CLASS : XI   MATHEMATICS

1. Let S be a set with 100 elements. How many subsets does S have which contain atleast 50 elements?

   (A) $\dfrac{2^{100}}{2}$

   (B) $\dfrac{2^{100} - {}^{100}C_{50}}{2}$

   (C) $2^{99} + \dfrac{{}^{100}C_{50}}{2}$

   (D) ${}^{100}C_{50}$

2. Find the distance between the two intersections of the line, $y = 2x - 3$, and the parabola, $y = x^2 + 2x - 7$.

   (A) $\sqrt{13}$ units   (B) 4 units   (C) $\sqrt{53}$ units   (D) $\sqrt{80}$ units

3. Let $y = 10 + 3x - x^2$, where x and y are positive whole numbers. Find the sum of all possible values of y.

   (A) 66   (B) 40   (C) 15   (D) 10

4. Find the sum of all real solutions to the equation $y^2 = |5 - 4y|$.

   (A) 0   (B) −4   (C) 8   (D) None of these

5. If $x^2 - (1 - 2i)x = \left(\dfrac{1}{2} + i\right)$, then the complete solution is:

   (A) $\left\{\dfrac{1 \pm 2i}{2}\right\}$

   (B) $\left\{\dfrac{1 \pm 3i}{3}\right\}$

   (C) $\left\{\dfrac{1+i}{i}, \dfrac{1+3i}{2}\right\}$

   (D) $\left\{\dfrac{1-i}{2}, \dfrac{1-3i}{2}\right\}$

6. Simplify: $x^{\frac{1}{2}} \cdot x^{-\frac{1}{4}} \cdot x^{\frac{1}{8}} \cdot x^{-\frac{1}{16}} \ldots\ldots\ldots$

   (A) x   (B) $\sqrt{x}$ (C) $\sqrt[3]{x}$ (D) $\sqrt[5]{x}$

7. Let L denote the line which passes through the point (7, 1) and the centre of the circle $x^2 + y^2 - 10x + 6y + 9 = 0$. Which of the following points is also on the line L?

    (A) (8, 3)   (B) (-3, 7)   (C) (4, -10)   (D) (5, -7)

8. If the system of equations

    $$y = 7 \sin x + 3 \cos x$$
    $$y = 7 \cos x + 3 \sin x$$

    is solved simultaneously for $0 \le x \le \pi$, the value of "y" must be:

    (A) $4\sqrt{2}$ (B) $5\sqrt{2}$ (C) $2\sqrt{5}$ (D) 2

9. Given three sets A, B and C for which the following is true. $\overline{A}$ indicates the complement of A.

    (i) $(A \cap B) \cup C = \{1, 2, 3, 4, 5\}$

    (ii) $A \cup (\overline{B} \cap C) = \{2, 3, 6, 7, 8\}$

    (iii) $B \subset C$

    If the total of the values in set A is twice the total of those in set B, what are the elements of B?

    (A) {2, 3, 5}   (B) {1, 2, 3, 4, 5}

    (C) {1, 3, 4, 5}   (D) None of these

10. Given that the points, (1, 4), (6, 12) and (c, 10) are collinear, what is the value of "c"?

    (A) 3.5   (B) 4   (C) 4.25   (D) 4.75

11. Let "Z" denote a complex number and define $S = \left\{ \dfrac{1}{1-Z} : |Z| = 1 \text{ and } Z \ne 1 \right\}$. Which of the following best describes the set "S", when "S" is interpreted geometrically as a set of points in the complex plane?

(A) S is a straight line parallel to the imaginary axis

(B) S is a parabola

(C) S is a circle

(D) S is a hyperbola

12. How many solutions, x, does the equation $\tan(2x) = \cot(x)$ have if $0 \le x \le 2\pi$?

(A) 3   (B) 4   (C) 5   (D) 6

13. Let $P(n) : '2^n < (1 \times 2 \times 3 \times \dots \times n)'$, then the smallest positive integer for which $P(n)$ is true is:

