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(With Important Questions and Answers)

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Section-A
Multiple Choice Questions (MCQs) -1 Mark

[Physics]

1. The curved lines along which iron filling align themselves around a bar magnet are called:
   A Magnetic field lines B. mechanical field lines
   C. electromagnetic field lines D. none of these.
   Answer: A

2. An electric device which converts electric energy into mechanical energy is called:
   A. dynamo B. electric generator
   C. electric motor D. transformer
   Answer: C

3. The strength of magnetic field inside a long current carrying straight solenoid is :
   A. more at the end than a centre
   B. minimum in the middle
   C. same at all points
   D. found to increase from end to other
   Answer: C

4. The resistance offered by a conductor is directly proportional to its
   A. areas of cross-section B. length
   C. thickness D. none of these
   Answer: B

5. Electrical resistivity of a given metallic wire depends upon
   A. its length B. its thickness
   C. its shape D. nature of material
   Answer: B

6. A cylindrical conductor of length l and uniform area of cross-section A has resistance R. And conductor of length 2l and resistance R of the same material has area of cross-section :
   A. A/2 B. 3A/2
   C. 2A D. 3A
   Answer: C

7. An ammeter is connected in series in an electric circuit because:
   A. it is low resistance instrument
   B. zero resistance instrument
   C. high resistance instrument
   D. none of these.
   Answer: A

8. A current of l A is drawn by a filament of an electric bulb. Number of electrons passing through a cross section of the filament ion 16 seconds would be roughly
   A. 10^{20} B. 10^{16}
   C. 10^{18} D. 10^{23}

Answer: A

9. The rate of flow of an electric charge is called :
   A. electric current B. electric energy
   C. electric potential D. none of these
   Answer: A

10. A body is said to have one coulomb electric charge, if compared to protons, it has in excess or in deficit:
   A. 6.25×10^{8} electron B. 2.65×10^{8} electron
   C. 6.25×10^{18} electron D. 6.25×10^{19} electron
   Answer: C

11. Work done in moving a unit positive charge from infinity to another point inside an electrical field, is called :
   A. Electric Potential B. field
   C. field intensity D. potential difference
   Answer: A

12. Electricity constituted by moving electric charges, is called :
   A. positive electricity B. negative electricity
   C. current electricity D. static electricity
   Answer: B

13. The work done in moving unit positive charge across two points in an electric circuit is measure of?
   A. Potential difference B. Current
   C. Resistance D. Galvanometer
   Answer: A

14. The free electrons of a metal
   A. are free to move anywhere in the metal
   B. do not collide with each other
   C. do not collide with each other
   D. are free to escape through the surface
   Answer: A

15. Three equal resistances when combine in series are equivalent to 90Ω. Their equivalent resistance when combined in parallel will be
   A. 10Ω B. 270Ω
   C. 30 Ω D. 810 Ω
   Answer: C

16. A battery is used to
   A. Maintain a potential difference
   B. Measure electric current
   C. Measure electric potential
   D. Safeguard against short – circuit
   Answer: A

17. Ohms law relate potential difference with

A. Current B. Time
C. Waves D. Energy

Answer: A

18. Electric current is:
    A. flow of charge per unit time
    B. work done per unit time
    C. Resistance per unit time
    D. All of these

Answer: A

19. The space around a charge in which some other charge experiences attraction or repulsion, is called its :
    A. Potential B. Electric field
    C. Electric field intensity D. Potential difference

Answer: B

20. Unit of potential difference is:
    A. Joule/Coulomb B. Volt
    C. Coulomb D. (a) & (b) are correct

Answer: B

21. Electron volt is measure of:
    A. charge B. current
    C. electrical potential D. energy

Answer: D

22. Which of the following is an ohmic resistor
    A. Nichrome B. Diamond
    C. Germanium D. Diode

Answer: A

23. At the time of short circuit, the electric current in the circuit :
    A. vary continuously B. does not change
    C. reduce substantially D. increase heavily

Answer: D

24. Resistance of the wire is given by
    A. $R = V/I$ B. $R = I/V$
    C. $R = IV$ D. $R = I^2V$

Answer: A

25. A neutral body has equal amount of :
    A. Both positive and negative charges
    B. Only positive charge
    C. Only negative charge
    D. No charge at all

Answer: A

26. Law which gives force between two charges is :
    A. Ohm's law B. Faraday's law

C. Coulomb's law D. None of these

Answer: C

27. Two heater wires of same length and material but of different thickness are connected in a series across a power supply. The power dissipated :
    A. Will be same in both
    B. will be more in thinner wire
    C. will be more in a thicker
    D. cannot be predicted

Answer: B

28. Current flows through a wire only when there is_____between the ends of the wire
    A. Potential difference
    B. Work is done in moving a charge
    C. Potential difference at one end is more than at the other end
    D. all the above

Answer: C

29. When there is electric current passing through a wire, the particles moving are
    A. Electrons B. Protons
    C. Atoms D. Ions

Answer: A

30. Unit of electric power may also be expressed as :
    A. volt- ampere B. kilowatt-hour
    C. watt-second D. joule-second

Answer: A

31. A sure test of electrification is :
    A. Attraction B. Repulsion
    C. Friction D. Induction

Answer: B

32. What is not true for electric charge :
    A. Electric charge is scalar quantity
    B. Charge on the body may be + ve or –ve
    C. S.I unit of charge is coulomb
    D. one coulomb is charge of one electron

Answer: D

33. All the following statements are correct except:
    A. A body is said to be negatively charged when it has got excess of electrons.
    B. When a body is charged positively, some electrons escape from it.
    C. The presence of moisture in the air reduces conductivity .
    D. none of the above

Answer: C

34. Electric fuse is connected with:
    A. Live wire B. neutral wire

C. earthing D. parallel to the live wire

Answer: A

35. Potential difference in a circuit in which components are connected in series
    A. Remain the same across each component
    B. Gets distributed equally
    C. Gets divided across each component
    D. potential difference does not appear

Answer: C

36. Commercial unit for electrical energy is :
    A. Calorie B. Joule
    C. Kilowatt hour D. All of these

Answer: C

37. Electrical resistivity of a given metallic wire depends upon :
    A. Its length B. Its thickness
    C. Its shape D. Nature of the material

