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NATIONAL LEVEL SCIENCE TALENT SEARCH EXAMINATION

Paper Code: UN426 (UPDATED)

Solutions for Class : 9

Mathematics

1. **(A)** $x = 2 + 2^{1/3} + 2^{2/3}$

$x = 2 + \sqrt[3]{2} + \sqrt[3]{4}$

$x - 2 = \sqrt[3]{2} + \sqrt[3]{4}$

$(x - 2)^3 = \left(\sqrt[3]{2} + \sqrt[3]{4}\right)^3$

$x^3 - 3.x.2\ (x - 2) - 2^3 = \left(\sqrt[3]{2}\right)^3 + 3\sqrt[3]{2}\ \sqrt[3]{4}\ \left(\sqrt[3]{2} + \sqrt[3]{4}\right) + \left(\sqrt[3]{4}\right)^3$

$x^3 - 6x^2 + 12x - 8 = 2 + 3\sqrt[3]{8}\ (x-2) + 4$

$x^3 - 6x^2 + 12x - 8 = 6 + 6(x - 2)$

$x^3 - 6x^2 + 12x - 6x = 8 - 6$

$x^3 - 6x^2 + 6x$

2. **(C)** Let the angles be $3x$, $7x$, $6x$ and $4x$.

$\therefore\ 3x + 7x + 6x + 4x = 360°$ or

$20x = 360°$ or $x = 18°$. The angles are 54°, 126°, 108°, 72°. We see that adjacent angles are supplementary but opposite angles are not equal. Clearly, it is a trapezium.

3. **(D)** In ΔABC, $\angle ACB = 180° - (25° + 35°)$

$= 180° - 60°$

$= 120°$

now $\angle ACB + \angle ACD = 180°$ ($\square$ linear angles)

$120° + \angle ACD = 180°$

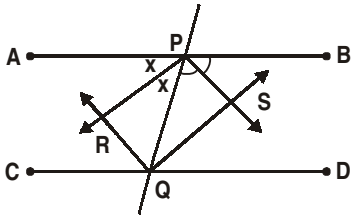
$\therefore\ \angle ACD = 180° - 120° = 60°$

$x° = \angle ACD + \angle ADC$ (exterior angle = sum of its two interior non-adjacent angles)

$x° = 60° + 60°$

$x° = 120°$

4. **(A)**



$\angle APQ + \angle CQP = 180°$

$\Rightarrow \frac{\angle APQ}{2} + \frac{\angle CQP}{2} = 90°$

$\Rightarrow \angle RPQ + \angle PQR = 90°$

$\Rightarrow \Delta PQR$ is a right angled triangle

Similarly, ΔPQS is a right angled triangle

$\Rightarrow$ PQRS is rectangle.

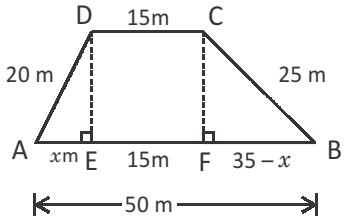
5. **(A)** α, β are the solutions of $ax + by + c = 0$

$\therefore$ clearly we can write $x = \alpha$ and $y = \beta$

$\Rightarrow a\alpha + b\beta + c = 0$

$\Rightarrow a\alpha + b\beta = -c$

6. **(C)** From right ΔAED



$DE^2 = 20^2 - x^2$

$DE^2 = 400 - x^2$ $\rightarrow$ (1)

From right ΔBCF,

$CF^2 = 25^2 - (35 - x)^2$

$CF^2 = 625 - (35^2 - 2(35)(x) + x^2)$

$CF^2 = 625 - (1225 - 70x + x^2)$

$CF^2 = 625 - 1225 + 70x + x^2$

$CF^2 = -600 + 70x - x^2 \rightarrow (2)$

but $DE^2 = CF^2$

So, $400 - x^2 = -600 + 70x - x^2$

$400 = -600 + 70x$

$400 + 600 = 70x$

$\therefore x = \frac{1000}{70} = \frac{100}{7}$ in (1)