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

14. Let a relation R be defined by

R = {(4,5), (1,4), (4,6), (7,6), (3,7)}, then $R \circ R$ = _____

(A) {(1,4), (1,5), (3,6)}   (B) {(1,5), (1,6), (3,6)}

(C) {(1,5), (1,6), (3,7)}   (D) {(1,4), (1,5), (3,7)}

15. If $f: A \to B$ is surjective, then _____

(A) $n(A) \le n(B)$ (B) $n(A) = n(B)$

(C) $n(A) \ge n(B)$ (D) None of these

16. The equation $Z\overline{Z} + (4 - 3i)Z + (4 + 3i)\overline{Z} + 5 = 0$ represents a circle whose radius is _____

(A) $2\sqrt{5}$ (B) 5   (C) $\dfrac{5}{2}$ (D) 1

17. Solution set of the inequations $2x - 1 \le 3$ and $3x + 1 \ge -5$ is:

(A) $(-2, 2)$ (B) $(-\infty, -2) \cup (2, \infty)$

(C) $(-\infty, -2] \cup [2, \infty)$ (D) $[-2, 2]$

18. How many numbers greater than 1000 but not greater than 4000 can be formed from the digits 0, 1, 2, 3, 4 when repetition is allowed?

(A) 350   (B) 375   (C) 450   (D) 576

7. Let L denote the line which passes through the point (7, 1) and the centre of the circle $x^2 + y^2 - 10x + 6y + 9 = 0$. Which of the following points is also on the line L?

(A) (8, 3)   (B) (-3, 7)   (C) (4, -10)   (D) (5, -7)

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(ii) $A \cup (\overline{B} \cap C) = \{2, 3, 6, 7, 8\}$

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(C) {1, 3, 4, 5}   (D) None of these

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(C) S is a circle

(D) S is a hyperbola

12. How many solutions, x, does the equation $\tan(2x) = \cot(x)$ have if $0 \le x \le 2\pi$?

(A) 3   (B) 4   (C) 5   (D) 6

13. Let $P(n)$: '$2^n < (1 \times 2 \times 3 \times \dots \dots \times n)$', then the smallest positive integer for which $P(n)$ is true is:

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

14. Let a relation R be defined by

R = {(4,5), (1,4), (4,6), (7,6), (3,7)}, then $R \circ R =$ _____

(A) {(1,4), (1,5), (3,6)}   (B) {(1,5), (1,6), (3,6)}

(C) {(1,5), (1,6), (3,7)}   (D) {(1,4), (1,5), (3,7)}

15. If $f: A \to B$ is surjective, then _____

(A) $n(A) \le n(B)$ (B) $n(A) = n(B)$

(C) $n(A) \ge n(B)$ (D) None of these

16. The equation $Z\bar{Z} + (4-3i)Z + (4+3i)\bar{Z} + 5 = 0$ represents a circle whose radius is _____

(A) $2\sqrt{5}$ (B) 5   (C) $\dfrac{5}{2}$ (D) 1

17. Solution set of the inequations $2x - 1 \le 3$ and $3x + 1 \ge -5$ is:

(A) (−2, 2)   (B) $(-\infty, -2) \cup (2, \infty)$

(C) $(-\infty, -2] \cup [2, \infty)$ (D) [−2, 2]

18. How many numbers greater than 1000 but not greater than 4000 can be formed from the digits 0, 1, 2, 3, 4 when repetition is allowed?

(A) 350   (B) 375   (C) 450   (D) 576

19. If $x = a(\sec\theta + \tan\theta)^2$, $y = b(\sec\theta - \tan\theta)^2$, then $x^2 y^2 =$ _____

   (A) $ab\sec\theta$ (B) $a^2 b^2 \tan\theta$

   (C) $a^2 b^4$ (D) $a^2 b^2$

20. Area of the triangle in the Argand diagram formed by the complex numbers Z, iZ and Z + iZ is:

   (A) $|Z|^2$ (B) $\frac{1}{2}|Z|^2$

   (C) $|Z|$ (D) $\frac{1}{2}|Z|$

21. The number of solutions of the system of equations given below is:

   $$|x| + |y| = 1; \quad x^2 + y^2 = a^2, \quad \frac{1}{\sqrt{2}} < a < 1$$

   (A) ∞ (B) 2   (C) 4   (D) 8

22. The number 111111 .... 1 (91 times) is:

   (A) not an odd number   (B) an even number

   (C) not a prime number   (D) all of these

23. In a 12 storey building 3 persons enter a lift cabin. It is known that they will leave the lift at different storeys. In how many ways can they do so if the lift does not stop at the second storey?

