MATRIX HIGH SCHOOL

STSE_10th_SAT

Answer & Solutions

1. The physical quantity which has unit N/kg is

a) Energy
b) Force
c) Momentum
d) Acceleration

Answer (d)

Sol. $N/Kg \Rightarrow \frac{N}{Kg} = \frac{Kg \times \frac{m}{s^2}}{Kg} = \frac{m}{s^2}$.

2. If M and N are two objects with masses $8\ Kg$ and $32\ Kg$ respectively then

a) M has more inertia then N
b) N has more inertia then M
c) M and N have the same inertia
d) Bothe will have no inertia

Answer (b)

Sol. $m_M = 8\ kg$

$m_N = 32\ kg$

$\because$ Inertia $\propto$ mass $\Rightarrow$ Hence object N has more inertia.

3. A body of mass 4 kg is moving on a smooth floor in straight line with a uniform velocity of 20 m/s Resultant force acting on the body is

a) $80\ N$
b) $40\ N$
c) $5\ N$
d) Zero

Answer (d)

Sol. $\because F_{net} = m \times a$ & object is moving with uniform velocity that mean its acceleration is zero(a =0)

$\therefore F = m \times (O) = ON$

4. Two objects of masses 200 g and 400 g are moving along the same line and direction with velocities of $4\ ms^{-1}$ and $2\ ms^{-1}$ respectively. Ratio of their momentum

a) $4:1$
b) $1:2$
c) $1:1$
d) $2:1$

Answer (c)

Sol. $m_1 = 200\ g,\ m_2 = 400g$

$v_1 = 4m/s,\ v_2 = 2m/s$

$P_1 = 0.2 \times 4 \qquad P_2 = 0.4 \times 2$

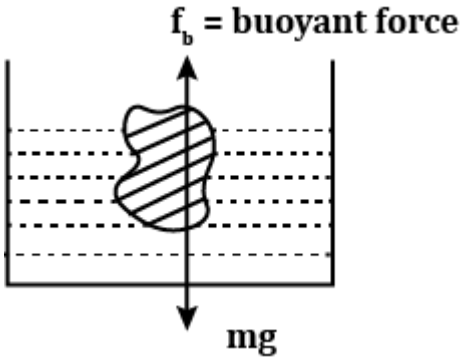
$\frac{P_1}{P_2} = \frac{0.2 \times 4}{0.4 \times 2} = \frac{1}{1}$

5. When a body is immersed in a liquid, the buoyant force that act on the body will be

a) Vertically downwards
b) Vertically upwards
c) Horizontally left side
d) Horizontally right side

Answer (b)

Sol.



6. Acceleration of all freely falling bodies

a) Decrease with time
b) Remains zero
c) Remains constant
d) Increase with time

Answer (c)

Sol. Acceleration of all freely falling bodies is always constant & it valve on earth is $9.81\ m/s^2$ & it is denoted by g.

7. Relative density of silver is 7.6. The density of water is $1\ g\ cm^{-3}$, Density of silver in

a) $15.2\ Kgm^{-3}$
b) $7.6\ Kg\ m^{-3}$
c) $7.6\ \times 10^{-3}\ Kg\ m^{-3}$
d) $7.6\ \times 10^{3}\ Kg\ m^{-3}$

Answer (d)

Sol. Relative density of liver $= 7.6\ = \frac{density\ of\ liver}{density\ of\ water} = \frac{ds}{dw} = \frac{ds}{1\ g/cm^3}$

$\therefore ds\ =\ 7.6\ g/cm^3$

$\therefore 1g/cm^3 = 1000\ kg/m^3$

$\therefore ds\ =\ 7.6\ g/cm^3 = 7600\ kg/m^3 = 7.6\ \times 10^3\ kg/m^3$

8. The value of universal gravitational constant (G) is

a) $6.673\ \times 10^{-11}\ Nm^2kg^2$
b) $6.673\ \times 10^{+11} Nm^2kg^{-2}$
c) $6.673\ \times 10^{-11}\ Nm^2kg^2$
d) $6.673\ \times 10^{-11}\ Nm^2kg^{-2}$

Answer (d)

Sol. Value of universal constant G is $6.673\ \times 10^{-11}\ Nm^2kg^{-2}$

9. An object of mass 2 kg is moving with a constant velocity 2 ms^{-1}. How much work is needed against the object in order to bring it to rest.

a) $20\ J$
b) $16\ J$
c) $4\ J$
d) $8\ J$

Answer (c)

Sol. $m\ =\ 2kg,\ v\ =\ 2m/s,\ v\ =\ final\ velocity\ =\ 0m/s$

According to work Energy theorem $= w_{net} = \Delta k = K_j - K_i$

$W_{net} = \frac{1}{2}m(v)^2 - \frac{1}{2} \times 2 \times (2)^2 = -\ 4\ J$

10. The angle between the force and displacement for negative work will be

a) 0°

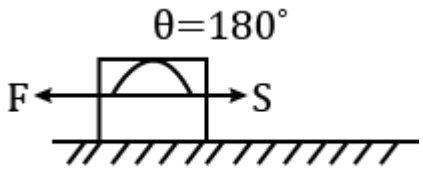
b) 180°

c) 90°

d) 270°

Answer (b)

Sol.