Answer: D

38. The current in a wire
    A. depends on both resistance and potential difference
    B. depends only on the potential difference applied
    C. depends only on the resistance of wire
    D. does not depend on resistance and potential difference

Answer: A

39. A body get positively charged by losing:
    A. Neutrons B. Electrons
    C. Protons D. α-particles

Answer: B

40. 30 electrons are flowing through a electric wire in a time of 3sec (c) Then the amount of current flowing through the wire is
    A. 1.6×10^{-18} A B. 4.8×10^{-19} A
    C. 9×10^{-18} A D. 9×10^{-9} A

Answer: A

41. Joule /Coulomb is same as?
    A. Volt B. Ampere
    C. Ohm D. Watt

Answer: A

42. What is principle behind the working of an electric motor?
    A. Magnetic effect of current
    B. Heating effect of current
    C. Chemical effect of current
    D. Electrostatics

Answer: A

43. Which of the following is the device that coverts mechanical energy into electrical energy?

A. Dynamo B. Motor
C. Transformer D. Resistor

Answer: A

44. Appliances that have a metal body are generally connected to the earthing wire. What is the reason to earth these wires?

A. To prevent the excess of current
B. To prevent the leakage of current
C. To provide extra current to the appliances
D. To provide high resistance to the appliances

Answer: B

45. Which of the following is the SI unit of magnetic field?

A. Joule B. Volt
C. Ampere D. Tesla

Answer: D

46. The most suitable material for making the core of an electromagnet is :

A. Steel B. Iron
C. Soft iron D. Aluminium

Answer: C

47. Which of the following is not attracted by a magnet?

A. Steel B. Cobalt
C. Brass D. Nickel

Answer: C

48. When a straight conductor is carrying current:

A. There are circular magnetic field lines around it
B. There are magnetic field lines parallel to the conductor
C. There are no magnetic field lines
D. None of the above

Answer: A

49. Which of the following is the property of a magnetic field?

A. It can change the direction of a moving charged particle
B. It can change the speed of a moving charged particle
C. It can create an electric field
D. It can create a gravitational field

Answer: A

50. Which of the following is the direction of the magnetic field produced by a straight current-carrying conductor?

A. Away from the conductor
B. Toward the conductor
C. Parallel to the conductor
D. Perpendicular to the conductor

Answer: D

51. A soft iron bar is introduced inside a current-carrying solenoid. The magnet field inside a solenoid:
    A. Decreases
    B. Will increase
    C. Will be zero
    C. Will remain unaffected

    Answer: B

52. When current-carrying conductor placed in a magnetic field, what is the force experienced by a conductor?
    A. Electric force
    B. Gravitational force
    C. Magnetic force
    D. None of the above

    Answer: C

53. A strong bar magnet is placed vertically above a horizontal wooden board. The magnetic lines of a force will be:
    A. Only the horizontal plane around the magnet
    B. Only the vertical plane around the magnet
    C. In horizontal as well vertical planes around the magnet
    D. In all the planes around the magnet

    Answer: D

54. Magnetic field lines do not intersect because:
    A. An explosion takes place, if they intersect
    B. They mutually repel each other
    C. They always travel parallel to each other in north to south direction
    D. None of these

    Answer: B

55. The most important safety method used for protecting home appliance from short circuiting or overloading is:
    A. Earthing
    B. Use of fuse
    C. Use of stabilizers
    D. Use of electric meter

    Answer: B

56. We can see in a room which is not directly illuminated by sunlight due to:
    A. Regular reflection
    B. Refraction
    C. Irregular reflection
    D. None of these

    Answer: C

57. When you stand in front of mirror, your image is always erect, of the same size and laterally inverted. The mirror may be:
    A. Plane
    B. Concave
    C. Convex
    D. Both A and B

    Answer: A

58. Which of the following quantity does not have any unit?
    A. Velocity of light
    B. Light year
    C. Magnification
    D. Power of lens

    Answer: C

59. The image of an object in a spherical mirror appears magnified, erect and behind it. The spherical mirror is:
    A. Convex B. Concave
    C. Plane D. None of these
    Answer: B

60. Which of the following can produce a virtual image?
    A. Convex image B. Concave mirror
    C. Plane mirror D. All of these
    Answer: D

61. A ray of light incident perpendicularly on a glass slab:
    A. Bends towards the normal
    B. Bends away from the normal
    C. Moves along the normal
    D. None of these
    Answer: C

62. The perpendicular shift in the path of light while emerging from another optical medium is called:
    A. Displacement B. Lateral displacement
    C. Shifting D. None of these
    Answer: B

63. A material medium having the lowest optical density is:
    A. Water B. Glass
    C. Air D. Diamond
    Answer: C

64. When the light travels from one medium to another medium of different refractive index, then which of the following will change?
    A. Wavelength and speed
    B. Frequency and wavelength
    C. Frequency and speed
    D. Frequency, Wavelength and Speed
    Answer: A

65. A parallel beam of light on striking a concave lens appears to converge at a point on the principal axis. The point is called:
    A. Optical centre of lens
    B. First principal focus of lens
    C. Second principal focus of lens
    D. None of these
    Answer: B

66. The laws of reflection are true for.
    A. A plane mirror only
    B. The concave mirror only
    C. The convex mirror only
    D. All reflecting surfaces
    Answer: D

67. In order to have a very wide field of view, the mirror used in cars is.
    A. Convex B. Plane
    C. Concave D. None of these
    Answer: A

68. The blind spot on retina has:
    A. Few nerve endings B. High concentration of nerve endings
    C. No nerve endings D. None of these
    Answer: C

69. The ciliary muscles help in:
    A. Only holding eye lens in position
    B. Only in altering focal length of crystalline lens
    C. Both A and B
    D. None of these
    Answer: C

70. The focal length of the eye lens increases when eye muscles:
    A. Are relaxed and lens become thinner
    B. Contract and lens become thicker
    C. Are relaxed and lens become thicker
    D. Contract and lens become thinner
    Answer: A

71. The danger signals installed at the top of tall building are red in colour. These can be easily seen from a distance because among all other colours, the red light:
    A. Is scattered the most by smoke or fog
    B. Is scattered the least by smoke or fog
    C. Is absorbed the most by smoke or fog
    D. Moves fastest in air
    Answer: B