   (A) 720   (B) 240   (C) 120   (D) 36

24. $\underset{x \to \frac{\pi}{4}}{Lt} \dfrac{2\sqrt{2} - (\cos x + \sin x)^3}{1 - \sin 2x} =$ _____

   (A) $\dfrac{3}{\sqrt{2}}$ (B) $\dfrac{\sqrt{2}}{3}$

   (C) $\dfrac{1}{\sqrt{2}}$ (D) $\sqrt{2}$

25. The set of values of x, for which $\dfrac{\tan 3x - \tan 2x}{1 + \tan 3x \cdot \tan 2x} = 1$ is:

(A) $\varnothing$

(B) $\left\{\dfrac{\pi}{4}\right\}$

(C) $\left\{n\pi + \dfrac{\pi}{4} ; n \in Z\right\}$

(D) $\left\{2n\pi + \dfrac{\pi}{4} ; n \in Z\right\}$

26. If the extremities of a diagonal of a square are (1, –2, 3), (2, –3, 5), then the length of its side is:

(A) $\sqrt{6}$ (B) $\sqrt{3}$ (C) $\sqrt{5}$ (D) $\sqrt{7}$

27. If $\dfrac{x}{a} + \dfrac{y}{b} = \sqrt{2}$ touches the ellipse $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} = 1$, then its eccentric angle "θ" is equal to:

(A) 0^0 (B) 90^0 (C) 45^0 (D) 60^0

28. If x_1, x_2, x_3 as well as y_1, y_2, y_3 are in G.P. with same common ratio, then the points $P(x_1, y_1)$, $Q(x_2, y_2)$ and $R(x_3, y_3)$ are :

(A) lie on a straight line   (B) lie on an ellipse

(C) lie on a circle   (D) vertices of a triangle

29. Let f(x) be a polynomial function of second degree. If f(1) = f(–1) and a, b, c are in A.P., then f'(a), f'(b) and f'(c) are in:

(A) A.P.   (B) G.P.   (C) H.P.   (D) A.G.P.

30. If 2a + 3b + 6c = 0, then atleast one root of the equation $ax^2 + bx + c = 0$ lies in the interval _____

(A) (1, 2)   (B) (2, 3)   (C) (0, 1)   (D) (1, 3)

31. The locus of the middle points of chords of the hyperbola $3x^2 - 2y^2 + 4x - 6y = 0$ parallel to y = 2x is :

(A) 3x – 4y = 4   (B) 3y – 4x = 4

(C) 3x – 4y = 2   (D) 3y – 4x = 2

32. If $y = x^{\sin x} + (\sin x)^x$, then $\dfrac{dy}{dx} =$ _____

   (A) $x^{\sin x}\left(\dfrac{x}{\sin x} + \cos x \cdot \log x\right) + (\sin x)^x (x \cot x - \log \sin x)$

   (B) $x^{\sin x}\left(\dfrac{\sin x}{x} + \cos x \cdot \log x\right) + (\sin x)^x (x \cot x + \log \sin x)$

   (C) $x^{\sin x} (x \cdot \operatorname{cosec} x - \cos x \cdot \log x) + (\sin x)^x (x \cdot \cot x + \log \cos x)$

   (D) $x^{\sin x} (x \cdot \cos x - \sin x \cdot \log x) + (\sin x)^x (x \cdot \tan x + \log \sin x)$

33. The coefficient of the middle term in the binomial expansion in powers of x of $(1 + \alpha x)^4$ and of $(1 - \alpha x)^6$ is the same if $\alpha =$ _____

   (A) $\dfrac{-5}{3}$ (B) $\dfrac{3}{5}$ (C) $\dfrac{-3}{10}$ (D) $\dfrac{10}{3}$

34. If $\cot(\alpha + \beta) = 0$, then $\sin(\alpha + 2\beta)$ is equal to:

   (A) $\sin \alpha$ (B) $\cos 2\beta$ (C) $\cos \alpha$ (D) $\sin \beta$

35. In how many ways the letters of the word "NATION" can be placed in the squares of the following figure so that no row remains empty?

   (A) 6!   (B) 18700   (C) 18720   (D) 8!

