

INSTRUCTIONS

NUMBER OF QUESTIONS : 100

TIME : 2 Hrs

1. ATTEMPT ALL QUESTIONS WITHIN THE TIME.
2. EACH QUESTION CARRIES 1 MARK
3. NO NEGATIVE MARKS.
4. DON'T DO ROUGH WORK ON QUESTION PAPER AND OMR.
5. USE BLACK (OR) BLUE PEN FOR BUBBLING ON OMR.

CORRECT METHOD OF BUBBLING



WRONG METHOD OF BUBBLING



MATHEMATICS

1. If $a : b = 5 : 3$ then $(5a + 8b) : (6a - 7b) =$

1. 27 : 8

2. 49 : 9

3. 41 : 3

4. 39 : 7

2. Find the value of 'k' for which $x = 3$ is a solution of the quadratic equation

$$(k + 2)x^2 - kx + 6 = 0$$

1. -3

2. 4

3. -4

4. -2

3. If $A = \begin{bmatrix} 3 & a \\ -4 & 8 \end{bmatrix}$, $B = \begin{bmatrix} c & 4 \\ -3 & 0 \end{bmatrix}$, $C = \begin{bmatrix} -1 & 4 \\ 3 & b \end{bmatrix}$ and $3A - 2C = 6B$ then $(a, b, c) =$

1. $\left(\frac{32}{3}, 12, \frac{11}{6}\right)$

2. $\left(\frac{30}{3}, 12, \frac{10}{6}\right)$

3. $\left(\frac{29}{3}, -12, \frac{11}{6}\right)$

4. $\left(\frac{28}{3}, -12, \frac{13}{6}\right)$

4. In the given figure, AB and DE are perpendiculars to BC. If

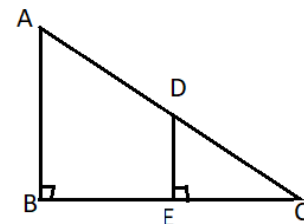
AB = 9cm, DE = 3cm and AC = 24cm then AD =

1. 20cm

2. 12cm

3. 8cm

4. 16cm



5. If $\frac{a+bx}{a-bx} = \frac{b+cx}{b-cx} = \frac{c+dx}{c-dx}$ ($x \neq 0$), then a, b, c, d are in

1. A.P

2. G.P

3. H.P

4. A.G.P

6. Calculate the compound interest for the second year on Rs.8000 invested for three years at 10% per annum

1. Rs. 800 2. Rs. 860 3. Rs. 880 4. Rs. 870

7. Slope of $x -$ axis is _____

1. 1 2. 0 3. -1 4. Not defined

8. Find the value of 'k' if $(x - 2)$ is a factor of $x^3 + 2x^2 - kx + 10$

1. 9 2. 11 3. 13 4. 15

9. How many terms of the A.P $20 + 19\frac{1}{3} + 18\frac{2}{3} + \dots$ must be taken so that their sum is 300?

1. 26 2. 36 3. 35 4. 28

10. If 32 students in a class are females and the ratio of females to male students is 16 : 9, then what percentage of the class is female?

1. 32% 2. 36% 3. 56.25% 4. 64%

11. The midpoint of the line segment joining $(4a, 2b - 3)$ and $(-4, 3b)$ is $(2, -2a)$ then $(a, b) =$

1. $(2, -1)$ 2. $(-2, 3)$ 3. $(3, -1)$ 4. $(-2, 4)$

12. If the lines $14x + 7y = 44, 9x + 7y = 23, 8x + 14y = a$ are concurrent, then $a =$

1. -1 2. -2 3. -7 4. 4

13. If $\sin\theta, \cos\theta, \tan\theta$ are in G.P then $\cos^9\theta + \cos^6\theta + 3\cos^5\theta - 1 =$

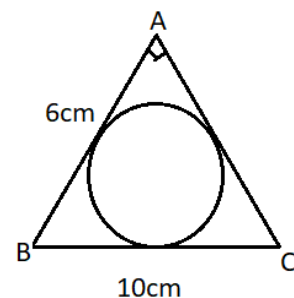
1. -1 2. 0 3. 1 4. 2

14. If $A = \begin{bmatrix} 1 & -1 \\ 2 & -1 \end{bmatrix}, B = \begin{bmatrix} x & 1 \\ 4 & -1 \end{bmatrix}$ and $(A + B)^2 = A^2 + B^2$, then the value of x is