- For negative work, force must be opposite to the displacement $(\theta = 180^{\circ})$

11. If work, force and times are represented by P, Q and R respectively then the term $\left(\frac{P}{QR}\right)$ will represent

a) displacement

b) acceleration

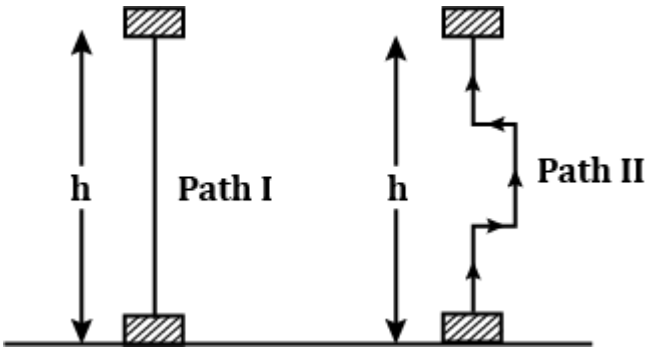
c) velocity

d) energy

Answer (c)

Sol. $Work = P = N - m,\ Force = Q = N,\ times = R = S \Rightarrow \left(\frac{P}{QR}\right) = \frac{N-m}{N-s} = \left(\frac{m}{s}\right)$

12. Correct relation for work done by the gravitational force in path I and II is



a) $W_I = W_{II}$

b) $W_I < W_{II}$

c) $W_I > W_{II}$

d) none of these

Answer (a)

Sol. Work done by gravitational force is independent on path so, $w_1 = w_2$

13. The refractive index of glass is 1.50. If the speed of light in air to $3 \times 10^8 ms^{-1}$ then the speed in glass will be

a) $3 \times 10^8 ms^{-1}$

b) $2 \times 10^8 ms^{-1}$

c) $1.5 \times 10^8 ms^{-1}$

d) $4.5 \times 10^8 ms^{-1}$

Answer (b)

Sol. $\because n = \frac{speed\ of\ light\ in\ vacuum}{speed\ in\ glass\ \ medium} = \frac{3\times10^8}{V} = 1.5 \Rightarrow V = 2 \times 10^8 m/s$

14. Correct relation between object - distance (u), image distance (v) and focal length (f) mirror is

a) $v - u = f$

b) $\frac{1}{v} = \frac{1}{u} = \frac{1}{f}$

c) $v + u = f$

d) $\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$

Answer (d)

Sol. Minor formula, $\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$

15. Nature and focal length of a lens of power $+\ 2.0D$ will be

a) Concave lens, $+\ 50\ cm$
b) Concave lens, $-\ 50\ cm$
c) Convex lens, $+\ 50\ cm$
d) Convex lens, $-\ 50\ cm$

Answer (c)

Sol. $f = \frac{100}{P} cm$

$f = \frac{100}{+2} = 50\ cm,$ convex lens

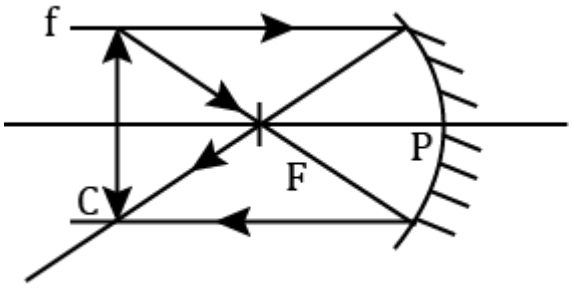
16. The image formed by a concave mirror is of the same size, real and inverted when the object is placed

a) Between P and F
b) At infinity

c) At C
d) At F

Answer (c)

Sol. at C



17. Twinkle of stars is due to

a) scattering
b) dispersion
c) reflection
d) Atmospheric

Answer (d)

Sol. Stars Twinkle due to Atmosphere Refraction.

1**8.** The human eye can focus on objects at different distances by adjusting the focal length of the eye lens. This is due to

a) Far - sightedness
b) Near - sightedness
c) accommodation
d) presbyopia

Answer (c)

Sol. Ability of eye lens to adjust its focal length to form image on retina is accommodation.

19. If $2\ J$ of work is done to move a charge of $2C$ between two points of a circuit from one point to another point then the potential difference between those two points will be

a) $3\ V$
b) $1\ V$
c) Zero
d) $2\ V$

Answer (b)

Sol. Potential difference, $\Delta V = \frac{W}{q}$

$\Delta V = 1\ volt$

20. A certain household has consumed 100 units of energy during a november month. Its value in joules will be

a) 3.6×10^{10}
b) 3.6×10^{8}
c) 7.2×10^{10}
d) 3.6×10^{6}

Answer (b)

Sol. $1\ unit = 1\ kilowatt : hour = 3.6 \times 10^{6}$

$\therefore$ for unit $= 100 \times 3.6 \times 10^{6} J$

$= 3.6 \times 10^{8} J$

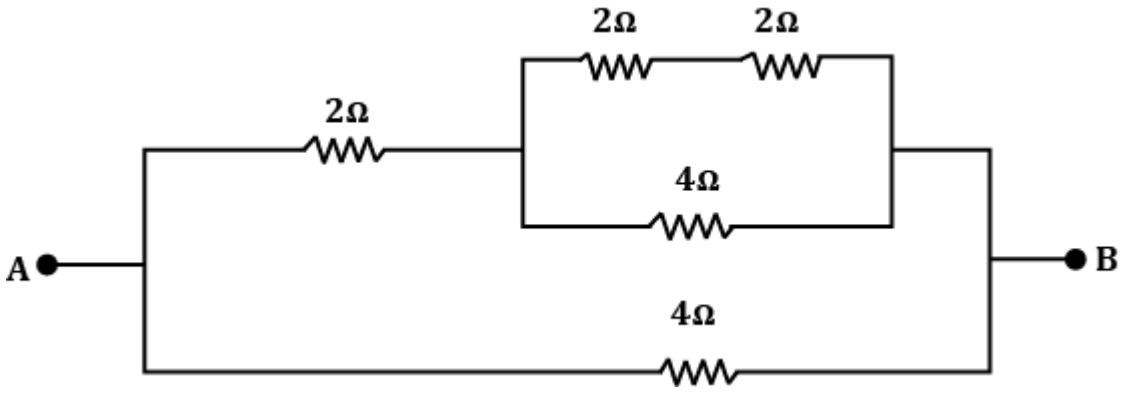
21. The electric power of an electric appliance is given by

a) V^2R
b) IV
c) IR^2
d) I^2V

Answer (b)

