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NATIONAL LEVEL SCIENCE TALENT SEARCH EXAMINATION

Paper Code: **UN439 (UPDATED)**

Solutions for Class : 9

MATHEMATICS

1. (A) $9^{\frac{1}{3}}, 11^{\frac{1}{4}}, 17^{\frac{1}{6}}$

$$9^{\frac{4}{12}}, 11^{\frac{3}{12}}, 17^{\frac{2}{12}}$$

$$\sqrt[12]{9^4}, \sqrt[12]{11^3}, \sqrt[12]{17^2}$$

$$x = \sqrt[12]{6561} \quad y = \sqrt[12]{1331} \quad z = \sqrt[12]{289}$$

$$\therefore x > y > z.$$

2. (A) $(\sqrt{4+\sqrt{15}})^3 - (\sqrt{4-\sqrt{15}})^3 = k\sqrt{6}$

$$\left[\sqrt{4+\sqrt{15}} - \sqrt{4-\sqrt{15}} \right]$$

$$\left[(\sqrt{4+\sqrt{15}})^2 + \sqrt{4+\sqrt{15}} \times \sqrt{4-\sqrt{15}} + (\sqrt{4-\sqrt{15}})^2 \right] = k\sqrt{6}$$

$$\left[\frac{\sqrt{8+2\sqrt{15}}}{\sqrt{2}} - \frac{\sqrt{8-2\sqrt{15}}}{\sqrt{2}} \right]$$

$$\left[4 + \sqrt{15} + \sqrt{4^2 - (\sqrt{15})^2} + 4 - \sqrt{15} \right] = k = \sqrt{6}$$

$$\left[\frac{\sqrt{5} + \sqrt{3}}{\sqrt{2}} - \frac{(\sqrt{5} - \sqrt{3})}{\sqrt{2}} \right] (9) = k\sqrt{6}.$$

$$\frac{2\sqrt{3}}{\sqrt{2}} \times 9 = k\sqrt{6}$$

$$\sqrt{6} \times 9 = k\sqrt{6}$$

$$k = 9$$

3. (A) We know that in a square the diagonals are equal and bisect each other at right angles.

4. (D) $(a+b)^3 + (b+c)^3 + (c+a)^3 - 3(a+b)(b+c)(c+a) = (a+b+b+c+c+a)[(a+b)^2 + (b+c)^2 + (c+a)^2 - (a+b)(b+c) - (b+c)(c+a) - (c+a)(a+b)]$

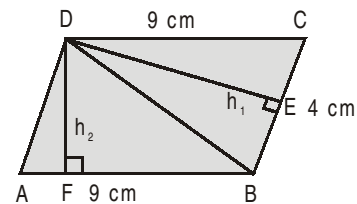
$$= 2(a+b+c)(a^2+b^2+c^2-ab-bc-ca)$$

$$= 2(a^3+b^3+c^3-ab-bc-ca)$$

$$\therefore \frac{(a+b)^3 + (b+c)^3 + (c+a)^3 - 3(a+b)(b+c)(c+a)}{3(a^3+b^3+c^3-3abc)}$$

$$= \frac{2(a^3+b^3+c^3-3abc)}{3(a^3+b^3+c^3-3abc)} = \frac{2}{3}$$

5. (B) A diagonal divides a parallelogram into two triangles of equal area.



\therefore Area of parallelogram ABCD

$$= 4 \text{ cm} \times h_1 = 9 \text{ cm} \times h_2$$

$$\Rightarrow \frac{h_1}{h_2} = \frac{9}{4} \text{ or } h_1 : h_2 = 9 : 4$$

6. (C) Amount = $35 + 15(25) = ₹ 410$

7. (C) $\Rightarrow x^{17}(x^2+1) + x^{11}(x^2+1) + x^5(x^2+1) + x^3 + x - x.$

[\therefore Adding and subtraction $\frac{1}{x}$]

$$\Rightarrow x^{17}(x^2+1) + x^{11}(x^2+1) + x^5(x^2+1) + x(x^2+1) - x.$$

$$\Rightarrow (x^2+1)(x^{17} + x^{11} + x^5 + x) - x.$$

8. (D) $\frac{1}{1+\sqrt{2}} + \frac{1}{\sqrt{2}+\sqrt{3}} + \frac{1}{\sqrt{3}+\sqrt{4}} + \dots +$