1. 2 2. -1 3. 1 4. 0

15. A circle touches all the sides of a right angled ΔABC right angled at A as shown in the figure. The radius of the circle is

1. 2cm
2. 3cm
3. 4cm
4. 5cm



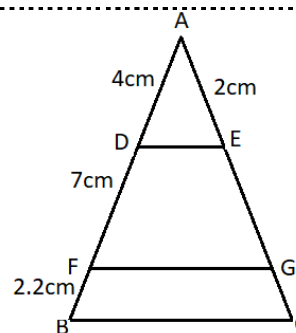
16. The reflexion of P(x, y) in the x-axis is _____

1. (x, -y) 2. (-x, y) 3. (-x, -y) 4. (x, 0)

17. If the product of two consecutive integers is 56 then the two numbers are

1. 8, 9 2. 6, 7 3. 7, 8 4. 14, 4

18. In the figure DE, FG and BC are parallel line segments. AD = 4cm, AE=2cm, DF=7cm and FB = 2.2cm. The ratio of area of trapezium DBCE to area of trapezium DFGE is



1. $\frac{3965}{2256}$ 2. $\frac{3956}{2625}$ 3. $\frac{3695}{2652}$ 4. $\frac{3956}{2623}$

19. Two circles with radii 25cm and 9cm touch each other externally. The length of the direct common tangent is

1. 40cm 2. 35cm 3. 25cm 4. 30cm

20. The diameter of a circle is 10cm. It has a chord of length 8cm. The distance of the chord from the centre is

1. 3cm 2. 4cm 3. 5cm 4. 6cm

21. The area of the curved surface of a cylinder is $4,400\text{cm}^2$ and the circumference of its base is 110cm then the height of the cylinder is

1. 38cm 2. 44cm 3. 40cm 4. 42cm

22. If $x = a \sec A \cos B$, $y = b \sec A \sin B$ and $z = c \tan A$ then $\frac{x^2}{a^2} + \frac{y^2}{b^2} - \frac{z^2}{c^2} =$ _____

1. -1 2. 1 3. 0 4. 2

23. $2\left(\frac{\tan 35^\circ}{\cot 55^\circ}\right)^2 + \left(\frac{\cot 55^\circ}{\tan 35^\circ}\right)^2 - 3\left(\frac{\sec 40^\circ}{\operatorname{cosec} 50^\circ}\right) =$

1. 2 2. 1 3. -1 4. 0

24. A vertical pole and a vertical tower are on the same level ground. From the top of the pole the angle of elevation of the top of the tower is 60° and the angle of depression of the foot of the tower is 30° . Find the height of the tower if the height of the pole is 20m.

1. 80m 2. 60m 3. 75m 4. 90m

25. The median of $\frac{x}{6}, \frac{x}{4}, x, \frac{x}{2}, \frac{x}{3}$ is 8 where x is a natural number. Then x is equal to

1. 8 2. 12 3. 6 4. 24

26. If the diameter of a sphere is 42cm then the volume of the sphere is

1. $38,805\text{cm}^3$ 2. $38,808\text{cm}^3$ 3. $39,000\text{m}^3$ 4. $37,800\text{cm}^3$

27. Probability of impossible event is _____

1. 1 2. 0 3. $\frac{1}{3}$ 4. $\frac{1}{2}$

28. A box contains some black balls and 30 white balls. If the probability of drawing a black ball is Two-fifths of a white ball, then the number of black balls in the box is