36. If a, b, c are real numbers such that a > b, c < 0, then ____

    (A) $ac < bc$ (B) $ac \leq bc$

    (C) $ac > bc$ (D) $ac \geq bc$

37. For $n \in N$, $\left(\dfrac{1}{5}\right)n^5 + \left(\dfrac{1}{3}\right)n^3 + \left(\dfrac{7}{15}\right)n$ is:

    (A) an integer   (B) a natural number

    (C) a positive fraction   (D) none of these

38. Which of the following relations is a function?

    (A) $R = \{(x, y) : x^2 + y^2 \leq 9\}$ on R

    (B) $A = \{1, 2, 3\}, B = \{1, 2, 3, 4, 5\}$ and

       $R = \{(x, y) : 5x + 2y$ is a prime number$\}$ on A

    (C) $A = \{1,2,3,4\}, B = \{1,2,3,4,5,6,7\}$ and

       $R = \{(x, y) \mid y = x^2 - 3x + 3\}$ on A

    (D) None of these

39. Let R be a reflexive relation on a finite set A having "n" elements, and let there be "m" ordered pairs in R. Then

    ____

    (A) $m = n$ (B) $m \leq n$

    (C) $m \geq n$ (D) None of these

40. The natural numbers are grouped as indicated:

    $\{1\}, \{2, 3\}, \{4, 5, 6\}, \{7,8,9,10\}, \ldots$ with "m" numbers in the mth group. Find the sum of the numbers in the 110th group.

    (A) 665,555   (B) 55,555

    (C) 450,000   (D) 700,565

CLASS : XI   PHYSICS

41. A point initially at rest moves along x-axis. Its acceleration varies with time as $a = (9t + 2)$ m/s^2. If it starts from origin, the distance covered in 2 s is:

   (A) 20 m   (B) 14 m   (C) 16 m   (D) 18 m

42. For inelastic collision between two spherical rigid bodies:

                                        (Assume no external forces acting)

   (A) the total kinetic energy is conserved

   (B) the linear momentum is not conserved

   (C) the total mechanical energy is conserved

   (D) the linear momentum is conserved

43. The vectors A and B are such that $|A + B| = |A - B|$. The angle between the two vectors is:

   (A) 45°   (B) 90°   (C) 60°   (D) 75°

44. The moment of inertia of a uniform circular disc of radius R and mass M about an axis touching the disc at its diameter end and normal to the disc is.

   (A) $\dfrac{MR^2}{2}$ (B) MR^2 (C) $\dfrac{2}{5} MR^2$ (D) $\dfrac{3}{2} MR^2$

45. A force of 10 N is applied on a body for 3 seconds and the corresponding displacement 6 m. The power of the source is:

   (A) 20 W   (B) 25 W   (C) 40 W   (D) 50 W

46. If 'h' is the height of capillary rise and 'r' be the radius of capillary tube, then which of the following relation will be correct?

   (A) hr = constant   (B) $\dfrac{h}{r^2}$ = constant

   (C) hr^2 = constant   (D) $\dfrac{h}{r}$ = constant

47. A 500 kg car takes a round turn of radius 50 m with a velocity of 36 kmph. The centripetal force is:

   (A) 250 N   (B) 750 N   (C) 1000 N   (D) 1200 N

48. The potential energy of a simple harmonic oscillator, when the particle is half way to its end point, is: *(E is total energy)*

    (A) $\dfrac{E}{4}$ (B) $\dfrac{E}{2}$ (C) $\dfrac{2E}{3}$ (D) $\dfrac{E}{8}$

49. A man of mass 60 kg stands on the floor of a lift which is accelerating downwards at 1 m/s^2. Then, the reaction of the floor of the lift on the man is:.   *(Take g = 10 m/s^2)*

    (A) 528 N   (B) 600 N   (C) 540 N   (D) 546 N

50. 743 J of heat energy is added to raise the temperature of 5 moles of an ideal gas by 2 k at constant pressure. How much heat energy is required to raise the temperature of the same mass of the gas by 2 k at constant volume? *(Take R = 8.3 J/k-mol)*

    (A) 826 J   (B) 743 J   (C) 660 J   (D) 620 J

51. E_O and E_H respectively represent the average kinetic energy of a molecule of oxygen and hydrogen. If the two gases are at the same temperature, which of the following statements will be true?

    (A) $E_O > E_H$ (B) $E_O = E_H$ (C) $E_O < E_H$

    (D) Nothing can be said about the magnitude of E_O and E_H as the information given is insufficient
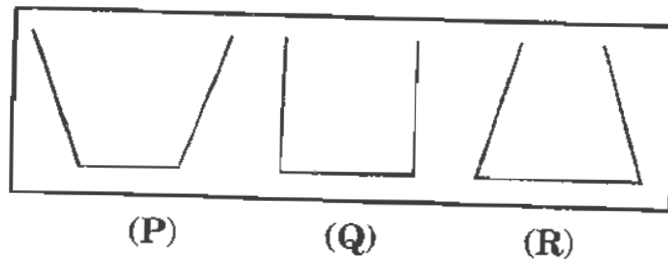
52. Two bodies of masses 1 kg and 2 kg are connected by a steel wire of cross-section 2 cm^2 going over a smooth pulley as shown. The longitudinal strain in the wire, is:

    (Take g = 10 m/s^2, y = 2 × 10^{11} N/m^2)
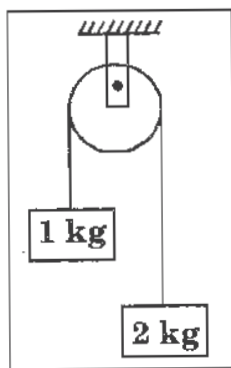
    (A) 3.3×10^{-7} (B) 3.3×10^{-6} (C) 2×10^{-6} (D) 4×10^{-6}

53. The three vessels shown below have the same base areas.

(P)   (Q)   (R)

Equal volume of water is poured into three, the force on the base of vessel:

(A) P would be maximum   (B) Q would be maximum

(C) R would be maximum   (D) Equal in all three

54. The energy emitted per second by a black body at 27 °C is 20 J, if the temperature of the black body is increased to 327 °C, the energy emitted per second will be:

(A) 160 J   (B) 320 J

(C) 480 J   (D) 640 J

55. A block of mass 3 kg is pressed against a rough wall as shown in the figure.

$\mu_s = 0.6, \mu_k = 0.5$

100 N
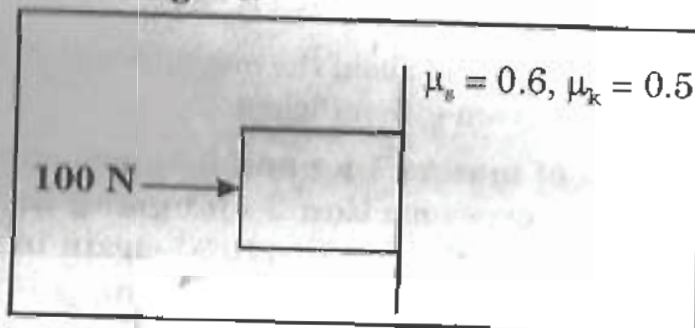
The friction force between the wall and the block is:

(Take g = 10 m/s²)

(A) 60 N   (B) 50 N   (C) 30 N   (D) 20 N

56. For a wave propagating in a medium, identify the property that is independent of the others?

(A) Velocity

(B) Wavelength

(C) Frequency

(D) All these depend on each other

57. A block of wood weighs 4 N in air and 2 N when immersed in a liquid. The buoyant force in newton is:

    (A) zero   (B) 1 N   (C) 2 N   (D) 3 N

58. The edge length of a cube is 1.32 cm, the total surface area and volume of cube are, respectively:

    (A) 10.5 cm² and 2.30 cm³   (B) 10.5 cm² and 2.20 cm³

    (C) 10.4 cm² and 2.20 cm³   (D) 10.54 cm² and 2.298 cm³

59. Two particles of masses m_1 and m_2 ($m_1 > m_2$) attract each other with a force inversely proportional to the square of the distance between them. The particles are initially held at rest and then released. Which one is correct?

    (A) The centre of mass moves towards m_1

    (B) The centre of mass moves towards m_2

    (C) The centre of mass remains at rest

    (D) Centre of mass moves at right angles to the line joining m_1 and m_2

60. If a body is raised from the surface of the Earth up to height R, what is the change in potential energy?

    (A) $mg R$ (B) $\dfrac{3}{2} mg R$ (C) $\dfrac{mg R}{2}$ (D) $\dfrac{mg R}{4}$

61. A block C of mass 'm' is moving with velocity v_0 and collides elastically with block A of mass 'm' and connected to another block B of mass 2 m through spring of spring constant 'k'. What is 'k' if x_0 is compression of spring, when velocity of A and B is same?
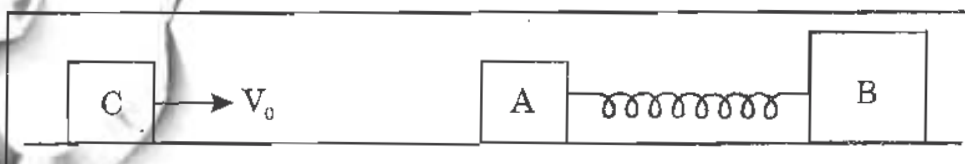