72. Which of the following statement is correct?
    A. A person with myopia can see distant object clearly
    B. A person with hypermetropia can see nearby object clearly
    C. A person with myopia can see nearby object clearly
    D. A person with hypermetropia cannot see distant object clearly
    Answer: C

73. The screen behind the eye lens is called the:
    A. Iris B. Ciliary muscles
    C. Retina D. Pupil
    Answer: C

74. At noon the sun appears white as
    A. light is least scattered
    B. all the colours of the white light are scattered away
    C. blue colour is scattered the most
    D. red colour is scattered the most
    Answer: A

75. Which of the following phenomena of light are involved in the formation of a rainbow?
    A. Reflection, refraction and dispersion
    B. Refraction, dispersion and total internal reflection
    C. Refraction, dispersion and internal reflection
    D. Dispersion, scattering and total internal reflection

    Answer: B

76. Twinkling of stars is due to atmospheric
    A. Dispersion of light by water droplets
    B. Refraction of light by different layers varying refractive indices
    C. Scattering of light by dust particles
    D. Internal reflection of light by clouds

    Answer: B

77. Which of the following phenomena contributes significantly to the reddish appearance of the sun at sunrise or sunset?
    A. Dispersion of light
    B. Scattering of light
    C. Total internal reflection of light
    D. Reflection of light from the earth

    Answer: B

78. The bluish colour of water in deep sea is due to
    A. The presence of algae and other plants found in water
    B. Reflection of sky in water
    C. Scattering of light
    D. Absorption of light by the sea

    Answer: C

79. When light rays enter the eye, most of the refraction occurs at the
    A. Crystalline lens
    B. Outer surface of the cornea
    C. Iris
    D. Pupil

    Answer: B

80. Light of a single wavelength is called:
    A. Bi-chromatic light
    B. Dichromatic light
    C. Monochromatic light
    D. None of these

    Answer: C

[Chemistry]

1. A chemical reaction is characterized by
    (A) a change in state
    (B) formation of new products
    (C) evolution or absorption of energy
    (D) all of these

Ans: (D) all of these

2. Which one amongst the following is a complete balanced equation?
   (A) $2Al(s) + 3H_2SO_4\ (aq) \rightarrow Al_2(S0_4)_3\ (l) + 3H_2(g)$
   (B) $2Al(s) + 3H_2SO_4(aq) \rightarrow Al_2(S0_4)_3\ (g) + 3H_2(g)$
   (C) $2Al(s) + 3H_2SO_4(aq) \rightarrow Al_2(S0_4)_3\ (aq) + 3H_2(g)$
   (D) $2Al(s) + 3H_2SO_4(aq) \rightarrow Al_2(S0_4)_3\ (aq) + 3H_2(g) + \Delta H$
   Ans: (C) $2Al(s) + 3H_2SO_4(aq) \rightarrow Al_2(S0_4)_3\ (aq) + 3H_2(g)$

3. Regarding a balanced chemical equation which one of the following is incorrect?
   (A) It tells us about the rate of reaction
   (B) It tells the ratio of masses of the reactants and products.
   (C) It saves time and space in expressing a chemical reaction.
   (D) All the above.
   Ans: (A) It tells us about the rate of reaction

4. Which of the following processes involves chemical reactions?
   (A) Storing of oxygen gas under pressure in a gas cylinder
   (B) Liquefaction of air
   (C) Keeping petrol in a china dish in the open
   (D) Heating copper wire in the presence of air at high temperature
   Ans: (D) Heating copper wire in the presence of air at high temperature

5. Zinc or aluminium do not corrode because
   (A) They do not react with moist air
   (B) They react with moist air to form a very thin layer of oxides which is very sticky and hard
   (C) They are inactive metals
   (D) They are metalloids.
   Ans: (B) They react with moist air to form a very thin layer of oxides which is very sticky and hard

6. Which of the following is (are) double displacement reaction(s)?
   (A) $Pb + CuCl_2 \rightarrow PbCl_2 + Cu$
   (B) $Na_2SO_4 + BaCl_2 \rightarrow BaS0_4 + 2NaCl$
   (C) $C + O_2 \rightarrow CO_2$
   (D) $CH_4 + 2O_2 \rightarrow CO_2 + 2\ H_2O$

Ans: (B) $Na_2SO_4 + BaCl_2 \rightarrow BaSO_4 + 2NaCl$

7. Regarding a balance chemical equation which one of the following is incorrect?
   (A) It tells about the rate of reaction
   (B) It tells the ratio of masses of reactants and products
   (C) It saves time and space in expressing a chemical reaction
   (D) All the above
   Ans: (A) It tells about the rate of reaction

8. The reaction $AgNO_3 + HCl \rightarrow AgCl + HNO_3$ is a
   (A) Decomposition reaction
   (B) Double displacement reaction
   (C) Displacement reaction

(D) Combination reaction
Ans: (B) Double displacement reaction.

9. The reaction $2HgO(s) \rightarrow 2Hg(l) + O_2(g)$ is a
   (A) Combination reaction
   (B) Displacement reaction
   (C) Decomposition reaction
   (D) Double displacement reaction
   Ans: (C) Decomposition reaction.

