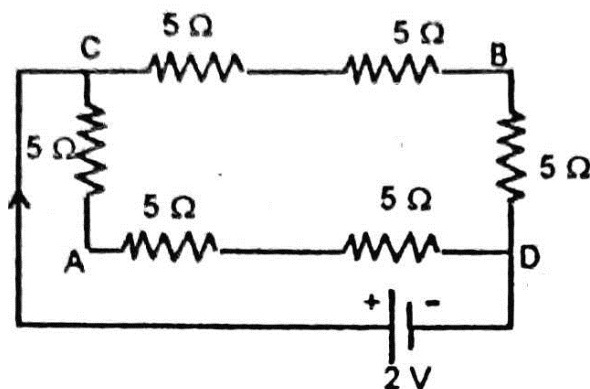
- 1) L
- 2) $6L/7$
- 3) $L/7$
- 4) $\frac{L}{\sqrt{3}}$

59. Consider the situation shown in figure. Water $\left(\mu_w = \frac{4}{3}\right)$ is filled in a beaker upto a height of 10cm. A plane mirror is fixed at a height of 5cm from the surface of water. Distance of image from the mirror after reflection from it of an object O at the bottom of the beaker is



- 1) 25 cm 2) 12.5 cm
3) 7.5 cm 4) 10 cm

60. In the circuit shown in the following figure, the potential difference between points A and B will be:



- 1) $(8/9)$ volts 2) $(4/3)$ volts
3) $(2/3)$ volts 4) 2 volts

SECTION-IV

CHEMISTRY

61. Which of the following reaction is characterised by the yellow colour of product?
- 1) $\text{Zn} + \text{H}_2\text{SO}_4 \rightarrow \text{ZnSO}_4 + \text{H}_2$ 2) $\text{Na}_2\text{CO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + \text{H}_2\text{O} + \text{CO}_2$
3) $2\text{Pb}_3\text{O}_4 \rightarrow 6\text{PbO} + \text{O}_2$ 4) $2\text{KClO}_3 \rightarrow 2\text{KCl} + 3\text{O}_2$
62. When liquid starts boiling, further heat energy which is supplied
- 1) increases the kinetic energy of the particles in the liquid
2) is absorbed as latent heat of vaporisation by the liquid
3) increases the temperature of the liquid
4) is lost to the surroundings as much
63. In one of the industrial processes used for manufacture of sodium hydroxide, a gas X is formed as bi-product. The gas X reacts with lime water to give a compound Y which is used as a bleaching agent in chemical industry. The compound X and Y could be
- 1) H_2 and NaHCO_3 respectively 2) CO_2 and CaOCl_2 respectively
3) Cl_2 and CaOCl_2 respectively 4) Cl_2 and NaHCO_3 respectively
64. A student mixed a small amount of iron filings and sulphur powder in a dish. He could not affect the separation by simple hand-picking. Which liquid will you suggest to affect the separation?
- 1) Carbon disulphide 2) Cold water
3) Boiling water 4) Kerosene
65. The composition of aqua-regia is:
- 1) Dil. HCl : Conc. HNO_3 :: 3 : 1 2) Conc. HCl : Dil. HNO_3 :: 3 : 1
3) Conc. HCl : Conc. HNO_3 :: 3 : 1 4) Dil. HCl : Dil. HNO_3 :: 3 : 1
66. What mass of carbon-di-oxide (CO_2) will contain 3.011×10^{23} molecules?
- 1) 11 g 2) 44 g
3) 13 g 4) 22 g
67. Correct formula for propanoic acid is:
- 1) CH_3COOH 2) $\text{HOOCCH}_2\text{CH}_3$
3) $\text{CH}_3\text{-CH}_2\text{-COOCH}_3$ 4) $\text{CH}_3\text{COOCH}_3$
68. **Assertion:** In Rutherford's gold foil experiment, very few α -particles are deflected back.
Reason: Nucleus present inside the atom is heavy.
- 1) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A)
2) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A)
3) Assertion (A) is true but reason (R) is false
4) Assertion (A) is false but reason (R) is true
69. Which of the following statement is incorrect for atomic size?
- 1) Atomic size of $\text{B} > \text{Be}$ 2) Atomic size of $\text{Be} > \text{B}$
3) Atomic size of $\text{N} > \text{O}$ 4) Atomic size of $\text{C} > \text{N}$

70. **Assertion:** Diamond and graphite are allotropes of carbon
Reason: Some elements can have several different structural forms while in the same physical state. These differing forms are called allotropes.
 1) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A)
 2) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A)
 3) Assertion (A) is true but reason (R) is false
 4) Assertion (A) is false but reason (R) is true
71. The nucleus of an atom consist of
 1) neutrons only
 2) protons only
 3) nucleons only
 4) electrons only
72. Which of the following is not an electrovalent compound?
 1) NaH
 2) CaH₂
 3) KH
 4) BH₃
73. An element from chloride with formula MCl_5 . Formula of its oxide will be
 1) MO_5
 2) M_2O_{10}
 3) M_2O_5
 4) None of these
74. Which of the following reaction produces a hydrocarbon?
 1) $C_2H_5OH \xrightarrow{\text{Conc. } H_2SO_4}$
 2) $CH_2 = CH_2 + H_2 \xrightarrow{Ni}$
 3) $CH_3COONa \xrightarrow{\text{Soda lime}}$
 4) All are correct
75. Which of the following two elements are diagonally related to each other and they have a lot of similar properties?
 1) Li and Be
 2) Na and Ca
 3) Li and Mg
 4) Mg and B
76. 2.2g of a gas C_xH_y has volume equal to 1.12lit at STP. Then x and y are
 1) 1, 4
 2) 3, 8
 3) 5, 10
 4) 2, 2
77. If 11 g of oxalic acid is dissolved in 500 mL of solution ($d_{\text{solution}} = 1.1 \text{ g/mL}$). The mass % of oxalic acid in solution is:
 1) 4%
 2) 2%
 3) 8%
 4) 1%
78. Two elements A (at. Wt. 75) and B (at. Wt.16) combine to give a compound having 75.8% A. The formula of the compound is
 1) AB
 2) A₂B
 3) AB₂
 4) A₂B₃
79. Smoke is
 1) gel
 2) sol
 3) aerosol
 4) foam

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SPACE FOR ROUGH WORK