Sol. $P = I \times V$

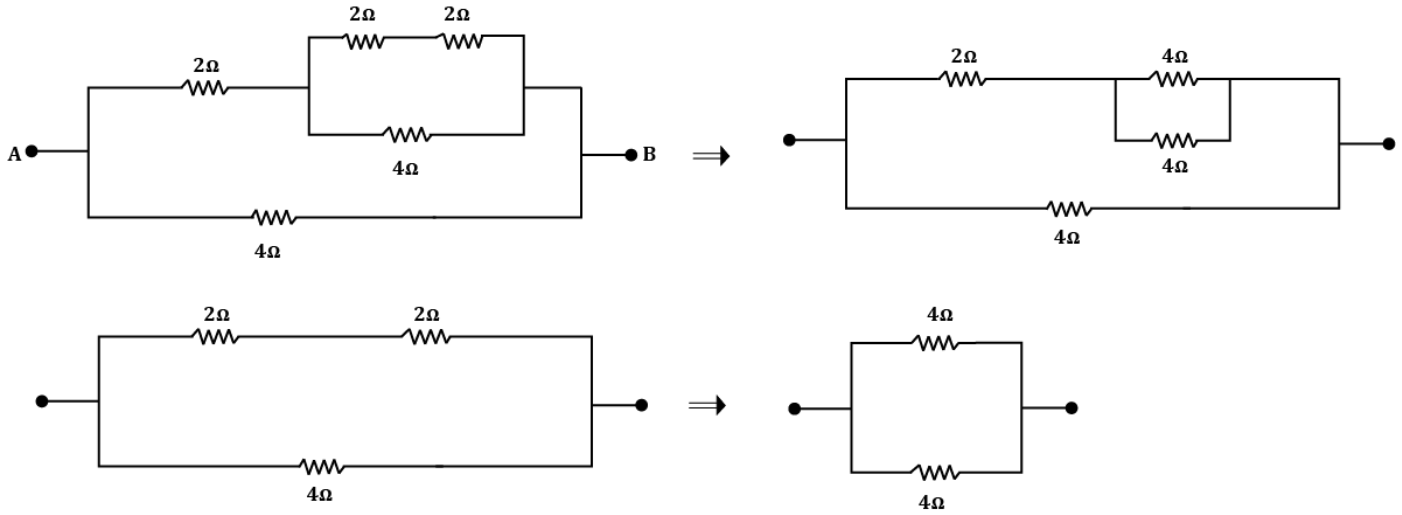
22. Equivalent resistance between the points A and B in the following circuit diagram will be



a) $8\ \Omega$
b) $6\ \Omega$
c) $4\ \Omega$
d) $2\ \Omega$

Answer (d)

Sol.



$\therefore R_{AB} = 2\Omega$

23. A device which converts electrical energy into mechanical energy is

a) Electric generator
b) Transformer
c) Electric motor
d) Voltmeter

Answer (c)

Sol. Electric motor converts electrical energy into mechanical energy.

24. The magnetic field inside a long straight solenoid - carrying current

a) Is zero
b) Decrease as we move towards its end
c) Increase as we move towards its end
d) Is the same at all points

Answer (d)

Sol. Magnetic field inside solenoid is uniform.

25. The frequency of an alternating current is $50\ Hz$. In how much time does it reverse

a) $100\ S$
b) $10\ S$
c) $\frac{1}{100}\ S$
d) $\frac{1}{10}\ S$

Answer (c)

Sol. By $50\ Hz$ frequency, we mean, AC charges its direction after every $\frac{1}{100}\ S$.

26. Unit of density is

a) Kilogram
b) Kilogram per cubic meter
c) Cube meter
d) Newton

Answer (b)

Sol. unit of density :-

kg/m^3 "," Kilogram per cubic meter

$density\ =\ \frac{mass}{volume}$

SI unit of mass = kg

SI unit of volume = m^3

Thus SI unit of density = $\frac{kg}{m^3}$

27. Sublimate along the following is -

a) Sodium chloride
b) Sodium Sulphate
c) Ammonium chloride
d) Silica

Answer (c)

Sol. Out of these Ammonium chloride can undergo sublimation.(direct conversion from solid to gaseous state)

28. An example of Aerosol is -

a) Clouds
b) Shaving cream
c) Milk
d) Foam

Answer (a)

Sol. Aerosol is a colloid in which gas is the depression medium
Cloud (Aerosol) → dispersed phase = liquid
dispersion medium = gas
Shaving cream (foam)
Dispersed phase = gas
Dispersion medium = liquid
Milk (emulsion)
Dispersed phase :- liquid

Dispersion medium :- liquid

(Foam)
Dispersed phase - gas
Dispersion medium - solid

29. Method for separation of cream from milk is -

a) Chromatography
b) Distillation
c) Fractional distillation
d) Centrifugation

Answer (d)

Sol. Centrifugation
To separate cream from milk, the process of centrifugation is used.
In this technique mixture is rotated at a very high speed in a centrifuge.
When mixture is rotated at a high speed, in the container called centrifuge it gets separated into its constituent parts by the action of centrifugal force.The centrifugal force acts on the heavier particles and brings them down to the bottom of the test tube. The lighter component remains on the top.