    (A) $\dfrac{mv_0^2}{x_0^2}$ (B) $\dfrac{mv_0^2}{2x_0^2}$ (C) $\dfrac{3}{2} \dfrac{mv_0^2}{x_0^2}$ (D) $\dfrac{2}{3} \dfrac{mv_0^2}{x_0^2}$

62. If the angular momentum of a rotating body about a fixed axis is increased by 10%, its kinetic energy will be increased by:

(A) 10%   (B) 20%   (C) 21%   (D) 5%

63. Choose the correct statement from the following.

(A) Time period of a simple pendulum depends on amplitude

(B) Time shown by a spring watch varies with the acceleration due to gravity

(C) In a simple pendulum, the time period varies linearly with the length of the pendulum

(D) The graph between length of the pendulum and time period is a parabola

64. In the given figure the position-time graph of a particle of mass 0.1 kg is shown. Linear momentum at t = 2 s is:
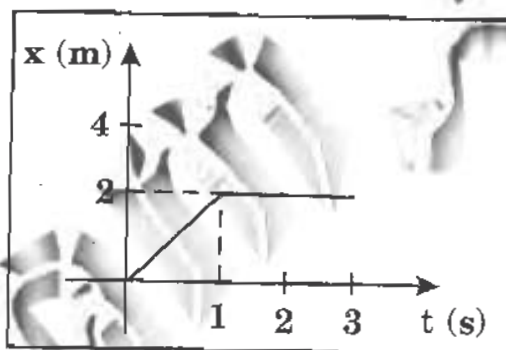
(A) 0   (B) − 0.2 kg m/s^{-1}

(C) 0.1 kg m/s^{-1} (D) − 0.4 kg m/s^{-1}

65. A uniform solid cylinder rolling without slipping along a horizontal plane suddenly encounters a plane inclined at angle θ as shown in the figure. The value of θ which could bring the cylinder immediately to rest after impact, is:
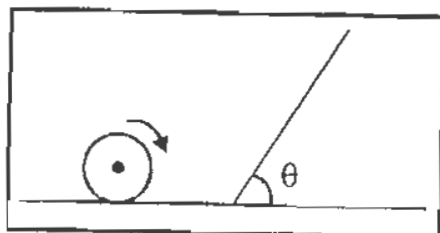

(A) 90°   (B) 60°   (C) 120°   (D) 30°

CLASS : XI   CHEMISTRY

66. The smog is essentially caused by the presence of:

   (A) oxides of sulphur and nitrogen   (B) O_3 and N_2

   (C) O_2 and O_3 (D) O_2 and N_2

67. Which of the following is responsible for depletion of the ozone layer in the upper strata of the atmosphere?

   (A) Polyhalogens   (B) Freons

   (C) Fullerenes   (D) Ferrocene

68. Reaction of HBr with propene in the presence of peroxide gives:

   (A) alkyl bromide   (B) 3-bromopropane

   (C) isopropyl bromide   (D) n-propyl bromide

69. Propyne when passed through a hot iron tube at 400 °C produces:

   (A) methyl benzene   (B) trimethyl benzene

   (C) dimethyl benzene   (D) benzene

70. The IUPAC name of
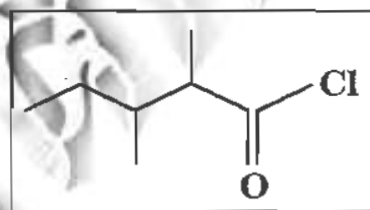
   is:

   (A) 2-ethyl-3-methyl butanoyl chloride

   (B) 1-chloro-1-oxo- 2, 3-dimethyl pentane

   (C) 2,3 dimethyl pentanoyl chloride

   (D) 3,4 dimethyl pentanoyl chloride

71. The compounds $CH_3OC_3H_7$ and $C_2H_5OC_2H_5$ exhibit:

   (A) chain isomerism   (B) cis-trans isomerism

   (C) metamerism   (D) optical isomerism

72. Which of the following oxide is amphoteric in character?
   (A) CO_2 (B) CaO (C) SiO_2 (D) SnO_2

73. Assertion (A): Alkali metals impart colour to the flame.
   Reason (R): Their ionization energies are low.
   (A) Both 'A' and 'R' are true and 'R' is the correct explanation of 'A'.
   (B) Both 'A' and 'R' are true but 'R' is not the correct explanation of 'A'.
   (C) 'A' is true and 'R' is false.
   (D) 'A' is false and 'R' is true.