(1) $\Rightarrow DE^2 = 400 - \left(\frac{100}{7}\right)^2 = 400 - \frac{10000}{49}$

$= \frac{19,600 - 10000}{49}$

$DE^2 = \frac{9600}{49} \Rightarrow DE = \sqrt{\frac{9600}{49}} = \frac{40\sqrt{6}}{7}$

Now, trapezium area $= \frac{1}{2}$ h (a + b) $= \frac{1}{2}$

$\times \frac{40^{20}}{7}\sqrt{6}\ (50 + 15) = \frac{20\sqrt{6}}{7} \times 65$

$= \frac{1300}{7}\sqrt{6}\ m^2.$

7. **(D)** $\square$ Interior angle $= \frac{(n-2)\times 180^O}{n}$

and exterior angle $= \frac{360^O}{n}$

Now, $\frac{(n-2)\times 180^O}{n} - \frac{360^O}{n} = 120°$

$\Rightarrow$ $(n - 2) \times 180° - 360° = 120° n$

$\Rightarrow$ $180° n - 360° - 360° = 120° n$

$\Rightarrow$ $60° n = 720°$

$\therefore$ $n = 12$

8. **(B)** Since, CE || BA and AC is transversal.

$\therefore \angle ACE = \angle BAC = 60^O$

[alternate angles]

$\therefore \angle ACD = \angle ACE + \angle ECD$

$= 60° + 65° = 125°$

Now, $\angle ACB = 180^O - \angle ACD$

$= 180° - 125° = 55°$

9. **(A)** Angles in the same segment are equal.

$\Rightarrow \angle BAD = \angle BCD = 30°$

In ΔCBP, $\angle C + \angle B + \angle P = 180°$

$\Rightarrow \angle CBP = 105°$

10. **(A)** Given equation is

$\sqrt{k + 64} - 8 = -2$

$\Rightarrow k = -28$

11. **(A)** Let $f(x) = px^2 + 5x + r$

Given, $(x - 2)$ is a factor of $f(x)$

$\therefore f(x) = 0 \Rightarrow p(2)^2 + 5(2) + r = 0$

$\Rightarrow 4p + r + 10 = 0 \rightarrow (1)$

and also, $\left(x - \frac{1}{2}\right)$ is a factor of f(x)

$\therefore f\left(\frac{1}{2}\right) = 0 \Rightarrow p\left(\frac{1}{2}\right)^2 + 5\left(\frac{1}{2}\right) + r = 0$

$\Rightarrow \frac{p}{4} + \frac{5}{2} + r = 0$

$\Rightarrow \frac{p + 10 + 4r}{4} = 0$

$\Rightarrow p + 4r + 10 = 0 \rightarrow (2)$

from (1) & (2)

$4p + r + 10 = p + 4r + 10$

$4p - p = 4r - r$

$3p = 3r$

$\Rightarrow p = r$

12. **(B)** According to the mid-point theorem,

In ΔACD,

PQ || AC

[Since, P and Q are mid-points of AD and DC]

and $PQ = \frac{1}{2} AC$

$\therefore \frac{PQ}{AC} = \frac{1}{2}$

Now, PQ : AC = 1 : 2

13. **(B)** Let $5, 3 \in R^+$

here $5 > 3$ but $-5 < -3$

From the above if $x > y$ then $-x < -y$ (This means when a negative value is multiplied on both sides of inequality then the inequality symbol changes).

14. **(A)** According to SAS congruency criteria.

15. **(C)** ΔCDE

$\angle D + \angle C + \angle DEC = 180^O$

Now, $\angle DEC = 180^O - 130^O = 50^O$

[by linear pair]

$\therefore$ $\angle D = 180^O - (50^O + 20^O) = 110^O$

$\therefore$ $\angle A = \angle D = 110^O$

[since, angles in the same segment of a circle are equal]

16. **(B)** Equation of the line passing through (–2, 8) and (5, 7)

$(x - x_1)(y_2 - y_1) = (y - y_1)(x_2 - x_1)$

$(x + 2)(7 - 8) = (y - 8)(5 + 2)$

$(x + 2)(-1) = (y - 8)(7)$

$x + 2 = -7y + 56$

$x + 7y = 56 - 2$

$x + 7y = 54$

$$\frac{x}{54} + \frac{y}{\frac{54}{7}} = 1$$

$\therefore$ x – intercept = (54, 0)

y – intercept = $\left(0, \frac{54}{7}\right)$

Hence, it cuts both the axes.