1. 8 2. 10 3. 12 4. 14

29. The solution set of $6x - 1 \geq 9 + x$ ($x \in Z$) is

1. {2, 3, 4, 5, 6, 7} 2. {0, 1, 2, 3, 4, 5} 3. {1, 3, 4, 5, 6, 8} 4. {0, 4, 5, 6, 9}

30. If x is a negative integer, then the solution set of $\frac{2}{3} + \frac{1}{3}(x+1) > 0$

1. {2,1} 2. {-2,-1} 3. {2,-1} 4. {-2,1}

31. Let $f_k(x) = \frac{1}{k}(\sin^k x + \cos^k x)$ where $x \in R$ and $k \geq 1$. Then $f_4(x) - f_6(x)$ equals

1. $\frac{1}{4}$ 2. $\frac{1}{12}$ 3. $\frac{1}{6}$ 4. $\frac{1}{3}$

32. From a point on the level ground, the angle of elevation of the top of a pole is 30° . On moving 20 meters nearer, the angle of elevation is 45° . Then the height of the pole, in meters is

1. $10(\sqrt{3}-1)$ 2. $5(\sqrt{3}-1)$ 3. $5(\sqrt{3}+1)$ 4. $10(\sqrt{3}+1)$

33. A line touching a circle only at one point. Then the line is called _____ to the circle

1. Secant 2. Diameter 3. Tangent 4. Radius

34. The value of $\frac{2 \tan 30^\circ}{1 + \tan^2 45^\circ}$ is

1. $\sqrt{3}$ 2. $\frac{2}{\sqrt{3}}$ 3. $\frac{1}{\sqrt{3}}$ 4. 1

35. A cone of radius 5cm and height 8cm is melted and made into small spheres of radius 0.5cm. Find the number of spheres formed.

1. 400 2. 380 3. 420 4. 360

36. The points D, E, F are the midpoints of the sides $\overline{BC}, \overline{CA}, \overline{AB}$ of $\triangle ABC$ respectively. If $A = (-2, 3), D = (1, -4), E = (-5, 2)$, then F =

1. (4, 3) 2. (4, -3) 3. (-4, 3) 4. (-4, -3)

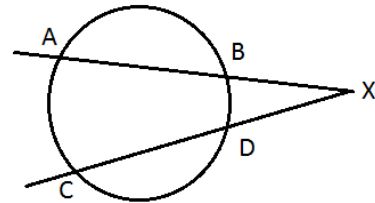
37. $A(a, b)$ and $B(0, 0)$ are two fixed points. M_1 is the midpoint of \overline{AB} . M_2 is the midpoint of $\overline{AM_1}$, M_3 is the midpoint of $\overline{AM_2}$ and soon. Then M_5 is

1. $\left(\frac{7a}{8}, \frac{7b}{8}\right)$ 2. $\left(\frac{15a}{16}, \frac{15b}{16}\right)$ 3. $\left(\frac{31a}{32}, \frac{31b}{32}\right)$ 4. $\left(\frac{63a}{64}, \frac{63b}{64}\right)$

38. The point which divide internally the line segment joining the points (1, 7), (6, -3) in the ratio 2 : 3 is

1. (-9, 27) 2. (3, 1) 3. (0, 5) 4. (3, 3)

39. In the given figure, chords AB and CD, when extended meet at X. Given $AB = 4\text{cm}$, $BX = 6\text{cm}$, $XD = 5\text{cm}$. The length of CD is



1. 6cm 2. 8cm 3. 7cm 4. 5cm

40. The longest chord in a circle is _____

1. Diameter 2. Radius 3. Tangent 4. None

41. The value of k , so that the sum and product of the roots of $2x^2 + (k - 3)x + 3k - 5 = 0$ are equal is

1. 0 2. 1 3. 2 4. 9

42. A shopkeeper buys a certain number of books for Rs. 960. If the cost per book was Rs. 8 less, the number of books that could be bought for Rs. 960 would be 4 more. The number of books is