74. Among the alkaline earth metals, the element forming predominantly covalent compound is:
   (A) calcium   (B) strontium
   (C) barium   (D) beryllium

75. Which of the following compounds are formed when BCl_3 is treated with water?
   (A) $B_2H_6 + HCl$ (B) $H_3BO_3 + HCl$
   (C) $B_2O_3 + HCl$ (D) $B_2O_3 + B_2H_6$

76. Polyphosphates are used as water softening agents because they:
   (A) form soluble complexes with anionic species
   (B) precipitate anionic species
   (C) form soluble complexes with cationic species
   (D) precipitate cationic species

77. Calcium phosphide gets hydrolysed and give:
   (A) H_3PO_4 (B) $(HPO_3)_n$
   (C) PH_3 (D) $Ca_3(PO_4)_2$

78. Sodium burns in air to give mainly:
   (A) Na_2O (B) NaO_2 (C) Na_2O_2 (D) Na_2CO_3

79. Which of the following is a redox reaction?

    (A) $CaC_2O_4 + 2HCl \longrightarrow CaCl_2 + H_2C_2O_4$

    (B) $Mg(OH)_2 + 2NH_4Cl \longrightarrow MgCl_2 + NH_4OH$

    (C) $Zn + 2AgCN \longrightarrow 2Ag + Zn\,(CN)_2$

    (D) $NaCl + KNO_3 \longrightarrow NaNO_3 + KCl$

80. Nitrogen combines with oxygen to form nitric oxide.

    $N_2(g) + O_2(g) \rightleftharpoons 2NO(g),$ $\Delta H = + 80$ kJ mol^{-1}

    The decomposition of NO(g) is favoured by:

    (A) decrease in pressure   (B) increase in pressure

    (C) decrease in temperature   (D) increasing the concentration of N_2

81. ΔH and ΔS for the reaction are $+ 30.558$ kJ mol^{-1} and 0.066 kJ mol^{-1} at 1 atm pressure. The temperature at which free energy is equal to zero and the nature of reaction below this temperature are:

    (A) 483 K, spontaneous   (B) 443 K, non-spontaneous

    (C) 443 K, spontaneous   (D) 463 K, non-spontaneous

82. Kinetic energy of a molecule is zero at:

    (A) 0 °C   (B) 273 °C   (C) –273 °C   (D) 116 °C

83. The rate of diffusion of methane at a given temperature is twice that of a gas X. The molecular weight of X is:

    (A) 64 a.m.u   (B) 16 a.m.u   (C) 40 a.m.u   (D) 80 a.m.u

84. Which of the following statements is NOT correct for sigma and pi bonds formed between two carbon atoms?

    (A) Bond energies of sigma and pi bonds are in the order of 264 kJ mol^{-1}

    (B) Sigma bond is stronger than pi bond

    (C) Free rotation of atoms around a sigma bond is allowed but not in case of a pi bond

    (D) Sigma bond determines the direction between carbon atoms but a pi bond has no primary effect in this regard

85. In which of the following molecules are all the bonds NOT equal?

    (A) AlF_3 (B) BF_3 (C) NF_3 (D) ClF_3

86. Arrange the following elements in the increasing order of their non-metallic character.

    B, C, Si, N and F

    (A) $F < N < Si < C < B$ (B) $N < F < Si < C < B$

    (C) $C < B < Si < N < F$ (D) $B < C < Si < N < F$

87. Arrange each pair of ions in order of increasing ionic radius.

    (i) Mg^{2+} and Al^{3+} (ii) O^{2-} and S^{2-} (iii) O^{2-} and F^-

    (A) (i) $Al^{3+} < Mg^{2+}$ (ii) $O^{2-} < S^{2-}$ (iii) $F^- < O^{2-}$

    (B) (i) $Mg^{2+} < Al^{3+}$ (ii) $O^{2-} < S^{2-}$ (iii) $F^- < O^{2-}$

    (C) (i) $Mg^{2+} < Al^{3+}$ (ii) $S^{2-} < O^{2-}$ (iii) $F^- < O^{2-}$

    (D) $Al^{3+} < Mg^{2+}$ (ii) $O^{2-} < S^{2-}$ (iii) $O^{2-} < F^-$

88. What transition in He^+ ion shall have the same wave number as the first line in Balmar series of H atom?

    (A) 7 $\longrightarrow$ 5 (B) 4 $\longrightarrow$ 2 (C) 6 $\longrightarrow$ 4 (D) 5 $\longrightarrow$ 3