$$\frac{1}{\sqrt{24}+\sqrt{25}}$$

$$= \frac{1-\sqrt{2}}{1-2} + \frac{\sqrt{2}-\sqrt{3}}{2-3} + \dots + \frac{\sqrt{24}-\sqrt{25}}{24-25}$$

$$= \frac{1 - \sqrt{2} + \sqrt{2} - \sqrt{3} + \dots + \sqrt{23} - \sqrt{24} + \sqrt{24} - \sqrt{25}}{-1}$$

$$= \frac{1 - \sqrt{25}}{-1} = -\frac{1-5}{-1} = \frac{-4}{-1} = 4.$$

9. (D) $\angle OGH = 180^\circ - (65^\circ + 45^\circ)$
 $= 180^\circ - 110^\circ = 70^\circ$

$$\triangle GOH, \angle OGH = 40^\circ = q$$

$$70^\circ + 40^\circ = q$$

$$q = 110^\circ.$$

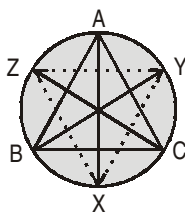
10. (D) Distance between PQ = 5 - 1 = 4 units
 SR is a horizontal line and 'R' is 4 units away from s.

$$\therefore r = (2 + 4, 3) = (6, 3)$$

11. (A) Clearly, $\angle BYX = \angle BAX = \frac{\angle A}{2}$.

$$\text{Also } \angle ZYB = \angle ZCB = \frac{\angle C}{2}.$$

(Angles in the same segment.)



$$\text{Hence, } \angle ZYX = \angle ZYB + \angle BYX$$

$$\Rightarrow \angle ZYX = \frac{\angle C}{2} + \frac{\angle A}{2} = \frac{\angle A + \angle C}{2}$$

$$= \frac{180^\circ - \angle B}{2} = 90^\circ - \frac{\angle B}{2}$$

Similarly, the other angles are

$$90^\circ - \frac{\angle A}{2} \text{ and } 90^\circ - \frac{\angle C}{2}.$$

12. (A) $(x-1)$ is a factor means sum of coefficient are zero.

13. (A) $AC^2 = AB^2 + BC^2$

$$AC = \sqrt{25+144} = 13 \text{ mts.}$$

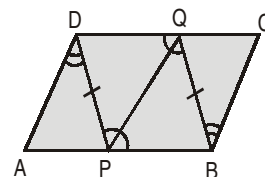
14. (B) Sum of abscissa and ordinate is zero in the given ordered pairs.

$$x + y = 0.$$

15. (A) $\angle DPB = \angle BQD$ (Given)

$$\Rightarrow 180^\circ - \angle DPB = 180^\circ - \angle BQD$$

$$\Rightarrow \angle APD = \angle BQC \quad \dots (1)$$



Now, in $\triangle ADP$ and $\triangle BCR$,

$$\angle APD = \angle BQC \text{ [By (1)]}$$

$$DP = BR \text{ and}$$

$$\angle ADP = \angle BCR \text{ (Given)}$$

$$\therefore \triangle ADP \cong \triangle BCR$$

16. (B) Edge of big cube = k units

Let the edge of small cube be 'a' units.

Volume of each small cube = a^3 cu.units;

$$\Rightarrow \text{Volume of big cube} = k^3$$

Given there are 'n' small cubes

$$\Rightarrow k^3 = n \cdot a^3$$

$$\Rightarrow a^3 = \frac{k^3}{n} \Rightarrow a = \frac{k}{\sqrt[3]{n}}$$

$$\therefore \text{Length of the edge of new cube is } \frac{k}{\sqrt[3]{n}}.$$

17. (B) Given ABCD is a trapezium with AB = a cm and CD = b cm. EF is the line joining the midpoints of non parallel sides.