10. A chemical reaction that proceeds with the release of heat energy is called:
   (A) Endothermic reaction
   (B) Redox reaction
   (C) Exothermic reaction
   (D) Reduction reaction
   Ans: (C) Exothermic reaction

11. A researcher adds barium hydroxide to hydrochloric acid to form a white-coloured barium chloride. Which of the following option gives the balanced chemical equation of the reaction?
   (A) $HCl + Ba(OH)_2 \rightarrow BaCl_2 + 2H_2O$
   (B) $2HCl + Ba(OH)_2 \rightarrow BaCl_2 + 2H_2O$
   (C) $2HCl + Ba(OH)_2 \rightarrow BaH_2 + 2HCl + O_2$
   (D) $HCl + 2Ba(OH) \rightarrow 2BaCl_2 + 2H_2O + O_2$
   Ans: (B) $2HCl + Ba(OH)_2 \rightarrow BaCl_2 + 2H_2O$

12. Which of the following shows an oxidation reaction?
   (A) Gain of oxygen (B) Loss of oxygen
   (C) Gain of hydrogen (D) None of the above
   Ans: (A) Gain of oxygen

13. Give the ratio in which hydrogen and oxygen are present in water by volume.
   (A). 1:2 (B). 1:1
   (C). 2:1 (D). 1:8
   Ans: (C) 2:1

14. Which of the following oxides of iron would be obtained on the prolonged reaction of iron with steam?
   (A). FeO (B). Fe_2O_3
   (C). Fe_3O_4 (D). Fe_2O_3 and Fe_3O_4
   Ans: (C) Fe_3O_4

15. An aqueous solution turns red litmus blue. Excess addition of which of the following solutions would reverse the change?
   (A) Baking powder
   (B) Lime
   (C) Ammonium hydroxide
   (D) Hydrochloric acid
   Ans : (D) Hydrochloric acid

16. Which one of the following can be used as an acid-base indicator by a visually impaired student?

(A). Litmus (B). Turmeric
(C). Vanilla essence (D)Methyl orange

Ans: (C) Vanilla essence

17. Which one of the following is a strong acid?
    (A). Carbonic acid (B). Sulphurous acid
    (C). Nitrous acid (D). Hydrochloric acid

Ans: (D) Hydrochloric acid

18. Which one of the following is not a neutral salt?
    (A). NaCl (B). $NaNO_3$
    (C)$Na_2 SO_4$ (D). $Na_2 CO_3$

Ans: (D) $Na_2 CO_3$

19. The property of a metal that can be beaten into thin sheets is known as
    (A) Ductility.
    (B) Malleability.
    (C) Sonority.
    (D) Conductivity.

Ans: (B) Malleability

20. The acid present in sour milk or curd is
    (A). acetic acid (B). lactic acid
    (C). formic acid (D). uric acid

Ans: (B) lactic acid

21. Which of the following acid-base indicators will turn blue in basic or alkaline solutions?
    (A) Methyl orange
    (B) Phenolphthalein
    (C) Blue litmus
    (D) Red litmus

Ans: (D) Red litmus

22. If a few drops of a concentrated acid accidentally spills over the hand of a student, what should be done?
    (A) Wash the hand with saline solution
    (B) Wash the hand immediately with plenty of water and apply a paste of sodium hydrogen carbonate.
    (C) After washing with plenty of water apply solution of sodium hydroxide on the hand
    (D) Neutralise the acid with a strong alkali

Ans: (B) Wash the hand immediately with plenty of water and apply a paste of sodium hydrogen carbonate.

23. To protect tooth decay, we are advised to brush our teeth regularly. The nature of the tooth pastes commonly used is
    (A). acidic (B). neutral
    (C). basic (D). corrosive

Ans: (C) Basic

24. The pH of the gastric juices released during digestion is

(A) less than 7 (B) more than 7
(C) equal to 7 (D) equal to 0

Ans: (A) Less than 7

25. Which of the following is acidic in nature?
    (A) Lime juice
    (B) Human blood
    (C) Lime water
    (D) Antacid
    Ans: (A) Lime Juice

26. Which among the following is not a base?
    (A) NaOH
    (B) KOH
    (C) NH_4 OH
    (D) C_2H_5 OH

Ans: (D) C_2H_5 OH

27. Plaster of Paris on mixing with water forms the fine crystals of
    (A) Gypsum
    (B) Anhydrous calcium sulphate
    (C) Calcium hydrogen sulphate
    (D) None of these

    Ans: (A) Gypsum

28. A compound form by the partial or complete replacement of H^+ (aq) ion of an acid by a metal ion or an electropositive ion is called:
    (A). Base (B). Salt
    (C). Metal oxide (D). Acid

    Ans: (B) Salt

29. The gas with which snacks packed in aluminium bags are flushed before packing is
    (A). Nitrogen (B). Oxygen
    (C). Hydrogen (D). Air

    Ans: (A) Nitrogen

30. Which Acid is present in Tomato?
    (A). Citric Acid (B). Oxalic Acid
    (C). Lactic Acid (D). HCl

    Ans: (B) Oxalic Acid

31. Lactic Acid is present in
    (A). Orange (B). Tea
    (C). Curd (D). Vinegar

    Ans: (C) Curd

32. Which of the following salts does not contain water of crystallisation?
    (A). Blue vitriol (B). Baking soda
    (C). Washing soda (D). Gypsum

    Ans: (B) Baking Soda

33. Which one of the following metals does not react with cold as well as hot water?
(A) Na (B) Ca
(C) Mg (D) Fe
Ans: (D) Fe

34. A metal whose density is less than 1 gcm^{-3} is
(A). aluminium (B). magnesium
(C). calcium (D). sodium
Ans: (D) Sodium

35. The metal that is not malleable at room temperature is
(A). copper (B) zinc
(C). lead (D) tin
Ans: (B) Zinc

36. A metal that is the best conductor of electricity is
(A). Copper (B) aluminium
(C). sodium (D). silver
Ans: (D) Silver

37. A non-metal which is stored in water is
(A). Sulphur (B). silicon
(C) phosphorus (D) carbon
Ans: (C) Phosphorus

38. Aluminium is used for making cooking utensils. Which of the following property of aluminiumn is responsible for the same?
(A) Poor thermal conductivity
(B) Good electrical conductivity
(C) Ductility
(D) High melting point
Ans: (D) High melting point

39. Which of the following is a strategic metal?
(A). uranium (B). platinum
(C). titanium (D). radium
Ans: (C) Titanium

40. Which of the following is not a radioactive metal
(A). Uranium (B). Magnesium
(C). thorium (D). radium
Ans: (B) Magnesium

41. Which of the following is a noble metal?
(A). Calcium (B). Iron
(C). Lead (D). Gold
Ans: (D) Gold

42. A liquid in a fused state or solution form that conducts electricity and at the same time decomposes into ions is called
(A). conducting solution (B). molten solution

(C). electrolyte (D). none of these

Ans: (C) electrolyte

43. A small piece of sodium is dropped into a beaker containing water. Which of the following observations is incorrect?
    (A) It floats on the surface of water to form a silvery ball
    (B) It darts over the surface of water and decreases in size
    (C) It catches fire and burns with a golden-yellow flame
    (D) The water on testing turns blue litmus red