17. **(C)** Let initial surface area = x sq.units

$\therefore$ V_1 = initial volume = $\frac{x\sqrt{x}}{6\sqrt{6}}$ cu.units

$\left[\because 6a^2 = x \Rightarrow a = \frac{\sqrt{x}}{\sqrt{6}}\right]$

surface area increased by 1%.

$\therefore$ new surface area = $x + \frac{x}{100}$

$= \frac{101x}{100}$ sq.units

$\therefore$ V_2 = new volume = $\frac{101x}{6000}\frac{\sqrt{101x}}{\sqrt{6}}$ cu.units

increase percent in volume

$= \frac{V_2 - V_1}{V_1} \times 100$

$= \left(\frac{101x}{6000}\frac{\sqrt{101x}}{\sqrt{6}} - \frac{x\sqrt{x}}{6\sqrt{6}}\right) \times \frac{6\sqrt{6}}{x\sqrt{x}} \times 100$

$= \frac{101\sqrt{101} - 1000}{10}$

$= 10.1\sqrt{101} - 100$

$= 1.5\%$.

18. **(Del)**

19. **(C)** Given $x = 2 + \sqrt{3}$

$\Rightarrow \frac{1}{x} = \frac{1}{2 + \sqrt{3}}$

$\Rightarrow \frac{1}{x} = \frac{\left(2 - \sqrt{3}\right)}{\left(2+\sqrt{3}\right)\left(2-\sqrt{3}\right)} = \frac{2-\sqrt{3}}{2^2 - \left(\sqrt{3}\right)^2}$

$= \frac{2-\sqrt{3}}{4-3} = \frac{2-\sqrt{3}}{1}$

$\Rightarrow \frac{1}{x} = 2 - \sqrt{3}$

Now, $x^2 + \frac{1}{x^2} = \left(x + \frac{1}{x}\right)^2 - 2$

$= \left[\left(2+\sqrt{3}\right) + \left(2-\sqrt{3}\right)\right]^2 - 2$

$= \left[2 + \sqrt{3} + 2 - \sqrt{3}\right]^2 - 2$

$= (4)^2 - 2$

$= 16 - 2$

$= 14$.

20. **(A)** From right ΔABD,

BD = $\sqrt{12^2 + 5^2} = \sqrt{144 \times 25} = \sqrt{169}$

= 13 cm

right ΔABD area = $\frac{1}{2} \times 5 \times 12 = 30$ cm^2

equilateral ΔBDC area = $\frac{\sqrt{3}}{4} \times 13^2$

$= \frac{169}{4}\sqrt{3}$

$\therefore$ Area of quadrilateral ABCD

= Area of ΔABD + Area of ΔBDC

$= 30 + \frac{169}{4}\sqrt{3}$

$= \left(\frac{120 + 169\sqrt{3}}{4}\right)$

$= \frac{1}{4}\left(120 + 169\sqrt{3}\right)$ cm^2

21. **(A)** According to the question,

$$2\alpha(1)+(\alpha+8)\times 2=32$$

$$\Rightarrow \quad 2\alpha+2\alpha+16=32\Rightarrow 4\alpha=16$$

$$\therefore \quad \alpha=4$$

22. **(B)** Let edge of square field be a.