30. Non-metal among the following is -

a) Sodium
b) Oxygen
c) Potassium
d) Boron

Answer (b)

Sol. Non-metal among the following is oxygen.

Sodium -metal

Potassium - metal

Boron - metalloid

31. Compound among the following is -

a) Iodine
b) Hydrogen
c) Water
d) Iron

Answer (c)

Sol. water is compound.
Iodine - element
Hydrogen - element
Iron - element

Compound : - is formed from atoms of different elements.
Element : - An element consists of the same kind of atoms.

32. An example of chemical change the following is -

a) Bending of iron rod
b) Freezing of water
c) Rusting of iron
d) Cutting of wood

Answer (c)

Sol. Rusting of Iron is a chemical change.
Chemical change is that change in which a new substance is formed. (new chemical composition)
In rusting of iron - iron (Fe) gets changed into hydrated ferric oxide (rust) $(Fe_2O_3.XH_2O)$

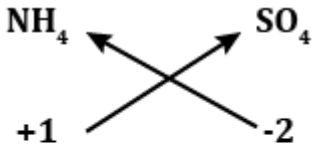
Bending of iron rod,
Freezing of water, cutting of wood → all are physical changes
Physical change is that in which no new substance is formed, chemical composition will remain the same.

33. Molecular formula of Ammonium sulphate is -

a) NH_4SO_4
b) $(NH_4)_2SO_4$
c) $NH_4(SO_4)_2$
d) $(NH_4)_2(SO_4)_2$

Answer (b)

Sol. Molecular formula of Ammonium sulphate is $(NH_4)_2SO_4$



$(NH_4)_2SO_4$

34. Mass of 0.5 mole of N_2 gas will be -

a) $14\ g$
b) $28\ g$
c) $56\ g$
d) $7\ g$

Answer (a)

Sol. 0.5 mol of Nitrogen gas means $0.5\ mol\ N_2$ (as nitrogen gas exists as N_2)

No. of moles= $\frac{given\ mass}{molar\ mass}$

$\Rightarrow n = \frac{W}{M}$ "." Molar mass of $N_2 = 14 + 14 = 28\ g/mol$

$0.5 = \frac{W}{28g}$

$\Rightarrow W = 0.5 \times 28\ g$

$W = 14\ g$

35. $Zn(s) + CuSO_4(aq.) \rightarrow ZnSO_4(aq) + Cu(s)$

Type of above reaction is

a) Displacement reaction
b) Decomposition reaction
c) Double displacement reaction
d) Combination reaction

Answer (a)

Sol. $Zn(s) + CuSO_4(aq.) \rightarrow ZnSO_4(aq) + Cu(s)$

This is a displacement reaction. In displacement reaction a more reactive element (Zn) displaces a less reactive element from its compound.

36. The pH value of blood is -

a) 7.0
b) 7.2
c) 7.4
d) 7.8

Answer (c)

Sol. pH of blood $= 7.4$

Blood is slightly basic.

pH = power of hydrogen ". "

human body (living beings) can survive only in a narrow range of pH change.

37. The chemical formula of Baking soda is :-

a) NH_4CI
b) Na_2CO_3
c) $NaHCO_3$
d) $Na_2CO_3.10H_2O$

Answer (c)

Sol. Chemical formula of Baking soda is $NaHCO_3$ sodium bicarbonate/sodium hydrogen carbonate

It is used to make bread or cake soft & spongy as it gives CO_2 on heating or mixing with water.

38. Electronic configuration of chlorine is -

a) $2, 8, 5$
b) $2, 7$
c) $2, 8, 1$
d) $2, 8, 7$

Answer (d)

Sol. Electronic configuration of chlorine is $2, 8, 7$

Atomic no.of chlorine 17

So, it has 17 electrons which are arranged in shells as $2, 8, 7$

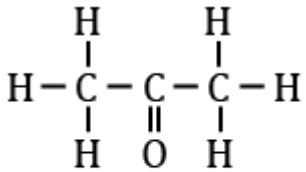
39. Most active metal on the basis of activity series is -

a) Zinc
b) Copper
c) Sodium
d) Iron

Answer (c)

Sol. According to the reactivity series of metals potassium is the most reactive metal and sodium is the second most reactive metal.So, out of the given options sodium is the most active metal.

40. $IUPAC$ name of the above compound is



a) Propanol
b) Propane
c) Propanone
d) Propanal

Answer (c)

Sol. Functional group present in the compound is Ketone and the given Ketone is a three carbon compound. So, the correct $IUPAC$ name is Propanone.

41.

$$CH_3COOH + C_2H_5OH \overset{Acid}{\rightleftharpoons} CH_3-\underset{\underset{O}{\|}}{C}-OC_2H_5 + H_2O$$

The name of above reaction is -

a) Esterification
b) Oxidation
c) Dissociation
d) Micelles formation

Answer (a)

Sol. Carboxylic acid reacts with an alcohol to give an ester and water in the presence of an acid and the reaction is known as esterification reaction.

42. $CuO + H_2 \rightarrow Cu + H_2O$

a) Oxidation reaction
b) Reduction reaction
c) Redox reaction
d) Combination reaction

Answer (c)

Sol. When oxidation and reduction occurs simultaneously in a chemical reaction, the reaction is known as redox reaction. In the given reaction CuO is reduced while H_2 is oxidised hence, it is a redox reaction.

43. The gas produced by the reaction of metal carbonates with acid is

a) Nitrogen
b) Carbon dioxide
c) Carbon monoxide
d) Hydrogen

Answer (b)

Sol. When a metal carbonate reacts with an acid it gives the respective metal salt, water and carbon dioxide as products.