    Ans: (D) The water on testing turns blue litmus red

44. Which of the following properties is not generally exhibited by ionic compounds?
    (A). Solubility in water
    (B). Electrical conductivity in solid state
    (C). High melting and boiling points
    (D). Electrical conductivity in molten state

    Ans: (B) Electrical conductivity in solid state

45. Although metals form basic oxides, which of the following metals form an amphoteric oxide?
    (A). Na (B) Ca
    (C) Al (D) Cu

    Ans: (C) Al

46. Silver articles become black on prolonged exposure to air. Thís ís due to the formation of
    (A). Ag_3N (B). Ag_2O
    (C). Ag_2S (D). Ag_2S and Ag_3N

    Ans: (C) Ag_2S

47. Alloys are homogeneous mixtures of a metal with a metal or non-metal. Which among the following alloys contain a non-metal as one of its constituents?
    (A). Brass (B) Bronze
    (C) Amalgam (D) Steel

    Ans: (D) Steel

48. The principal metal in stainless steel is
    (A). Iron (B) Carbon
    (C) Chromium (D) Nickel

    Ans: (A) Iron

49. The conversion of metal oxide into metal is called
    (A) Froth floatation
    (B) Calcination
    (C) Roasting
    (D) Reduction

    Ans: (D) Reduction

50. Which of the following will displace hydrogen from dilute sulphuric acid?
    (A). Copper (B) Zinc
    (C) Mercury (D) Gold

Ans: (B) Zinc

51. Which of the following non-metal has the Lustre?
(A). Chlorine (B). Bromine
(C). Potassium (D). Iodine
Ans: (D) Iodine

52. What happens when a pellet of sodium is dropped in water?
A. It catches fire and forms oxide
B. It absorbs heat and forms oxide
C. It catches fire and forms hydroxide
D. It absorbs heat and forms hydroxide
Ans: (C) It catches fire and forms hydroxide

53. Which of the following properties is not generally exhibited by ionic compounds?
(A) Solubility in water
(B) Electrical conductivity in solid state
(C) High melting and boiling point
(D) Electrical conductivity in molten state
Ans: (B) Electrical conductivity in solid state

54. The electronic configuration of sodium atom is
(A) 2, 8, 1 (B) 2, 8, 7
(C) 2, 8, 8 (D) 2, 8, 8, 1
Ans: (A) 2, 8, 1

55. Classification of elements helps us to
(A) study elements better in a systematic way
(B) correlate the properties of elements with some fundamental properties of matter
(C) reveal relationship of various elements with each other
(D) All of the above
Ans: (D) All of the above

56. Long form of Periodic Table was reconstructed by
(A) Moseley (B) Niels Bohr
(C) J. J. Thomson (D) Rutherford
Ans: (B) Niels Bohr

57. Which of the following forms the basis of the Modern Periodic Table?
(A). Atomic mass (B) Atomic number
(C) Number of nucleons (D) All of the above
Ans: (B) Atomic number

58. What is the other name for Group 18 elements?
(A). Noble gases (B) Alkali metals
(C) Alkaline earth metals (D) Halogens
Ans: (A) Noble gases

59. The law of octaves for the classification of elements was stated by

(A). Mendeleev (B) Dobereiner
(C) Niels Bohr (D) Newlands
Ans: (D) Newlands

60. Which among the following elements has the largest atomic radii?
(A) Na (B) Mg
(C) K (D) Ca
Ans: (C) K

61. Three elements B, Si and Ge are
(A) Metals
(B) non-metals
(C) metalloids
(D) metal, non-metal and metalloid respectively
Ans: (C) Metalloid

62. Which one of the following does not increase while moving down the group of the periodic table?
(A) Atomic radius
(B) Metallic character
(C) Valency
(D) Number of shells in an element
Ans: (C) Valency

63. According to Mendeleev's Periodic Law, the elements were arranged in the periodic table in the order of
(A) increasing atomic number
(B) decreasing atomic number
(C) increasing atomic masses
(D) decreasing atomic masses
Ans: (C) increasing atomic masses

64. Name the element which Mendeleev had named as Eka-Aluminium, what is the present name of this element?
(A). Germanium (B). Gallium
(C). Scandium (D). Aluminium
Ans: (B) Gallium

65. Organic compounds having the same molecular formula, but different structural formulae are called:
(A) Allotropes (B) Isomers
(C) Isobars (D) None of the above
Ans: (B) Isomers

66. Which of the following is the most reactive element of group 17?
(A). Oxygen (B). Sodium
(C). Fluorine (D). Magnesium
Ans: (C) Fluorine

67. Carbon exists in the atmosphere in the form of
(A) carbon monoxide only

(B) carbon monoxide in traces and carbon dioxide.
(C) carbon dioxide only
(D) coal
Ans: (C) carbon dioxide

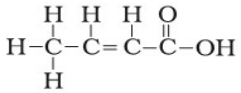
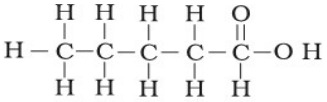
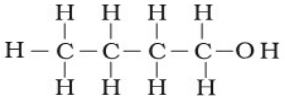
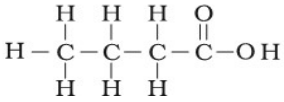
68. Buckminsterfullerene is an allotropic form of
(A). Phosphorus (B). sulphur
(C). carbon (D). tin
Ans: (C) Carbon

69. Oils on treating with hydrogen in the presence of palladium or nickel catalyst form fats. This is an example of
(A). Addition reaction (B). Substitution reaction
(C). Displacement reaction (D). Oxidation reaction
Ans: (A) Addition reaction

70. The first member of alkene homologous series is
(A) ethene (B) ethane
(C) propyne (D) methane
Ans: (A) Ethene

71. Which amongst the following is not a free state of carbon?
(A). Diamond (B) Graphite
(C) Petrol (D) Coke
Ans: (C) Petrol