1. 48 2. 40 3. 42 4. 20

43. If the roots of $px^2 - 4x + 3 = 0$ are equal then the value of p is

1. $\frac{3}{4}$ 2. $\frac{4}{3}$ 3. $-\frac{4}{3}$ 4. $\frac{2}{3}$

44. The condition that $\sin\theta, \cos\theta$ may be the roots of $ax^2 + bx + c = 0$ is
1. $a(a + 2b) = c^2$ 2. $a(a + 2c) = b^2$ 3. $b(b + 2c) = a^2$ 4. $b(b + 2a) = c^2$
-
45. 6 is the mean proportion between two number x and y and 48 is third proportion to x and y then $(x, y) =$
1. (2,9) 2. (5, 6) 3. (4,9) 4. (3,12)
-
46. If $x+1$ and $x-2$ are factors of $x^3 + (a+1)x^2 - (b-2)x - 6$. then $(a, b) =$
1. (1, 7) 2. (2, 6) 3. (4, 3) 4. (6, 1)
-
47. If the remainders of the polynomial $f(x)$ when divided by $x+1, x-1$ are 7, 3 then the remainder of $f(x)$ when divided by $x^2 - 1$ is
1. $3x + 5$ 2. $2x + 7$ 3. $-2x + 5$ 4. $2x + 5$
-
48. If $\begin{bmatrix} x+y & x-4 \end{bmatrix} \begin{bmatrix} -1 & -2 \\ 2 & 2 \end{bmatrix} = \begin{bmatrix} -7 & -11 \end{bmatrix}$ then $(x, y) =$
1. $\left(\frac{1}{2}, \frac{5}{2}\right)$ 2. $\left(\frac{5}{2}, \frac{1}{2}\right)$ 3. $\left(\frac{5}{2}, \frac{3}{2}\right)$ 4. $\left(\frac{3}{2}, \frac{1}{2}\right)$
-
49. If $A = \begin{bmatrix} 2 & 1 \\ 0 & -2 \end{bmatrix}, B = \begin{bmatrix} 4 & 1 \\ -3 & -2 \end{bmatrix}$ and $C = \begin{bmatrix} -3 & 2 \\ -1 & 4 \end{bmatrix}$ then $A^2 + AC - 5B$ is
1. $\begin{bmatrix} -23 & 3 \\ 17 & 6 \end{bmatrix}$ 2. $\begin{bmatrix} -7 & 8 \\ 2 & -8 \end{bmatrix}$ 3. $\begin{bmatrix} 20 & 5 \\ -15 & -10 \end{bmatrix}$ 4. $\begin{bmatrix} 23 & -3 \\ 17 & -6 \end{bmatrix}$
-
50. The first and 8th terms of a G.P are 4 and 512 respectively then find sum its first 5 terms
1. 125 2. 124 3. 126 4. 134
-
51. A box consists of 4 red, 5 black and 6 white balls, one ball is drawn out at random. Find the probability that the ball drawn is red or white
1. $\frac{3}{7}$ 2. $\frac{5}{6}$ 3. $\frac{3}{4}$ 4. $\frac{2}{3}$
-
52. If a_1, a_2, a_3, \dots are in A.P. such that $a_1 + a_5 + a_{10} + a_{15} + a_{20} + a_{24} = 225$, then $a_1 + a_2 + \dots + a_{23} + a_{24} =$
1. 909 2. 75 3. 750 4. 900

53. Which term of the A.P. 4, 9, 14, 19,.....is 109?

1. 22 2. 21 3. 23 4. 24

54. If a, b and c in A.P. whereas x, y and z are in G.P then $x^{b-c} \cdot y^{c-a} \cdot z^{a-b} =$

1. 0 2. 1 3. 2 4. -1

55. The points $(k, 3), (2, -4)$ and $(-k+1, -2)$ are collinear then $k =$

1. $\frac{2}{3}$ 2. $\frac{1}{3}$ 3. $-\frac{1}{3}$ 4. $-\frac{2}{3}$

56. Through the midpoint M of the side CD of a parallelogram $ABCD$, the line BM is drawn intersecting diagonal AC in L and AD produced in E then $EL : BL =$