Distance covered by Edward = a + a = 2a

Distance covered by Misha = $\sqrt{a^2+a^2}=\sqrt{2}a$

Required percentage = $\frac{\sqrt{2}a}{2a}\times 100$

$\approx 71\%$

23. **(D)** $\left(\frac{x^{1/a}}{x^{1/b}}\right)^{\frac{a^2b^2}{b-a}}\cdot\left(\frac{x^{1/b}}{x^{1/c}}\right)^{\frac{b^2c^2}{c-b}}\cdot\left(\frac{x^{1/c}}{x^{1/a}}\right)^{\frac{a^2c^2}{a-c}}$

$$=\left(x^{\frac{1}{a}-\frac{1}{b}}\right)^{\frac{a^2b^2}{b-a}}\cdot\left(x^{\frac{1}{b}-\frac{1}{c}}\right)^{\frac{b^2c^2}{c-b}}\cdot\left(x^{\frac{1}{c}-\frac{1}{a}}\right)^{\frac{a^2c^2}{a-c}}$$

$$\left[\because \frac{a^m}{a^n}=a^{m-n}\right]$$

$$=\left(x^{\frac{b-a}{ab}}\right)^{\frac{a^2b^2}{b-a}}\cdot\left(x^{\frac{c-b}{bc}}\right)^{\frac{b^2c^2}{c-b}}\cdot\left(x^{\frac{a-c}{ac}}\right)^{\frac{a^2c^2}{a-c}}$$

$$=x^{ab}\cdot x^{bc}\cdot x^{ca}$$

$$=x^{ab+bc+ca} \qquad \left[\because a^m\cdot a^n=a^{m+n}\right]$$

24. **(C)** Diagonal of a square = 2

$\therefore$ Length of side of square = $\sqrt{2}$

Now, length of rectangle = $3\sqrt{2}$

and breadth of rectangle = $2\sqrt{2}$

$\therefore$ Diagonal of rectangle

$$=\sqrt{(3\sqrt{2})^2+(2\sqrt{2})^2}$$

$$=\sqrt{18+8}=\sqrt{26}$$

25. **(B)** Let three sides of the triangle be a = 26 cm ; b = 28 cm and c = 30 cm

Area of triangle = $\sqrt{s(s-a)(s-b)(s-c)}$

$$\boxed{\begin{aligned} s &= \frac{a+b+c}{2} \\ &= \frac{26+28+30}{2} \\ &= 42 \text{ cm}\end{aligned}}$$

$$=\sqrt{42(42-26)(42-28)(42-30)}$$

$= 336 \text{ cm}^2$

but given parallelogram area = triangle area

$\therefore$ b × h = 336

b = 28 $\Rightarrow$ 28 × h = 336 $\Rightarrow$ h = $\frac{336}{28}=12$

Hence, height = 12 cm.

Physics

26. **(A)** Since the speed of sound in water is 1500 m/s, in 0.5 seconds the wave travels 750 metres. This is the distance from the surface to the bottom of the seabed and back to the surface. The depth of the sea is therefore $\frac{750}{2}$ = 375 metres.

27. **(C)** When the ball is being released in vacuum, the ball has an initial speed of 0 m s^{-1} and an acceleration of 10 m s^{-2}. There is no air resistance in vacuum and therefore the gravitational acceleration is constant throughout the journey. With the constant acceleration on the ball, the ball increases its speed at a constant rate of 10 m s^{-2} (constant acceleration).

28. **(D)** If the mass of liquid is 1 g and the volume is 1 cm^3, the density is 1 g/cm^3. When the mass of a liquid is doubled (i.e., 2 g) and the volume of a liquid is also doubled (i.e., 2 cm^3) then the density= 2/2 = 1 g/cm^3, remains unchanged.

29. **(D)** $p = mv$ = quantity of motion in the body. Clearly, p is doubled, when either m is doubled or v is doubled.

30. **(A)** Noise is an unpleasant loud sound such as a jet plane taking off. The other sounds are comparatively less noisy and are used as warning signals.

31. **(B)** The tenth floor is at a distance of 10 × 3 = 30 metres from the ground floor. The lift travels this distance in 20 seconds. As

$$\text{Speed} = \frac{\text{distance}}{\text{time}}$$

$$\frac{30\text{ m}}{20\text{ s}} = 1.5\text{ m/s}.$$

32. **(A)** As the plum falls off a branch to the ground, its speed increases and thus its kinetic energy also increases. However, as its height decreases so does its gravitational potential energy.