72. The correct structural formula of butanoic acid is

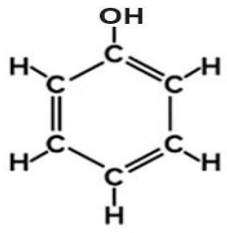
(A) 
(B) 
(C) 
(D) 

Ans – (D)

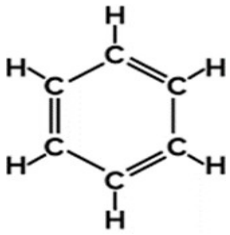
73. The first member of alkyne homologous series is
(A). Ethyne (B) Ethane
(C) Propyne (D) Methane
Ans: (A) Ethyne

74. Chlorine reacts with saturated hydrocarbons at room temperature in the
(A) absence of sunlight
(B) presence of sunlight
(C) presence of water
(D) presence of hydrochloric acid
Ans: (B) Presence of sunlight

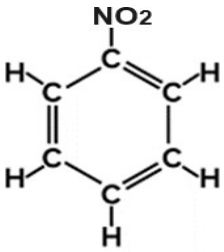
75. Structural formula of benzene is



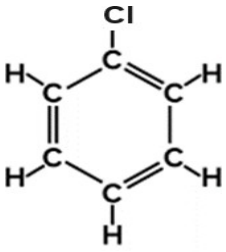
(A)



(B).



(C)



(D)

Ans: (B)

76. Hydrolysis of an ester by sodium hydroxide solution is known as:
    (A). Neutralisation (B). Saponification
    (C). Both (A) and (B) (D). None of these
    Ans: (B) Saponification

77. A homologous series of unsaturated hydrocarbons, characterised by the presence of triple covalent bond in straight chain carbon compound is called:
    (A). Alkyne series (B). Alkene series
    (C). Alkane series (D). None of these
    Ans: (A) Alkyne Series

78. The IUPAC name of the compound C_2H_5OH is:
    (A). Ethanol (B). Methanol
    (C). Propanol (D). Ethane
    Ans: (A) Ethanol

79. The common name of CH_3COOH is:
    (A). Formic acid (B). Acetic acid
    (C)Propionic acid (D). Butyric acid
    Ans: (B) Acetic acid

80. The hardest naturally occurring substance is
    (A). Diamond (B). Titanium
    (C). Platinum (D). Silicon
    Ans: (A) Diamond

[Biology]

1. Plants store carbohydrates in the form of

(A). Glycogen. (B). Starch.
(C). Glucose. (D). Protein
Ans. (B) Starch.

2. What is the correct sequence of different parts present in alimentary canal?
   (A). Stomach, oesophagus, small intestine, large intestine
   (B). Stomach, oesophagus, large intestine, small intestine
   (C). Oesophagus, stomach, small intestine, large intestine
   (D). Oesophagus, stomach, large intestine, small intestine
   Ans. (C) Oesophagus, stomach, small intestine, large intestine

3. The inner lining of the stomach is protected by one of the following from hydrochloric acid
   (A). Pepsin. (B). Mucus.
   (C) Salivary amylose. (D). Bile
   Ans. (B) Mucus.

4. Which part of alimentary canal receives bile from the liver?
   (A). Stomach. (B). Small intestine.
   (C) Large intestine (D). Oesophagus
   Ans. (B) Small intestine.
5. The mode of nutrition in which the organism depends on another organism(host) for nutrition is called
   (A) Holozoic. (B) Saprophytic.
   (C)Symbiotic. (D) Parasitic
   Ans. (D) Parasitic

6. The opening and closing of the stomatal pore is a function of
   (A). Guard cells. (B) Epidermal cells.
   (C) Subsidiary cells. (D). Mesophyll
   Ans. (A) Guard cells.

7. The process that converts light energy to chemical energy is
   (A) Respiration. (B) Circulation.
   (C) Photosynthesis. (D) Photolysis
   Ans. (C) Photosynthesis.

8. The oxygen released during photosynthesis comes from
   (A) Photolysis of water. (B) Fixation of carbon dioxide.
   (C)Excitation of chlorophyll. (D) Sunlight
   Ans. (A) Photolysis of water.

9. An enzyme that digests protein is
   (A) Lipase. (B). Amylase.
   (C)Pepsin. (D) Hydrochloric acid
   Ans. (C) Pepsin.

10. Complete digestion of food takes place in the
    (A).Stomach. (B) Small intestine.
    (C) Mouth. (D) Large intestine
    Ans. (B) Small intestine.

11. Saliva contains an enzyme called
(A) Pepsin. (B) Salivary amylase.
(C)Trypsin. (D) Lipase
Ans. (B) Salivary amylase.

12. The digested food is absorbed by the wall of the
(A) Small intestine. (B) Stomach.
(C)Mouth. (D) Large intestine
Ans. (A) Small intestine.

13. An autotrophic plant showing heterotrophic mode of nutrition is
(A) Pitcher plant. (B) Mustard plant.
(C)Mimosa. (D) Mango tree
Ans. (A) Pitcher plant.

14. The rate of photosynthesis increases with rise in temperature and slows down at a temperature more than
(A) 30^0C. (B) 40^0C.
(C) 35^0C. (D) 45^0C
Ans. (B) 40^0C.

15. The photosynthetic pigment is
(A) Pyruvate. (D) Chlorophyll.
(C)Xanthophyll. (D) Carotenoids
Ans. (B) Chlorophyll.

16. Nutrition in Amoeba is
(A)Saprophytic. (B) Symbiotic.
(C)Holozoic. (D) Parasitic
Ans. (C) Holozoic.

17. The taking in of food inside the body is
(A)Ingestion. (B) Digestion.
(C) Assimilation. (D) Egestion
Ans. (A) Ingestion.

18. The utilization of absorbed food materials for growth, reproduction, repair by living organisms is
(A) Absorption. (B) Assimilation.
(C)Digestion. (D) Egestion
Ans. (B) Assimilation.

19. In human muscles, deficiency of oxygen results in breakdown of pyruvate into
(a) Ethanol and Carbon dioxide
(b) Carbon dioxide only
(c) Lactic acid only
(d) Lactic acid and carbon dioxide
Ans. (C) Lactic acid only

20. First step of respiration is

(a) Formation of pyruvic acid
(b) Formation of oxygen
(c) Formation of glucose
(d) Formation of carbon dioxide

Ans. (A) Formation of pyruvic acid

21. The respiratory pigment in humans is
(A) Chlorophyll. (B) Haemoglobin.
(C) Fibrinogen. (D) Glucose

Ans. (B) Haemoglobin.