1. 1 : 2 2. 2 : 1 3. 2 : 3 4. 3 : 2

57. The curved surface of a cylindrical pillar is $256m^2$ and its volume is $924m^3$. The ratio of its diameter to its height is

1. 7 : 3 2. 3 : 7 3. 7 : 6 4. 6 : 7

58. If the mean is 41 and the median is 40, then the mode is

1. 36 2. 37 3. 38 4. 39

59. The mean of 10 observations is 6 and the mean of another 10 observations is 4. Then the mean of all the 20 observations will be

1. 6 2. 4 3. 10 4. 5

60. The probability of getting a 'Red card' when a card is drawn from a pack of 52 cards?

1. $\frac{13}{52}$ 2. $\frac{1}{2}$ 3. $\frac{1}{3}$ 4. $\frac{1}{13}$

PHYSICS

61. Which of the following quantity remains constant in a uniform circular motion:

1. Velocity 2. Speed
3. Acceleration 4. Both velocity and speed.

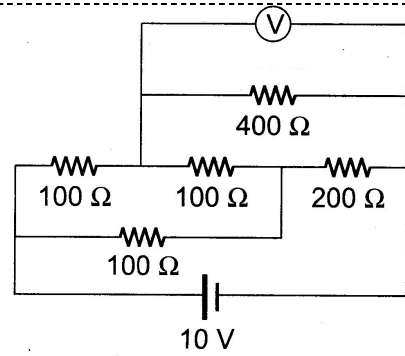
62. Renewable source of energy is

1. Coal 2. Fossil fuels 3. Natural gas 4. Sun

63. A light ray does not bend at the boundary in passing from one medium to the other medium if the angle of incidence is:

1. 0^0 2. 45^0 3. 60^0 4. 90^0

64. An electrical circuit is shown figure. Calculate the potential difference across the resistor of $400\ \Omega$, as will be measured by the voltmeter V of resistance $400\ \Omega$, either by applying Kirchhoff's rules or otherwise



1. $\frac{10}{3}V$ 2. 20V 3. $\frac{20}{3}V$ 4. 10V

65. A concave lens forms the image of an object which is:

1. Virtual, inverted and diminished 2. Virtual, upright and diminished
3. Virtual, inverted and enlarged 4. Virtual, upright and enlarged

66. A switch must be connected in:

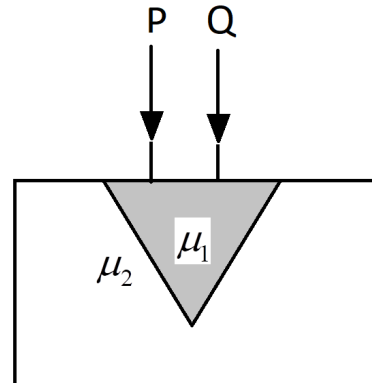
1. Live wire 2. Neutral wire
3. Earth wire 4. Either earth or neutral wire

67. By reversing the direction of current in a wire, the magnetic field produced by it:

1. Gets reversed in direction 2. Increases in strength
3. Decreases in strength
4. Remains unchanged in strength and direction

68. Consider a glass slab of refractive index μ_2 . An

equilateral prism is cut from the slab as shown in figure. This space is filled by liquid of refractive index μ_1 . Two narrow beams P and Q are incident as shown in figure. The angle between two emergent beams is θ select incorrect statement.