44. Metal having highest metallic character among the following is -

a) Magnesium
b) Boron
c) Aluminum
d) Silicon

Answer (a)

Sol. According to periodic trends, metallic character decreases along the period and increases down the group.

45. The element having electronic configuration $2, 7$ is -

a) Fluorine
b) Helium
c) Nitrogen
d) Chlorine

Answer (a)

Sol. Element with electronic configuration $2, 7$ has 9 total electrons. In a neutral atom number of electrons and protons are equal so the atomic number is 9. Element Fluorine has atomic number 9.

46. Modern periodic table is based on _____

a) Atomic mass
b) Atomic number
c) Number of neutrons
d) Number of electrons

Answer (b)

Sol. According to modern periodic law “The physical and chemical properties of elements are periodic functions of their atomic number.”

47. On moving left to right in a period -

a) The metallic nature of elements decreases
b) Atomic size increases
c) Nature of oxides become basic
d) Electron giving nature increases

Answer (a)

Sol. on moving from left to right in a period the effective nuclear charge increases. So, the metallic nature of element decreases while the atomic size decreases, the acidic nature of oxides increases and the electron giving nature decreases.

48. Among the following which element have two shells and both are completely filled -

a) Helium
b) Oxygen
c) Argon
d) Neon

Answer (d)

Sol. Atomic number of Neon is 10. According to its electronic configuration $2, 8$ it has two shells and both are completely filled.

49. Acid found in orange is -

a) Citric acid
b) Tartaric acid
c) Oxalic acid
d) Lactic acid

Answer (a)

Sol. Citric acid is present in orange and other citrus fruits.

50. Element X forms a chloride with the formula XCl_3, name of element is -

a) Sodium
b) Aluminum
c) Magnesium
d) Carbon

Answer (b)

Sol. According to the formula of the compound XCl_3 valency of X is 3. Out of the given options only Aluminium has a valency of 3.

51. The powerhouse of the cell is -

a) Plastid
b) Lysosome
c) Golgi Apparatus
d) Mitochondria

Answer (d)

Sol. Mitochondria is called powerhouse of the cell because it produces ATP (energy) through cellular respiration.

Plastid (chloroplast) is called kitchen house of the cell.

Lysosome is called suicidal bag of the cell.

Golgi apparatus is involved in secretion and packaging.

52. $AIDS$ disease is caused by -

a) Virus
b) Protozoa
c) Fungi
d) Bacteria

Answer (a)

Sol. HIV (Human immunodeficiency virus) causes $AIDS$ (Acquired immunodeficiency syndrome).

HIV destroys helper T cells which lead to the decrease in immunity.

53. Which plant group is called naked seed plants?

a) Pteridophyta
b) Thallophyta
c) Bryophyta
d) Gymnosperm

Answer (d)

Sol. Gymnosperms are called naked seed plants because seeds are not covered

Angiosperm seeds are covered.

Thallophyta, Bryophyta and Pteridophyta do not produce seeds.

54. The amount of nitrogen gas in the atmosphere is -

a) 21%
b) 78%
c) 40%
d) 0.03%

Answer (b)

Sol. Nitrogen is the most abundant gas in the atmosphere (78%)

Oxygen percentage is approx 21%

55. The breakdown of glucose to form pyruvate takes place in -

a) Mitochondria
b) Cytoplasm
c) Nucleus
d) Chloroplast

Answer (b)

Sol. Glycolysis is the process in which one glucose molecule is converted into 2 molecules of pyruvate.

This occurs in the cytoplasm of a cell.

56. The phloem in plants are responsible for -

a) Transport of food
b) Transport of water
c) Transport of oxygen
d) Transport of carbon dioxide

Answer (a)

Sol. Transport of food in plants is done through phloem tissue.

Xylem transport water and minerals from roots to all the parts of the plant.

57. Which of the following is a growth inhibitory plant hormone?

a) Cytokinin
b) Auxin
c) Abscisic acid
d) Gibberellin

Answer (c)

Sol. ABA (Abscisic acid) is an inhibitor plant hormone responsible for dormancy and closing of stomata.

Auxin, Gibberellin and cytokinin are plant growth promoters.

58. Which part of the flower makes the fruit?

a) Stamen
b) Ovary
c) Sepal
d) Petal

Answer (b)

Sol. Ovary is the female reproductive part of a flower.

Ovule is converted into seeds.

Ovary is converted into fruit.

Stamen is male reproductive part in a flower.

Sepal and petal are accessory parts of a flower

59. The first trophic level in food chain is -

a) Primary Consumers
b) Tertiary Consumers
c) Secondary Consumers
d) Producers

Answer (d)

Sol. Producers (Plants and Blue green algae) occupy the first trophic level in the food chain.

"Producers—----->Primary consumers —---> Secondary consumers—--->Tertiary consumers

60. Water harvesting technique in Rajasthan is -

a) Khadin
b) Kulh
c) Eris
d) Katta

Answer (a)

Sol. Water harvesting system in Rajasthan is called Khadins.

Kulh is a water harvesting system in Himachal pradesh.

Eris is a water harvesting system in Tamil Nadu.

Katta is a water harvesting system in Karnataka.

61. When right atrium expands then the type of blood and direction of flow is -

a) Deoxygenated from body

b) Deoxygenated from heart
c) Oxygenated from body
d) Oxygenated from heart

Answer (a)

Sol. When the right atrium expands, vena cava collects deoxygenated blood from various parts of the body and pour it into the right atrium.

62. Specialized for conducting information via electrical impulses amongst body organs is -

a) Veins
b) Epithelia
c) Muscles
d) Neurons

Answer (d)

Sol. Neurons are the structural and functional unit of the neuron system and are specialized for conducting information via electrical impulse amongst body organs.