33. **(C)** $u = 6\text{ m s}^{-1}$

$v = 0$

$t = 3$ seconds.

Acceleration

$$a = \frac{v-u}{t} = \frac{0-6}{3} = -2\text{ m s}^{-2}.$$

Force = $m \times a = 4 \times 2 = 8$ N

34. **(C)** If the compression travels along the length of the spring, then the wave is a longitudinal wave.

35. **(B)** $v = u + at = 0 + 17.5 \times (8 \times 60)$

$= 8400\text{ m s}^{-1}$

36. **(D)** Statements (A) and (B) are true of weight and mass. The units of weight and force are same i.e., newton. The unit of mass is kilogram.

37. **(C)** Work done = 600 N×20 m = 12 000 J = 12 kJ.

38. **(D)** All the three coal, petrol and sweet release energy as they have chemical potential energy. Coal and petrol release their energy on burning and sweets contain carbohydrates which release energy in the body.

39. **(D)** When the cork is floating, its weight is balanced by the upthrust. Therefore, net force on the cork is zero.

40. **(A)**

(i) From A to B, Speed = V

$$\text{Distance} = 2\pi R \times \frac{60^\circ}{360^\circ} = \frac{2\pi R}{6}$$

$$\text{Time} = \frac{D}{S} = \frac{2\pi R}{6 \times V}$$

(ii) From B to C, Speed = 2 V

$$\text{Distance} = 2\pi R \times \frac{120^\circ}{360^\circ} = \frac{2\pi R}{3}$$

$$\text{Time} = \frac{D}{S} = \frac{2\pi R}{3 \times 2V}$$

(iii) From C to A, Speed = 3 V

$$\text{Distance} = 2\pi R \times \frac{180^\circ}{360^\circ} = \frac{2\pi R}{2}$$

$$\text{Time} = \frac{D}{S} = \frac{2\pi R}{2 \times 3V}$$

$\therefore$ Average speed for total journey

$$= \frac{\text{Total Distance}}{\text{Total taken}} = \frac{2\pi R}{\frac{2\pi R}{6V} + \frac{2\pi R}{6V} + \frac{2\pi R}{6V}}$$

$$= \frac{2\pi R}{\frac{6\pi R}{6V}} = 2\text{ V}$$

41. **(D)** As per the given figure in the question, point P is pivoted and the direction is downward. Point Q is also pivoted and directed upward. The extreme end has a man of weight 800 N standing on the diving board that is balanced. Directions of P and Q are opposite and balanced as the forces at P and Q are equal to 800 N. Force at Q is 800 N up and weight of man standing on the diving board is also 800 N up.

42. **(A)** As more and more volume of an object is immersed in water, the apparent weight of the object goes on decreasing and it becomes more and more lighter. Once the object is completely immersed in the liquid (water), then further lowering it in the liquid (water) does not make it any more lighter. It means that the maximum loss in weight of an object takes place when it is fully immersed in a liquid (water). Spring balance 'P' shows the smallest reading.

43. **(A)** Frequency of sawing is 2 x 55 = 110 per second. The wavelength is given by

$$\frac{\text{speed}}{\text{frequency}} = \frac{330}{110} = 3\text{ metres}.$$

44. **(C)** There are two reaction forces because there are two legs in contact with the floor. Although the total reaction force acting on the man's legs is 600 N, this force is evenly distributed among the two legs. The force on each leg is therefore 300 N.

45. **(A)** The handle of a school bag is made of thick cloth (canvas) so that the weight of bag may fall over a large area of the shoulder of the child producing less pressure on the shoulder. And due to less pressure, it is more comfortable to carry the heavy school bag. On the other hand, if the school bag handle is made thin, then the weight of school bag will fall over a small area of the shoulder. This will produce a large pressure on the shoulder of the child and it will become very painful to carry the heavy school bag.

46. **(A)** 2 kg = 20 N. Energy used (250 J) = force (20 N) × distance in metres. The distance is $\frac{250}{20}$ = 12.5 m.