22. The energy currency of a cell is
(A) Glucose. (B) Starch.
(C)ATP. (D) ADP

Ans. (C) ATP

23. Plants growing in mangroves or saline swamps have breathing or respiratory roots called
(A) Lenticels. (B) Stomata.
(C) Pneumatophores. (D) Velamen

Ans. (C) Pneumatophores.

24. The breakdown of glucose into pyruvate takes place in
(A) Mitochondria. (B) Cytoplasm.
(C)Nucleus. (D) Plasma membrane

Ans. (B) Cytoplasm.

25. The part of the respiratory tract supported by rings of cartilage to ensure air passage does not collapse is
(A) Trachea. (B) Nasal passage.
(C) Pharynx. (B) Nose

Ans. (A) Trachea.

26. The actual site for gaseous exchange is
(A) Trachea. (B) Bronchus.
(C)Alveoli. (D) Bronchioles

Ans. (C) Alveoli.

27. Platelets help in
(A) Transport of oxygen (B) Transport of carbon dioxide
(C) Clotting of blood (D) Pumping of blood

Ans. (C) Clotting of blood

28. The human heart has
(A) Four chambers. (B) Three chambers.
(C) Two chambers. (D) One chamber

Ans. a) Four chambers.

29. The instrument used to measure blood pressure is
(A) Thermometer. (B) Sphygmomanometer.
(C) Stethoscope. (D) Glucometer

Ans. (B) Sphygmomanometer.

30. Water and minerals move from the soil upwards to the leaves through the
    (A) Xylem. (B) Phloem.
    (C) Epidermal cells (D) Mesodermal Cells
    Ans.(A) Xylem.

31. Loss of water from the aerial parts of the plant in the form of vapour is termed as
    (A) Translocation (B) Transpiration.
    (C) Evaporation. (D) Precipitation
    Ans. (B) Transpiration.

32. The transport of products of photosynthesis from leaves to other parts of the plant takes place through
    (A) Xylem. (B) Phloem.
    (C)Epidermis. (D) Cortex
    Ans. (B) Phloem

33. Which blood vessel brings oxygenated blood to the human heart from the lungs?
    (A) Vena cava. (B) Pulmonary artery.
    (C)Pulmonary vein. (D) Aorta
    Ans. c) Pulmonary vein.

34. The functional units of the excretory system are the
    (A) Villi (B) Nephron
    (C)Neuron (D) Alveoli
    Ans. (B) Nephron

35. Artificial removal of nitrogenous waste from the blood is called
    (A) Haemophilia. (B) Haemodialysis.
    (C) Haemoglobin (D) Haemoprotein
    Ans. (B) Haemodialysis

36. Urine is released to the outside through the
    (A) Ureter. (B) Urethra.
    (C) Collecting duct. (D) Urinary bladder
    Ans. (B) Urethra.

37. Which of the following is the largest part of the brain?
    (A) Cerebrum. (B) Cerebellum.
    (C) Medulla. (D) Pons
    Ans. (A) Cerebrum.

38. The neuron that transmits impulse from receptors to the brain are
    (A) Motor neuron. (B) Sensory neuron.
    (C) Connector neuron. (D) Muscle
    Ans. (B) Sensory neuron

39. Which of the following is an example of reflex action
    (A) Running a race.

(B) Climbing a tree.
(C) Removal of hand on touching a hot object.
(D) Eating a fruit

Ans. (C) Removal of hand on touching a hot object.

40. The control centres for thirst, sleep, fatigue and hunger is situated in the
(A) Cerebrum. (B) Pons.
(C) Medulla. (D) Hypothalamus

Ans. (D) Hypothalamus

41. Posture and balance of the body is controlled by the
(A) Cerebrum. (B) Cerebellum.
(C) Medulla. (D) Pons

Ans. (B) Cerebellum.

42. How many pairs of cranial nerves are present in the human body?
(A) 12 pairs. (B) 21 pairs.
(C) 13 pairs. (D) 31 pairs

Ans. (A) 12 pairs.

43. The nerves Controlling involuntary actions of smooth muscles and certain glands constitute the
(A) Somatic nervous system
(B) Autonomic nervous system
(C) Central nervous system
(D) Peripheral nervous system

Ans. (B) Autonomic nervous system

44. Dwarfism results due to
(A) Excess secretion of thyroxine
(B) Less secretion of growth hormone
(C) Less of secretion of adrenaline hormone
(D) Excess secretion of growth hormone

Ans. (B) Less secretion of growth hormone

45. The place of opposition of end plate of a neuron with the surface of the muscle is called
(A) Cell plate junction
(B) Neuro muscular junction
(C) Synapse
(D) Neural joint

Ans. (B) Neuro muscular junction

46. The movement in plant in response to touch is termed as
(A) Nyctinastic movements
(B) Tropic movements
(C) Seismonastic movements
(D) Phototropism

Ans. (C) Seismonastic movements

47. The movement of shoot towards light is called
(A) Geotropism. (B) Hydrotropism.

(C) Chemotropism. (D) Phototropism
Ans. (D) Phototropism

48. Which plant hormone promotes ripening of fruits?
(A) Gibberellins. (B) Cytokines.
(C)Ethylene. (D) Abscisic acid
Ans. (C) Ethylene

49. This hormone is responsible for 'fight or flight' response
(A) Thyroxine. (B) Insulin.
(C)Adrenaline. (D) Glycogen
Ans. (C) Adrenaline.

50. The endocrine gland that secretes insulin is
(A) Pancreas. (B) Liver.
(C) Adrenal gland (D) Pituitary gland
Ans. (A) Pancreas.

51. Which of the following endocrine gland is unpaired?
(A) Pituitary.
(B) Adrenal.
(C) Testes
(D) Ovary
Ans. (A) Pituitary.