The ratio of ar (EFCD) and ar (ABFE)

$$= \frac{\frac{1}{2}h(EF + CD)}{\frac{1}{2}h(AB + EF)}$$

$$= \frac{\left(\frac{a+b}{2} + b\right)}{\left(a + \frac{a+b}{2}\right)}$$

$$= (a + 3b) : (3a + b)$$

18. (D) $\sqrt{mn} = 10 \Rightarrow mn = 100$

\therefore The possible pairs of m and n are

$$(m, n) = (1, 100), (2, 50), (4, 25), (5, 20), (10, 10) \Rightarrow m + n \text{ can be } 101, 52, 29, 25, 20$$

So, 50 cannot be a value of m + n.

19. (A) In $\triangle ABC$, $\angle B = 90^\circ = AC^2 = AB^2 + BC^2$
 $41^2 = AB^2 + 40^2$

$$AB = 9.$$

Area of

$$\begin{aligned}\Delta ABC &= \frac{1}{2} \times AB \times BC \\ &= \frac{1}{2} \times 9 \times 40 \text{ cm}^2 = 180 \text{ cm}^2\end{aligned}$$

$$\text{In } \Delta ABC, \angle ACD = 90^\circ \text{ is } AB^2 = AC^2 + CB^2$$

$$841^2 = 41^2 + CB^2$$

$$CD = 840$$

Area of

$$\begin{aligned}\Delta ACD &= \frac{1}{2} \times AC \times CD \\ &= \frac{1}{2} \times 41 \text{ cm} \times 840 \text{ cm} \\ &= 17,220 \text{ cm}^2\end{aligned}$$

$$\begin{aligned}\text{Total area} &= 17,220 \text{ cm}^2 + 180 \text{ cm}^2 \\ &= 17,400 \text{ cm}^2\end{aligned}$$

20. (C) ARPQ is a parallelogram

$$\therefore AR = PQ \text{ \& } PR = AQ$$

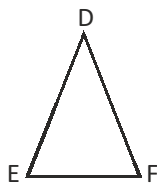
$$\therefore AR = PQ = \frac{AB}{2} = \frac{30 \text{ cm}}{2};$$

$$PR = AQ = \frac{AC}{2} = \frac{21 \text{ cm}}{2}$$

$$\begin{aligned}\therefore AR + RP + PQ + QA \\ &= \frac{30 \text{ cm}}{2} + \frac{30 \text{ cm}}{2} + \frac{21 \text{ cm}}{2} + \frac{21 \text{ cm}}{2} \\ &= 51 \text{ cm}\end{aligned}$$

21. (D) Sum of two sides of a triangle is greater than its third side.

$$\therefore DE + EF > FD$$



22. (D) $\angle PQR = 90^\circ$ [\therefore Angle in a semi circle]

$$\therefore \angle QPR + \angle QRP = 90^\circ$$

$$\angle QPR + 30^\circ = 90^\circ$$

$$\angle QPR = 60^\circ$$

$$\therefore \angle TPR = 100^\circ - 60^\circ = 40^\circ$$

$$\text{But } \angle TPR + \angle x = 180^\circ$$

$$40^\circ + x = 180^\circ$$

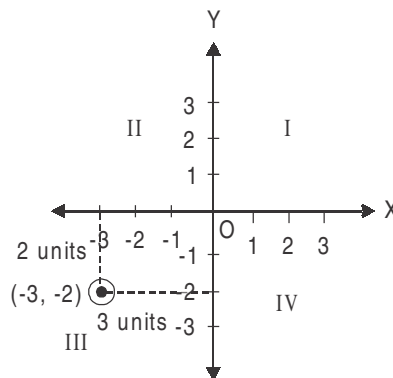
$$x = 140^\circ$$

23. (A) The perpendicular distance of a point from x-axis = 2 units.

The perpendicular distance of a point from y-axis = 3 units

Given, that the point lies in the III Quadrant

\Rightarrow Both the coordinates of the point are negative.



\therefore The required coordinates of the point are $(-3, -2)$.

24. (B) Const:- Join EF

AEFD is a cyclic quadrilateral.

$$\therefore \angle ADF + \angle AEF = 180^\circ$$

$$70^\circ + \angle AEF = 180^\circ$$

$$\angle AEF = 110^\circ$$

$$\therefore \angle BEF = 180^\circ - \angle AEF = 70^\circ$$

$$\text{But } \angle BEF + \angle BCD = 180^\circ$$

$$70^\circ + \angle BCD = 180^\circ \text{ \& } \angle DCB = 110^\circ$$

25. (A) As shown in the figure, since P is the midpoint of AB and $AB = 2AD$, we have $AB = 2AP = 2AD$.

or $AP = AD$.

i.e., triangle ADP is an isosceles triangle.