The stone thrown up reaches a height of 12.5 m before it returns to the ground.

47. **(B)** The object's echo is reflecting off in 3 seconds away (half of the 6 seconds). Therefore, 3 × 330 m = 990 m = approx. 1 km

48. **(A)** Centripetal force is the force acting towards the centre of a circle. The gravitational force between the sun and the earth provides the necessary centripetal force. In the solar system, planets move in almost circular orbits around the sun. A force (called centripetal force) is needed to make an object move in a circular orbit (or circular path). In the case of planets moving around the sun, the centripetal force is provided by the gravitational force of the sun.

49. **(D)** During photosynthesis, the green leaves of plants change light from the sun into chemical energy (sugars and starch).

50. **(A)** As per the given question and figure, the block on the slope is balanced, otherwise it will move down. The labelled upward arrow Z clearly indicates frictional force acting opposite to the motion of block.

Chemistry

51. **(A)** Since X has 11 protons, it also has 11 electrons, with a configuration of 2.8.1. Hence, X forms X^+ ion with nucleon number of 12 + 11 (23).

52. **(A)** The number of moles of hydrogen gas = 2/2 = 1; and the number of moles of methane = 16/16 = 1. Therefore, the ratio of volumes is 1 : 1 for hydrogen and methane respectively.

53. **(B)** The mass of an object is the amount of matter the object has.

As P floats on R but Q floats on P, P has a smaller mass than R but a greater mass than Q. Hence, R has the greatest mass among P, Q and R.

As R floats on S, S has a greater mass than R. Hence, S has the greatest mass among the four liquids.

54. **(D)** M_r of Al_2O_3 = 2(27) + 3(16) = 102

Mass of Al = $\frac{2\times27\times204}{102}$ = 108 g.

55. **(B)** When a solution does not dissolve any more solute (sugar) it is said to be saturated.

Option (A): Insoluble means a solid that will not dissolve in a particular solvent.

Option (C): Soluble means a solid that will dissolve in a solvent.

Option (D): Unsaturated means a solution in which more solute will dissolve in a solvent.

56. **(C)** Lighter gases diffuse faster.

M_r of Cl_2 = 2 x 35.5 = 71

M_r of CO_2 = 12 + 2 x 16 = 44

M_r of CH_4 = 12 + 4 x 1 = 16

M_r of N_2 = 2 x 14 = 28

57. **(D)** For calcium, P = 20, E = 20, N = 20. Therefore, the following relationships are true: P = N, E = N and 2E = P + N

58. **(B)** Solution in beaker 2 has the most concentrated salt solution as the concentration of the solution is 16 g/100 cm^3.

59. **(C)** Boron and carbon, both have 6 neutrons.

Option (A): Carbon has 6 neutrons and nitrogen has 7 neutrons.

Option (B): Lithium has 4 neutrons and beryllium has 5 neutrons.

Option (D): Oxygen has 8 neutrons and fluorine has 10 neutrons.

60. **(D)** Only CO_2 (Carbon dioxide) and $CaCl_2$ (Calcium chloride) contain three atoms.

CaO (calcium oxide) contains 2 atoms (calcium and oxygen).

61. **(D)** Diffusion is the movement of particles from a region of higher concentration to a region of lower concentration.

62. **(B)** Copper is an element; air is a mixture; Copper (II) sulphate is a compound.

Option (A): Has no element

Options (C) and (D): Has no mixture

63. **(C)** Ammonia gas NH_3 contains 4 atoms (1N and 3H)

Option (A): Ammonia gas NH_3 has two elements (nitrogen and hydrogen)

Option (B): Ammonia gas NH_3 has molecules with two elements (nitrogen and hydrogen)

Option (D): The size of atoms cannot be determined from the chemical formula.

64. **(A)** In a gas (air), the particles are the farthest apart.

Options (B), (C) and (D): All of these are liquids (water, molten iron and liquefied perfume) and therefore the particles are more closely packed together as compared to the particles in gases.

65. **Delete**

66. **(B)** Sodium and Chlorine are the elements present in the compound sodium chloride.