63. The generation which first of all expresses dominant characters in hybridization experiment is -

a) Parental generation
b) F_1 generation
c) F_2 generation
d) F_3 generation

Answer (b)

Sol. The 'pure line' plants are called parental generation, their offsprings are called F_1 or first filial generation, and the individuals resulting from the selfing of F_1 generations are called F_2 or second filial generation. The generation which first of all expresses dominant characters in hybridization experiment is F_1 generation.

64. Which of the following animal reproduce asexually by budding?

a) *Amoeba*
b) *Hydra*
c) *Plasmodium*
d) *Leishmania*

Answer (b)

Sol. *Amoeba* reproduces by binary fission.

Plasmodium reproduces by multiple fission.

Leishmania reproduces by longitudinal binary fission.

65. Which hormone regulates sugar level in the blood?

a) Testosterone
b) Thyroxin

c) Adrenaline
d) Insulin

Answer (d)

Sol. Insulin is secreted by the beta cells of pancreas. It decreases the blood sugar level by promoting glucose utilization by cells or by deposition of extra glucose of blood as glycogen in liver and muscles.

66. The part of brain, which is responsible for maintaining posture and balance of body -

a) Cerebrum
b) Cerebellum
c) Medulla Oblongata
d) Optic lobe

Answer (b)

Sol. Cerebellum is responsible for precision of voluntary actions, maintenance of the equilibrium and posture of the body.

67. The largest phylum of animal kingdom is -

a) Annelida
b) Mollusca
c) Arthropoda
d) Echinodermata

Answer (c)

Sol. Arthropoda is the largest phylum of the animal kingdom. It comprises the animals with jointed feet or appendages.

68. Disease caused by virus is -

a) Tuberculosis
b) Malaria
c) AIDS
d) Jaundice

Answer (c)

Sol. Acquired immunodeficiency syndrome (AIDS) is caused by Human Immunodeficiency Virus (HIV)..

69. Which of the following is not an example of “bilaterally symmetrical and triple animal” -

a) Earthworms
b) Prawn
c) Snail
d) Star fish

Answer (d)

Sol. Starfish belong to Echinodermata. The adult forms of echinoderms have radial symmetry.

70. Which scientist discovered cell, first is -

a) Robert Brown
b) Robert Hooke
c) Virchow
d) Schleiden

Answer (b)

Sol. Cell was discovered by Robert Hooke in 1965, while examining a thin slice of cork, saw these structures that resembled the structure of honeycomb and named it 'cells'.

71. The value of $\left(\frac{1}{27}\right)^{\frac{-2}{3}}$

a) 9
b) 3
c) $\frac{1}{3}$
d) $\frac{1}{9}$

Answer (a)

Sol. $\left(\frac{1}{27}\right)^{\frac{-2}{3}} = (27)^{\frac{2}{3}} = (3^3)^{\frac{2}{3}} = 3^2 = 9$

72. If $(x - 1)$ is a factor of $P(x) = 4x^3 + 3x^2 - 4x + K$ then the value of K is :-

a) 2
b) -11
c) -3
d) 4

Answer (c)

Sol. As $(x - 1)$ is a factor of $P(x) = 4x^3 + 3x^2 - 4x + K$,

$\therefore P(1) = 0 \Rightarrow 4 \times (1)^3 + 3 \times (1)^2 - 4(1) + K = 0$

$\Rightarrow 4 + 3 - 4 + K = 0$

$\Rightarrow K = -3$

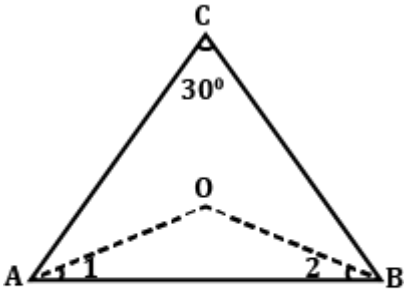
73. The equation of y-axis :-

a) $y = 0$
b) $x = 0$
c) $y + 4 = 0$
d) $x + y = 2$

Answer (b)

Sol. Equation of y-axis is, $x = 0$

74. In the given figure, OA and OB are bisectors of $\angle A$ and $\angle B$. If $\angle C = 30^\circ$ the measure of $\angle AOB$ is :-



a) 75°

b) 90°

c) 100°

d) 105°

Answer (d)

Sol. In $\Delta\, ABC,\ \angle C\ =\ 30^{\circ}$ (given)

$\therefore \angle A\ +\ \angle B\ =\ 180^{\circ} - 30^{\circ} = 150^{\circ}$

$\Rightarrow\ \frac{1}{2}\,(\angle A\ +\ \angle B)\ =\ 75^{\circ}$ .....(1)

Now, In $\Delta AOB,\ \frac{1}{2}\,\angle A\ +\ \frac{1}{2}\,\angle B\ +\ \angle AOB\ =\ 180^{\circ}$

$\Rightarrow\ \angle AOB\ =\ 180^{\circ} - \frac{1}{2}\,(\angle A\ +\ \angle B)$

$=\ 180^{\circ} - 75^{\circ}$ (from (1))

$=\ 105^{\circ}$

75. If two sides of a triangle are $18\ cm$ and $10\ cm$ and its perimeter is $42\ cm$, then area will be :-

a) $21\ cm^2$

b) $21\sqrt{11}\ cm^2$

c) $121\ cm^2$

d) $11\sqrt{21}\ cm^2$

Answer (b)