If $\angle ADP = x$

and $\angle ADP = x$, then,

$$\angle A = 180^\circ - 2x$$

$$\Rightarrow \angle B = 2x$$

$$\angle CPB = \angle PCB = 90^\circ - x$$

$$\text{Since } \angle APB = 180^\circ$$

$$\angle DPC = 90^\circ$$

PHYSICS

26. (A) Time taken for sound to travel to and from the bat to the obstacle = 0.8 s

Time taken for sound to travel to the obstacle = 0.4 s

Speed of sound in air = 300 m s^{-1}

Distance from the bat to the obstacle = speed \times time = $300 \times 0.4 = 120 \text{ m}$

27. (B) Here, $u = 10 \text{ ms}^{-1}$, $v = 20 \text{ m s}^{-1}$,
 $s = 135 \text{ m}$, $t = ?$

$$\text{As, } a = \frac{v^2 - u^2}{2s} = \frac{20^2 - 10^2}{2 \times 135} = \frac{10}{9} \text{ m s}^{-2}$$

$$\text{Now } t = \frac{v - u}{a} = \frac{20 - 10}{10/9} = 9 \text{ s}$$

28. (A) Object P is the heaviest while object Q is the lightest.

Object P is more than thrice the mass of object Q.

Object R is more than twice the mass of object Q.

29. (D) The applied force of 30 N will cause the three connected masses to accelerate at the same rate. If F_1 is the amount needed to pull P (mass m) to accelerate at an acceleration a , F_2 will be 2 times F_1 to pull P and Q (total mass of 2 m) to accelerate at acceleration a .

Applied force - Opposing force =

Resultant force = mass \times acceleration

$$30 - 0 = (3 \text{ m}) (a) \quad ma = 10$$

$$F_1 = (m) (a) = 10 \text{ N}$$

$$F_2 = (2 \text{ m})(a) = 20 \text{ N}$$

30. (D) When a man sings at the centre of a circular room, the sound will travel in all directions and reflect back to the centre after striking the wall. The man at the centre of the room will receive strong echoes concurrently and will hear himself the loudest at the centre of a circular room.

$$31. (A) S = \sqrt{l^2 + l^2} = \sqrt{2l^2} = l\sqrt{2} = 4\sqrt{2}$$

$$\text{Average velocity} = \frac{S}{t}$$

$$= \frac{4\sqrt{2} \text{ cm}}{15 \times 60 \text{ s}} = \frac{\sqrt{2}}{225} \text{ cms}^{-1}$$

32. (D) In 5 seconds, the wooden block moves $5 \times 10 \text{ m/s} = 50$ metres. Work done = $7 \text{ N} \times 50 \text{ m} = 350 \text{ J}$.

33. (D) A force can cause an object to increase its speed e.g. stepping on the accelerator of a moving car.

A force can cause an object to decrease its speed e.g. stepping on the brake of a moving car.

A force can cause an object to spin e.g. turning the steering wheel of a car.

34. (D) The highest pitch will also have the highest frequency, thus the correct sequence is 550 Hz, 5500 Hz (5.5 kHz) then 50 000 Hz (0.05 MHz) which is 3, 2, 1.

35. (B) $S = x_2 - x_1 = 55 - 50 = 5 \text{ m}$

36. (C) The mass of an object does not change with gravitational force but its weight does. Thus, the weight of a 600 g or 6 N object on the moon becomes $\frac{1}{6}$ that on the Earth which is 1 N. Thus, options (B) and (D) are incorrect. As the mass of the object on the moon is the same as the mass of the object on the Earth, which is 600 g, options (A) and (B) are incorrect.

37. (B) In space, there is no gravitational force. Thus objects have no weight and no work is done.

38. (A) A golf ball is dry and rebounds and returns to the thrower. A bomb of mud is wet and may, may not rebound and return to the thrower.

Thus, impulse of force is measured by change in momentum of an object. As the golf ball rebounds, the change in momentum is maximum resulting in greater impulse than the bomb of mud.