Option (A): Hydrogen (not nitrogen) and oxygen are the elements present in water.

Option (C): Sulfur and oxygen (not oxide) are the elements present in sulfur dioxide

Option (D): Copper and sulfur (not sulfide) are the elements present in copper sulfide.

67. **(D)** Molecules in a solid are held together by strong intermolecular forces as they are in fixed position. Liquids diffuse slowly because intermolecular distances are small. Hence, the molecules in liquids vibrate and undergo large number of collisions with the neighbouring molecules or slide over one another easily. The particles in liquids move slowly than the particles in gases, so diffusion in liquid is slower than that in gases.

68. **(D)** Chromatography can be used to determine the identity of the illegal colour additive.

Options (A), (B) and (C): These methods cannot accurately determine the identity of the illegal additive.

69. **(A)** CuO (Copper oxide) contains only 2 atoms but H_2O and CO_2 contain 3 atoms.

Option (B): All the three molecules

(CO, O_2, MgO) contain 2 atoms.

Option (C): All the three molecules

(NH_3, PCl_3, H_2O_2) contain 4 atoms.

Option (D): All the three molecules

(N_2O, NO_2, O_3) contain 3 atoms.

70. **(C)** The room temperature is less than +58°C, so the substance is in the solid state. Hence, the particles are packed closely together in a regular pattern. A solid substance sublimes to a gas at +56 °C. The gaseous vapours of the substance lose kinetic energy and heat to the surroundings by cooling and convert back to solid at room temperature. The gaseous particles of the substances rearrange to form solid again.

Biology

71. **(C)** Root hair cells have a long, narrow cytoplasmic extension to speed up the uptake of ions and water into roots.

72. **(B,C)** Mitochondria and chloroplasts contains DNA and RNA that help them to multiply on their own. Hence, they are called semi-autonomous organelles.

73. **(B)** Bacteria is an unicellular prokaryote with a cell wall and lacks membrane bound cell organelles. It belongs to monera.

74. **(D)** 'Y' in the given cells is nucleus. Nucleus controls the activities in the cells.

75. **(D)** Golgi apparatus play an important role in the storage, packing and secretion of cell products and repairing of broken membranes of lysosomes, cell wall and plasma membrane.

76. **(A)** Typhoid, tuberculosis and diptheria are bacterial diseases.

77. **(C)** Phloem is a food conducting tissue. It transports food made in leaves to other parts of the plant.

78. **(A)** Sea anemones are classified in the phylum cnidaria.

79. **(C)** Spinach is a leaf part that contains green pigment called chloroplast. Leucoplasts are found in storage organs like potato tuber. Chromoplasts are coloured plastids found in fruits and flowers.

80. **(A)** Liver stores food in the form of glycogen.

81. **(C)** The given figure shows mixed cropping. It helps in maintaining soil fertility and makes better use of resources.

82. **(D)** Azotobacter is a free living nitrogen fixing bacteria and nitrosomonas is a nitrifying bacteria that play an important role in providing nitrogen to plants.

83. **(D)** The basic objective of Pulse Polio Immunisation Programme is to immunise those children who are not earlier immunised or who are partially immunised. To boost the immunity of children already immunised. To remove the disease-causing virus from the environment.

84. **(B)** Niacin - Pellagra, Vitamin C - Scurvy, Vitamin K - Bleeding, Protein - Kwashiorkor, Vitamin A - Xerophthalmia.

85. **(B)** Sunflower is an oil yielding plant.

86. **(C)** Pteridophytes are vascular cryptogams.

87. **(A)** In the given figure 'P' is nucleus. Nucleus controls all the activities of the cell.

88. **(C)** Lizards grow their lost tails by regeneration.

89. **(D)** Lizards are cold blooded animals which do not have a constant body temperature.

90. **(A)** The correct sequence is

$Q \rightarrow R \rightarrow P \rightarrow S$

91. **(B)** 92. **(B)** 93. **(C)**

94. **(D)** 95. **(C)** 96. **(B)**

97. **(C)** 98. **(A)** 99. **(B)** 100. **(C)**