Sol. Given, perimeter of triangle, $2S\ =\ 42\ cm$

Length of one side, let $a\ =\ 18\ cm$

Length of second side, let $b\ =\ 10\ cm$

∴ length of third side, let $c = (42 - 18 - 10)\,cm = 14\,cm$

Now, a semiperimeter of triange, $S = \frac{42}{2}\,cm = 21\,cm$

∴ Area of triangle $= \sqrt{S(s-a)(s-b)(s-c)}\,cm^2$

$= \sqrt{21 \times 3 \times 11 \times 7}$

$= 21\sqrt{11}\,cm^2$

76. If the height and slant height of a right circular cone are 21 cm and 28 cm respectively, then its volume will be :- (use $\pi = \frac{22}{7}$)

a) $7546\,cm^3$
b) $22638\,cm^3$
c) $5746\,cm^3$
d) $5461\,cm^3$

Answer (a)

Sol. Given, height of cone = $21\,cm$
Start height of cone = $28\,cm$
∴ radius of cone = $\sqrt{28^2 - 21^2\,cm}$
And, vol. Of cone = $\frac{1}{3} \times \frac{22}{7} \times r^2 \times h\,cm^3$
$= \frac{1}{3} \times \frac{22}{7} \times 343 \times 21\,cm^3$
$= 7546\,cm^3$

77. In the distribution 4,8,3,6,7,5,3,5,9,4,5,5, the frequency of 5 will be :-

a) 3
b) 4
c) 5
d) 2

Answer (b)

Sol. In the distribution 4,8,3,6,7,5,3,5,9,4,5,5 frequency of 5 is 4.

78. A dice is thrown once. The probability of getting an even prime number is:-

a) $\frac{1}{2}$
b) $\frac{2}{6}$
c) $\frac{1}{6}$
d) $\frac{4}{6}$

Answer (c)

Sol. When a dice is thrown,

$S = \{1, 2, 3, 4, 5, 6\} \Rightarrow n(s) = 6$

E = Getting an even prime number $= \{2\}$

$\Rightarrow n(E) = 1$

$\therefore P(E) = \frac{n(E)}{n(s)} = \frac{1}{6}$

79. In the prime factorization of the number 196, the sum of the powers of the prime factors is :

a) 7
b) 2
c) 3
d) 4

Answer (d)

Sol. Prime factorization of $196 = 2^2 \times 7^2$

$\therefore$ Sum of powers $= 2 + 2 = 4$

80. If α and β are the zeroes of the polynomial $x^2 + 2x + 1$, then the value of $(\frac{1}{\alpha} + \frac{1}{\beta})$ is :-

a) 0
b) -2
c) 1
d) 3

Answer (b)

Sol. As α and β are the roots of $x^2 + 2x + 1$,

then , $\alpha + \beta = -2$ & $\alpha\beta = 1$

$\therefore \frac{1}{\alpha} + \frac{1}{\beta} = \frac{\alpha+\beta}{\alpha\beta} = \frac{-2}{1} = -2$

81. The semi-perimeter of a rectangular garden whose length is 4 metres more than its breadth, is 36 metres, then the length of the garden will be :-

a) 24 metres
b) 20 metres
c) 15 metres
d) 22 metres

Answer (b)

Sol. Let breadth of Rectangular Garden =x m

Then length $(y) = (x + 4)m$

Semi - perimeter of Rectangle $= 36$

$x + y = 36$

$x + x + 4 = 36$

$2x = 36 - 4$

$2x = 32$

$x = \frac{32}{2}$

$x = 16\,m$

Length $(y) = x + 4 = 16 + 4 = 20\,m$

82. The roots of the equation $ax^2 + bx + c = 0,\ a \neq 0$, will not be real, if :-

a) $b^2 < 4ac$

b) $b^2 > 4ac$

c) $a^2 < 4bc$

d) $a^2 > 4bc$

Answer (a)

Sol. Given : $ax^2 + bx + c = 0,\ a \neq 0,$

The root will not be real if Discriminant is negative

$D < 0$

$b^2 - 4ac < 0$

83. The first term of an Arithmetic progression is 5 and the last term is 45. If the sum of all the terms is 400, then the number of terms is :-

a) 22

b) 15

c) 16

d) 10

Answer (c)

Sol. Given: $a_1 = 5,\ a_n = 45,\ S_n = 400$

Len n is number of terms

We know $S_n = \frac{n}{2}[a, + a_n]$

$400 = \frac{n}{2}[5 + 45]$

$800 = n(50)$

$n = \frac{800}{50}$

$n = 16$

84. The coordinates of the point which divides the line segment joining the point (4,-3) and (8,5) internally in the ratio 3 :1 are :-

a) (3,7)

b) (7,3)

c) (4,7)

d) (7,5)

Answer (b)

Sol. Given point (4,-3) and (8,5) let point p(x,y) divide in ratio 3:1

$x = \frac{3\times8 + 1\times4}{3+1} = \frac{24+4}{4} = \frac{28}{4} = 7$

$y = \frac{3\times5 + 1\times(-3)}{3+1} = \frac{15-3}{4} = \frac{12}{4} = 3$

Hence point is (7,3)

85. If tan $2A = \cot(A - 18^\circ)$, where 2A is an acute angle, then the value of A is :-

a) 45°

b) 18°

c) 36°

d) 20°

Answer (c)