89. Electrons will first enter into the orbital with the set of quantum numbers:

    (A) $n = 5, l = 0$ (B) $n = 4, l = 1$

    (C) $n = 3, l = 2$ (D) all of the above

90. 34.2 g of sucrose $(C_{12}H_{22}O_{11})$ are dissolved in 90 g of water in a glass. The number of oxygen atoms in the solutions are:

    (A) 3.66×10^{26} (B) 6.6×10^{23} (C) 3.66×10^{24} (D) 6.02×10^{19}

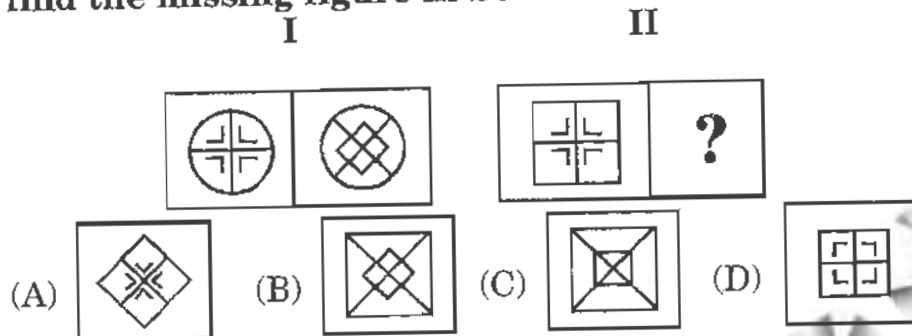## CLASS : XI   GENERAL KNOWLEDGE

91. Which of the following gives the meaning of the word 'ephemeral'?

    (A) Established   (B) Short-lived

    (C) Spiritual   (D) Invisible

92. **Study the relationship between the figures in Set I and find the missing figure in Set II?**

93. **The Simla Pact between India and Pakistan was signed by:**

    (A) Indira Gandhi and Zia-ul-Haq
    (B) Lal Bahadur Shastri and Ayub Khan
    (C) Indira Gandhi and Zulfikar Ali Bhutto
    (D) Rajiv Gandhi and Benazir Bhutto

94. **Which of the cities listed below is scheduled to host the 19th Commonwealth Games in 2010?**

    (A) Kula Lumpur (B) Bangkok (C) Victoria (D) New Delhi

95. **What does the term 'pixel' as used in digital images stand for?**

    (A) Format   (B) Resource Locator

    (C) Picture element   (D) None of these

96. **What is the duration of the zero hour in the Lok Sabha?**

    (A) 15 minutes   (B) Half an hour (C) One hour (D) Not specified

97. **'MODVAT' is the name of a:**

    (A) tribal group   (B) networking technology

    (C) official report   (D) tax imposed on a product

98. **Which one of the following is devoted to the cause of human rights?**

    (A) Amnesty international   (B) Red Cross
    (C) Group of 77   (D) Sandinista

99. **What is referred to as 'the crossroads of Europe, Africa and Asia'?**

    (A) Nile   (B) Amazon   (C) Suez Canal (D) Congo

100. **In 0' Clock, '0' is:**

    (A) the preposition 'of'   (B) often
    (C) the preposition 'on'   (D) over

KEY FOR THE Q.P.-2009

1.	C	2.	D	3.	B	4.	B	5.	D	6.	C	7.	A	8.	B
9.	C	10.	D	11.	A	12.	D	13.	D	14.	B	15.	C	16.	A
17.	D	18.	B	19.	D	20.	B	21.	D	22.	C	23.	A	24.	A
25.	A	26.	B	27.	C	28.	A	29.	A	30.	C	31.	A	32.	B
33.	C	34.	A	35.	C	36.	A	37.	B	38.	D	39.	C	40.	A
41.	C	42.	D	43.	B	44	D	45.	A	46.	A	47.	C	48.	A
49.	C	50.	C	51.	B	52.	A	53.	C	54.	B	55.	C	56.	C
57.	C	58.	A	59.	C	60.	C	61.	D	62.	C	63.	D	64.	A
65.	C	66.	A	67.	B	68.	D	69.	B	70.	C	71.	C	72.	D
73.	A	74.	D	75.	B	76.	C	77.	C	78.	C	79.	C	80.	C
81.	D	82.	C	83.	A	84.	A	85.	D	86.	A	87.	A	88.	C
89.	C	90.	C	91.	B	92.	B	93.	C	94.	D	95.	C	96.	C
97.	D	98.	A	99.	C	100.	A								