1. If $\mu_1 = 1$ and $\mu_2 = \sqrt{3}$ then $\theta = 120^\circ$
2. If $\mu_1 = \frac{4}{\sqrt{3}}$ and $\mu_2 = \sqrt{4}$ then $\theta = 180^\circ$
3. If $\mu_1 = \frac{2}{\sqrt{3}}$ and $\mu_2 = 2$ then $\theta = 90^\circ$
4. If $\mu_1 = \mu_2$ then $\theta = 0^\circ$

69. A house has main fuse of 5A rating. 5 bulbs each of 60W and 2 tube lights each of 40W are used simultaneously.

i) How much current is drawn from the mains of 220V?

ii) How many more bulbs each of 100W can also be lighted on a festival day?

1. 1.73A, 7 2. 1.73A, 8 3. 1.73A, 6 4. 1.73A, 5

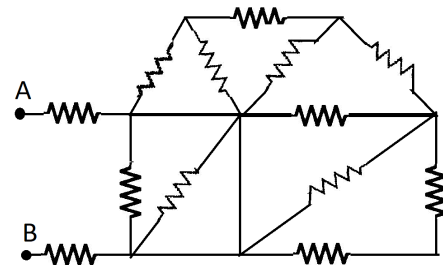
70. In a SONAR, ultrasonic waves are sent into the sea water and the reflected waves from a sunken ship are received after 2.0s. If the velocity of waves in sea water is 1450m s^{-1} , find the depth of sunken ship.

1. 1350m 2. 1450m 3. 2900m 4. 725m

71. Refractive index of water is $\frac{4}{3}$. Calculate the speed of light in water. Speed of light in vacuum is $3 \times 10^8 \text{m s}^{-1}$.

1. $2 \times 10^8 \text{m/s}$ 2. $2.25 \times 10^8 \text{m/s}$ 3. $3 \times 10^8 \text{m/s}$ 4. $4 \times 10^8 \text{m/s}$

72. In the given circuit all resistances are of value R ohm each. The equivalent resistance between A and B is:



1. $\frac{4R}{2}$ 2. $\frac{5R}{2}$ 3. $\frac{5R}{3}$ 4. $\frac{3R}{2}$

73. A spring is kept compressed by a toy cart of mass 150g. On releasing the cart, it moves with a speed of 0.2m s^{-1} . Calculate the potential energy (elastic) of the spring.

1. 3J 2. $3 \times 10^{-1} \text{J}$ 3. $3 \times 10^{-2} \text{J}$ 4. $3 \times 10^{-3} \text{J}$

74. On a see-saw, two children of masses 30kg and 50kg are sitting on one side of it at distance 2m and 2.5m respectively from its middle. Where should a man of mass 74kg sit to balance it?

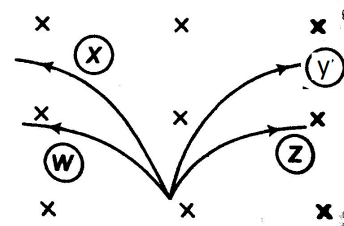
1. 2.5m on the other side 2. 3.5m on the other side
3. 3.5m on the same side 4. 1m on the other side

75. A cell supplies a current of 2A when it is connected to a 5Ω resistance and supplies a current of 1.2A, if it is connected to a resistance 9Ω . Find the e.m.f and internal resistance of the cell.