39. (B) Density = Mass / Volume
Therefore, Mass = Density x volume
= $0.9 \times 18 = 16.2 \text{ g}$
40. (D) $100 \text{ kg} = 1000 \text{ N}$, work done = $1000 \text{ N} \times 10 \text{ m} = 10\,000 \text{ J} = 10 \text{ kJ}$
Option (A) : $1 \text{ kg} = 10 \text{ N}$, work done = $10 \text{ N} \times 1 \text{ m} = 10 \text{ J}$ (not 1 J)
Option (B) : $5 \text{ kg} = 50 \text{ N}$, work done = $50 \text{ N} \times 5 \text{ m} = 250 \text{ J}$ (not 50 J)
Option (C) : $50 \text{ kg} = 500 \text{ N}$, work done = $500 \text{ N} \times 5 \text{ m} = 2500 \text{ J} = 2.5 \text{ kJ}$ (not 0.25 kJ)
41. (C) Average velocity
$$= \frac{\text{displacement}}{\text{time}} = \frac{2r}{t} = \frac{2 \times 40}{40} = 2 \text{ m/s}$$
42. (D)
- | | Side of cube | Volume of cube | Mass of cube | Density (mass/volume) |
|----|--------------|--------------------|--------------|-------------------------|
| A. | 2 cm | 8 cm^3 | 40.0 g | 5 g m^{-3} |
| B. | 3 cm | 27 cm^3 | 216.0 g | 8 g m^{-3} |
| C. | 4 cm | 64 cm^3 | 755.2 g | 11.8 g m^{-3} |
| D. | 5 cm | 125 cm^3 | 337.5 g | 2.7 g m^{-3} |
43. (D) The speed of ultrasound is the same as an audible sound when travelling in air. Ultrasound is a type of sound wave with frequencies greater than 20 kHz. Wavelength of ultrasound is shorter than that of audible sound.
44. (D) Forces of action and reaction are equal in magnitude, opposite in direction ; and act on two different bodies.
45. (C) The object that exerts the greatest pressure on the ground is the object that has the smallest area touching the surface. The object in Option (C) has the smallest surface area in contact with the ground.
46. (C) Climbing vertically up a ladder involves use of most of your energy as you are doing work against gravity.
Option (A) : Climbing down a hole in the ground, has gravity working with you so you spend less energy than climbing up.
Option (B) : Sitting involves no movement of forces thus spends little energy.
Option (D) : There is no gravitational force in space thus little energy is used up.

47. (B) The wavelength of a sound wave is given by the distance between successive compressions or rarefractions. The given diagram shows three wavelengths within 12 m. Each wavelength = $12 \text{ m} \div 3 = 4 \text{ m}$
48. (A) Distance travelled by X in 5th second,
$$D_x = 0 + \frac{a_1}{2}(2 \times 5 - 1) = \frac{9}{2}a_1$$

Distance travelled by Y in 3rd second,
$$D_y = 0 + \frac{a_2}{2}(2 \times 3 - 1) = \frac{5}{2}a_2$$

As per question, $D_x = D_y$
so $\frac{9}{2}a_1 = \frac{5}{2}a_2$ or $\frac{a_1}{a_2} = \frac{5}{9}$
49. (C) Sound is produced when objects vibrate and is therefore not a type of potential (stored) energy.
50. (A) Here, $m = 0.5 \text{ kg}$, $a = 2 \text{ m/s}^2$.
Rate of change of momentum = $F = ma$
 $= 0.5 \times 2 = 1 \text{ N}$

CHEMISTRY

51. (B) Carbon (C) is the element present in all the three of these compounds.
Option (A) : Calcium (Ca) is only present in CaCO_3 (calcium carbonate).
Option (C) : Hydrogen (H) is only present in CH_4 (methane).
Option (D) : Oxygen (O) is only present in CO_2 (carbon dioxide) and CaCO_3 (calcium carbonate).
52. (A) An iron nail contains only one kind of atoms as iron is a metallic element.
Option (B) : Brass is an alloy so it is a mixture of atoms (copper and zinc).
Option (C) : Steel is an alloy so it is a mixture of atoms (iron and carbon).
Option (D) : Bronze is an alloy so it is a mixture of atoms (copper and tin).