Sol. $\tan 2A = \cot(A - 18^\circ)$

$\cot(90^\circ - 2A) = \cot(A - 18^\circ)$

Comparing Angles

$90^\circ - 2A = A - 18^\circ$

$3A = 90^\circ + 18^\circ$

$3A = 108^\circ$

$A = 36^\circ$

86. If the shadow of a poll of height 6 metres is $2\sqrt{3}$ metres long, then the angle of elevation of the sum is:-

a) 30°

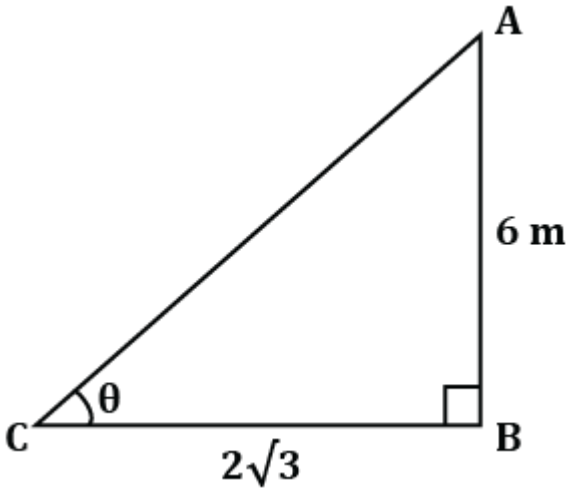
b) 45°

c) 60°

d) 90°

Answer (c)

Sol.



Let angle of elevation = θ

In ΔABC, $\angle B = 90^\circ$

$\tan\theta = \frac{AB}{BC}$

$\tan\theta = \frac{6}{2\sqrt{3}}$

$\tan\theta = \sqrt{3}$

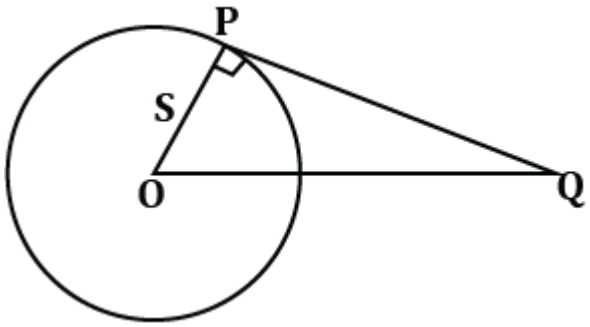
$\theta = 60^{\circ}$

87. A tangent PQ at a point P of a circle of radius 5 cm meets a line through O at a point Q so that OQ = 12 cm. Length PQ is :-

a) 13 cm
b) $\sqrt{119}$ cm
c) 12 cm
d) 7.5 cm

Answer (b)

Sol.



Given: Radius $(r) = 5\,cm$

$OQ = 12\,cm$

Angle between radius and tangent is 90° So, ΔOPQ is right Angle Triangle.Applying Pythagoras theorem.

$OQ^2 = OP^2 + PQ^2$

$(12)^2 = (5)^2 + PQ^2$

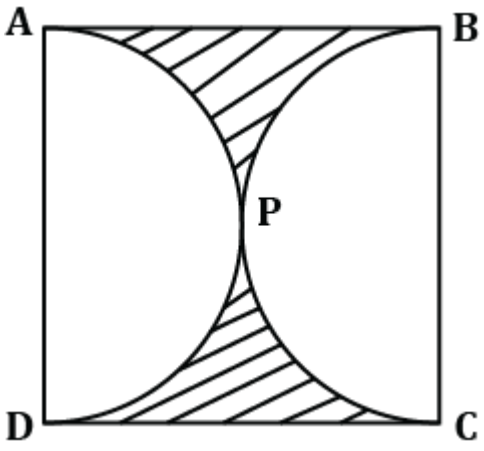
$144 = 25 + PQ^2$

$PQ^2 = 144 - 25$

$PQ^2 = 119$

$PQ = \sqrt{119}$

88. In the given figure, if ABCD is a square of side 14 cm and APD and BPC are semicircles, then the area of the shaded region will be :- (use $\pi = \frac{22}{7}$)



a) $42\ cm^2$

b) $154\ cm^2$

c) $196\ cm^2$

d) $24\ cm^2$

Answer (a)

Sol. Given: Side of square $= 14\ cm$

Diameter of semi-circle $= 14\ cm$

Radius of semi -circle $= \frac{14}{2} = 7\ cm$

Area of shaded region =Area of square - 2 (Area of a semicircle)

$= (14)^2 - 2(\frac{\pi(7)^2}{2})$

$= 196 - 49\,\pi$

$= 196 - 49 \times \frac{22}{7}$

$= 196 - 154$

$= 42\ cm^2$

89. If three solid metal spheres of radii 6 cm, 8 cm and 10 cm respectively are melted to form a large solid sphere, then the radius of this sphere will be :-

a) 24 cm

b) 20 cm

c) 16 cm

d) 12 cm

Answer (d)

Sol. Given : $r_1 = 6\ cm,\ r_2 = 8\ cm, r_3 = 10\ cm$

Let the radius of large solid sphere is R,

Volume of large sphere = Sum of volume of 3 small sphere

$\frac{4}{3}\pi R^3 = \frac{4}{3}\pi r_1^3 + \frac{4}{3}\pi r_2^3 + \frac{4}{3}\pi r_3^3$

$\frac{4}{3}\pi R^3 = \frac{4}{3}\pi (r_1^3 + r_2^3 + r_3^3)$

$R^3 = r_1^3 + r_2^3 + r_3^3$

$R^3 = 6^3 + 8^3 + 10^3$

$R^3 = 216 + 512 + 1000$

$R^3 = 1728$

$R = 12\ cm$

90. With usual notations, In the given formula, $\overline{X} = a + h\left(\frac{\Sigma f_i u_i}{\Sigma f_i}\right)$, the value of u_i will be :-

a) $h(x_1 - a)$

b) $\frac{x_i - a}{h}$

c) $\frac{a - x_i}{h}$

d) $\frac{x_i+a}{h}$

Answer (b)

Sol. $\overline{X} = a + h\left(\frac{\Sigma f_i u_i}{\Sigma f_i}\right)$

It is formula of step deviation Method,

Where $u_i = \frac{x_i-a}{h}$.