1. 1V, 12Ω 2. 12V, 1Ω 3. 2V, 9Ω 4. 10V, 1Ω

76. An isosceles glass prism has one of its equal faces coated with silver. A ray is normally incident on the other face and is reflected twice and then emerges perpendicularly. Find the angles of prism.
 1. $45^\circ, 45^\circ, 90^\circ$ 2. $36^\circ, 72^\circ, 72^\circ$ 3. $40^\circ, 70^\circ, 70^\circ$ 4. $32^\circ, 74^\circ, 74^\circ$
77. Water initially at 20°C at a height of 1.68km above the ground, falls down on ground. Taking the specific heat capacity of water to be $4200\text{J kg}^{-1}\text{K}^{-1}$, find the final temperature of water on reaching the ground. Take $g = 10\text{ ms}^{-2}$.
 1. 4°C 2. 20°C 3. 24°C 4. 28°C
78. Calculate the power of an electric heater required to melt 1kg of ice at 0°C in 30s if the efficiency of heater is 40%. Take specific latent heat of ice = 336J g^{-1}
 1. 28kW 2. $28 \times 10^3\text{kW}$ 3. 2.8kW 4. 280kW
79. A sound made on the surface of a lake takes 3s to reach a boatman. How much time will it take to reach a diver inside the water at the same depth? Velocity of sound in air = 330 m s^{-1} , velocity of sound in water = 1450 ms^{-1} .
 1. 1.36sec 2. 1.24sec 3. 0.86sec 4. 0.68sec

80. Four charged particles, $(-q, m), (-3q, 4m), (+q, m)$ and $(+2q, m)$ enter in uniform magnetic field (in inward direction) with same kinetic energy as shown in figure. Inside the magnetic field their paths are shown. Match the following two columns.



	Column -I		Column -II
a)	Particle $(-q, m)$	p)	w
b)	Particle $(-3q, 4m)$	q)	x
c)	Particle $(+q, m)$	r)	y
d)	Particle $(+2q, m)$	s)	z

1. $a \rightarrow s, b \rightarrow r, c \rightarrow q, d \rightarrow p$ 2. $a \rightarrow r, b \rightarrow s, c \rightarrow p, d \rightarrow q$
 3. $a \rightarrow p, b \rightarrow q, c \rightarrow s, d \rightarrow r$ 4. $a \rightarrow r, b \rightarrow s, c \rightarrow q, d \rightarrow p$

CHEMISTRY

81. Which of the following is not aromatic compound
 1. Cyclohexene 2. Benzene 3. Naphthalene 4. Phenol
82. Urea was prepared first time in the laboratory by heating
 1. Ammonium cyanide 2. Ammonium cyanite
 3. Ammonium cyanate 4. Ammonium isocyanate

93. Liquation method is used to refine following crude metal
1. Silver 2. Lead 3. Mercury 4. Copper
-
94. Species formed first in the depletion of ozone layer by chlorofluoro carbons
1. O_2, F_2, Cl 2. Cl, CF_2Cl 3. OF_2, Cl 4. OCl_2, Cl
-
95. Aqua regia is a mixture of
1. 3 : 1 ratio of conc. HCl and conc. HNO_3
 2. 1 : 3 ratio of conc. HCl and conc. HNO_3
 3. 1 : 3 ratio of conc HCl and NOCl
 4. 3 : 1 ratio of conc. HCl and NOCl
-
96. When a mixture of NH_3 and air is passed over heated platinum gauze at $800^\circ C$, it produces
1. HOCl 2. $POCl_3$ 3. NO 4. NO_2
-
97. When MnO_2 reacts with HCl gives a gas _____
1. H_2O 2. $MnCl_2$ 3. Cl_2 4. O_2
-
98. Which of the following statements regarding the manufacture of H_2SO_4 by contact process is not true?
1. Sulphur is burnt in air to form SO_2
 2. SO_2 is catalytically oxidized to SO_3
 3. SO_3 is dissolved in water to get 100% H_2SO_4
 4. H_2SO_4 obtained by contact process is of higher purity than that obtained by lead chamber process
-
99. When ethanol vapours pass through a tube containing Al_2O_3 at $350^\circ C$ gives
1. C_2H_6 2. C_2H_4 3. C_2H_2 4. C_6H_6
-
100. The increasing order of the ionic radii of the given isoelectronic species is
1. $Cl^-, Ca^{+2}, K^+, S^{-2}$ 2. $S^{-2}, Cl^-, Ca^{+2}, K^+$ 3. $Ca^{+2}, K^+, Cl^-, S^{-2}$ 4. $K^+, S^{-2}, Ca^{+2}, Cl^-$

THE END