53. (A) A window mists up because water vapour condenses to a liquid (water droplets).

Options (B), (C) and (D) : These options do not state the correct changes of state and name of the process, which is condensation.

54. (B) Warming up by 15°C takes the temperature from 200°C to -185°C . Therefore nitrogen (-196°C) would be given off first and argon (-186°C) would be given off next and finally oxygen would be given off.

Option (A): Gases will be given off based on the boiling points.

Option (C) : Argon has a lower boiling point than oxygen and would therefore be given off before oxygen.

Option (D) : Based on the boiling points of each gas given in the table, the order given in this option is reversed and therefore incorrect.

55. (A) Gases have highest kinetic energy because of greatest freedom of motion

56. (D) Five bromine molecules (Br_2) contain 10 atoms.

Option (A) : Six hydrogen molecules (H_2) contain 12 atoms.

Option (B) : Four water molecules (H_2O) contain 12 atoms.

Option (C) : Four carbon dioxide molecules (CO_2) contain 12 atoms.

57. (B) H_2 is diatomic, N_2O is triatomic and NH_3 is tetraatomic.

Option (A) : CH_4 is not tetraatomic (Four atoms). It has five atoms.

Option (C) : NCl_3 is not triatomic (three atoms). It has four atoms.

Option (D) : CoO is not triatomic (three atoms). It has two atoms.

58. (A) Chalk (insoluble) and salt (soluble) can be separated by adding cold water, stirring and then filtering.

Option (B) : Neither iron nor sulfur are soluble in water.

Option (C): Both sugar and instant coffee powder are soluble in water.

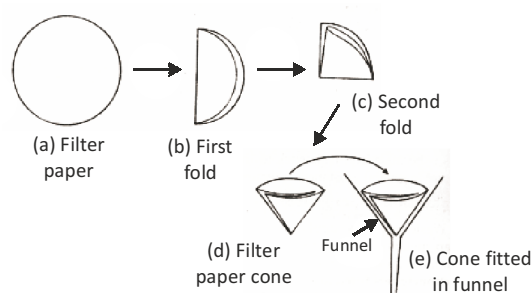
Option (D) : Both sulfuric and hydrochloric acids are water - soluble .

59. (B) i) The round piece of filter paper is taken and folded in half as shown in figure (a) and (b)

ii) The half folded filter paper is folded again as shown in figure (c).

iii) The twice folded filter paper is opened to form a hollow cone (by keeping three layers of filter paper on one side and one layer on the other side) as shown in figure (d).

iv) This cone of filter paper is placed inside a funnel as shown in figure (e).



60. (D) Boron contains 5 protons, 5 electrons and 6 neutrons.

Option (A) : Hydrogen contains 1 proton, 1 electron and no (not 1) neutrons.

Option (B) : Helium contains 2 protons, 2 electrons and 2 (not 4) neutrons.

Option (C) : Lithium contains 3 (not 7) protons, 3 electrons and 4 neutrons.

61. (D) L is melting (solid to liquid), M is condensing (gas to liquid) and N is subliming (solid to gas).

Options (A), (B) and (C) : These options do not show one or more processes correctly.

62. (A) Lighter gas like ammonia ($\text{NH}_3 = 17$) will diffuse faster than other gases as its molecular weight is less,
- $$\text{N}_2 = 14 \times 2 = 28, \text{CO}_2 = 12 + 16 \times 2 = 44, \text{O}_2 = 16 \times 2 = 32$$
63. (B) One mole of Ca = 40 g
One mole of Ca contains 6.02×10^{23} atoms
5.0 moles contains $5.0 \times 6.02 \times 10^{23}$ atoms = 3.01×10^{24} atoms.
64. (C,D) As this atom has 2 protons, it should have 2 electrons and not 3
Option (A) : This model has the correct number of protons (3) and correct number of electrons (3)
Option (B) : This model has the correct number of proton (1) and correct number of electron (1)
Option (D) : This model has the correct number of protons (2) and electrons (2) but the K shell is not filled with electrons instead, the electrons are filled in L shell which is incorrect.
65. (D) (i) In copper (I) oxide :
Mass of copper (I) oxide = 0.716 g
Mass of copper = 0.636 g
 \therefore Mass of oxygen = 0.08 g
(ii) In the copper (II) oxide :
Mass of copper (II) oxide = 0.398 g
Mass of copper = 0.318 g
 \therefore Mass of oxygen = 0.08 g
The ratio of the masses of copper combining with 0.08 g of oxygen = 0.636 : 0.318.
Dividing the ratio by the least number the ratio is
$$\frac{0.636}{0.318} : \frac{0.318}{0.318} = 2:1$$
66. (C) The volume of a gas is due to large empty spaces between the molecules.
67. (A) During distillation, the components in crude oil are separated because they boil at different temperatures, i.e., they have different boiling points.

Options (B), (C) and (D) These options include density, flammability or solubility, which are incorrect.

68. (C) Gases do not have any definite volume. Their volume is equal to the volume of the container.
69. (B) Sulfur dioxide contains only the non-metal sulfur and oxygen.
Option (A) : Calcium carbonate contains the metal calcium and the non-metals carbon and oxygen.
Option (C) : Copper sulfate contains the metal copper and the non-metals sulfur and oxygen.
Option (D) : Sodium hydroxide contains the metal sodium and the non-metals oxygen and hydrogen.
70. (B) Mass of 1 drop or 0.05 ml of H_2O = 0.05 g
$$\text{No. of moles in 0.05} = \frac{0.05}{18}$$

One mole contains 6.02×10^{23} molecules
No. of water molecules in one drop
$$= \frac{0.05}{18} \times 6.02 \times 10^{23} = 1.67 \times 10^{21}$$
 molecules

BIOLOGY

71. (B) Annelida and vertebrates are the animals with closed circulatory systems.
72. (C) Chloroplast are pigment cells or plastids they are round oval or disc shaped the conversion of light energy to chemical energy.
73. (B) Naming of an individual by two names one is generic name and other a species.
74. (C) Zygote is formed by the Union of sperm and Ovum. It is a diploid cell.
75. (C) Pseudocoelom is a fluid filled body cavity lying inside the external body wall of the nematodes like ascaris.

76. (C) Cockroach is bilaterally symmetrical segmented body with open circulatory system.
77. (C) After fertilization zygote undergoes mitosis to form an embryo, foetus and a baby, potato tuber undergoes mitosis division to develop a bud.
78. (D) Amoeba reproduces by binary fission hydra by budding and mucor by sporulation.
79. (D) Erythrocytes or RBC's carry oxygen to every part of the body. It contains a protein called globin and it is biconcave shape without a nucleus.
80. (B) Five part body plan, Radial symmetry and spiny outer covering are the characteristics found in the phylum Echinodermata.
81. (D) Part P represents the phloem tube while Part Q represents the xylem tube. The xylem tube transports both water and mineral salts from the roots to all parts of the plant while the phloem tube carries food made by the leaves to all parts of the plant.
82. (B) A plant needs to take in carbon dioxide during photosynthesis to make food. Hence, the amount of carbon dioxide in the surrounding air will drop. The boy cycling on his bike and the girl taking a short nap would require them to give out carbon dioxide during respiration. The burning of logs releases carbon dioxide into the air.
83. (D) The onion cell has a cell wall, and cell sap which cannot be found in a human cheek cell.
84. (D) Nucleus contains the parts that controls and carries information from one generation to the next generation.
85. (C) Mosses are the members of Bryophyta and ferns belong to Pteridophyta.
86. (C) The symptoms represent the disease AIDS.
87. (D) X - Virus, Y - Cholera, Z - Malaria
88. (D) The effects of global warming are shrinking of the Arctic and intense cyclone activity. Volcanic eruptions and increased cyclone activities.
89. (D) There are many benefits to having genetically modified crops. The crops have higher nutritional values. They also bring in higher yields and more profits to the farmers. Farmers save on pesticides when crops are more resilient to pests. These days, crops are not only resilient to floods, but droughts as well.
90. (C) Somatic cells like skin undergo mitotic cell division and produce new cells to replace damaged cells.

GENERAL AWARENESS

- | | | |
|----------|---------|---------|
| 91. (A) | 92. (A) | 93. (C) |
| 94. (A) | 95. (A) | 96. (D) |
| 97. (C) | 98. (B) | 99. (D) |
| 100. (C) | | |

===== *The End* =====