52. Which of the following acts as blue print of life?
(A) DNA (B) RNA
(C) Nucleus (D) Chromosome
Ans: (A) DNA

53. During germination, a seedling develops from a/an
(A) Ovule (B) seed coat
(C) embryo (D) seed
Ans: (C) embryo

54. External fertilisation takes place in
(A) Human (B) Cows
(C) Monkeys (D) Frogs
Ans: (D) Frogs

55. The mature ovary develops into a
(A) Seed (B) Fruit
(C) Stamen (D) Pistil
Ans: (B) Fruit

56. Yeast reproduces by
(A) Seeds (B) Budding
(C) Spore formation (D) Fragmentation
Ans: (B) Budding

57. This plant has unisexual flowers.

(A) Rose (B) Papaya
(C) Mustard (D) Peas
Ans: (B) Papaya

58. The process leading to the fusion of male and female gametes is called
(A) Fertilisation (B) Pollination
(C) Germination (D) Seed formation
Ans: (A) Fertilisation

59. The male reproductive part of a flower is
(A) Stamen (B) Anther
(C) Filament (D) Carpel
Ans: (A) Stamen

60. During favourable conditions, Amoeba reproduces by-
(A) Multiple fission (B) Binary fission
(C)Budding (D) Fragmentation
Ans: (B) Binary fission

61. In human beings, the fertilization occurs in the
(A) fallopian tubes (B) vagina
(C) ovaries (D) uterus
Ans: (A) fallopian tubes

62. We can get disease free plants by
(A) Fission (B) Regeneration
(C) Fragmentation (D) Micro propagation
Ans: (D) Micro propagation

63. The male gamete from pollen tube fuses with the egg to form
(A) polar nuclei (B) embryo
(C) zygote (D) endosperm
Ans: (C) zygote

64. Which among the following diseases is not sexually transmitted?
(A) Syphilis (B) Hepatitis
(C) HIV – AIDS (D) Gonorrhoea
Ans: (B) Hepatitis

65. Offspring formed as a result of sexual reproduction exhibit more variations because -
(A) sexual reproduction is a healthy process
(B) genetic material comes from two different parents of the same species
(C) genetic material comes from two parents of different species
(D) genetic material comes from many parents.
Ans: (B) genetic material comes from two different parents of the same species

66. Which of the following is an inherited trait?
(A) Reduction in the weight of an organism due to starvation.
(B) Removal of tail in mice by surgery.
(C) Type of earlobe.
(D) Development of muscles in athletes.

Ans. (C) Type of earlobe

67. Which of the following is not true with respect to variation?
    (A) All variations in a species have an equal chance of survival.
    (B) Change in genetic composition results in variation.
    (C) Selection of variants by environmental factors forms the basis of evolutionary processes.
    (D) Variation is minimal in Asexual reproduction.
    Ans. (A) All variations in a species have an equal chance of survival.

68. A trait in an organism is influenced by
    (A) Paternal DNA only.
    (B) Maternal DNA only.
    (C) Both paternal and maternal DNA.
    (D) Neither by paternal nor by maternal DNA.
    Ans. (C) Both paternal and maternal DNA.

69. Random change in frequency of alleles in a population over successive generation due to error during DNA copying called
    (A) Acquired trait (B) Inherited trait
    (C)Genetics (D) Genetic drift
    Ans. (D) Genetic drift

70. Human evolution took place in
    (A) Africa (B) America
    (C) India (D) China
    Ans. (A) Africa

71. Some dinosaurs had feathers although they could not fly but birds have feathers that help them to fly. In the context of evolution, this means that
    (A) Reptiles have evolved from birds
    (B) There is no revolutionary connection between reptiles and birds
    (C) Feathers are homologous structures in both organisms
    (D) Birds have evolved from reptiles
    Ans. (D) Birds have evolved from reptiles

72. The genetic constitution of an organism is called
    (A) Phenotype (B) Genotype
    (C)Heredity (D) Inheritance
    Ans. (B) Genotype

73. Which of the following is a unit of inheritance passed from parents to offspring?
    (A) Chromosomes (B) Gene
    (C) Allele (D) Gamete
    Ans. (B) Gene

74. In men, a sperm contains autosomes and
    (A) Both x and y chromosomes
    (B) Either x or y chromosomes
    (C) Only x chromosomes
    (D) Only y chromosomes

Ans. (A) Both x and y chromosomes

75. Planaria can give to new individual by_____process
(A) Binary fission (B) Multiple fission
(C) Regeneration (D) Fragmentation
Ans. (C) Regeneration

76. The study of inheritance and variation is known as
(A) Genetics (B) Archaeology
(C) Palaeontology (D) Heredity
Ans. (A) Genetics

77. A zygote which has an x- chromosome inherited from the father will develop into a
(A) Boy
(B) Girl
(C) Either boy or girl
(D) x- chromosome does not determine the sex of a child
Ans. (B) Girl

78. From the list given below, select the character which can be acquired but not inherited
(A) Colour of the eyes
(B) Colour of the skin
(C) Texture of hair
(D) Size of the body
Ans. (D) Size of the body

79. The formation of a new species is known as
(A) Classification (B) Specification
(C) Fertilisation (D) Reproduction
Ans. (B) Specification

80. The transfer of character from one generation to the next generation is known as
(A) Evolution (B) Heredity
(C) Genetics (D) Speciation
Ans. (B) Heredity

Section-B

Very Short Answer Question (2 Marks)

[Physics]

1. What is reflection of light?

Ans: When a ray of light travelling through a certain medium strikes on opaque, but a smooth polished surface, it bounces of the surface in to the original medium the phenomenon is called reflection of light.

2. State the laws of Reflection of light.

Ans: The two laws of Reflection of light are:

(i) The angle of incidence is equal to angle of reflection at the point of incidence.

(ii) At the point of incidence, the incident ray, the reflected ray and the normal lie in the same plane.

3. State the two laws of refraction of light?

Ans: Following are the laws of refraction:

(i) The incident ray, the refracted ray and the normal to the surface of the separation of two media at the point of incidence, all lie in the same plane.

(ii) The ratio of the sine of angle of incidence to the sine of angle of refraction is a constant, for the light given colour, for the given pair of media.

4. What is an inverted image and a laterally inverted image?

Ans: During inversion the image turns around its horizontal axis through an angle of $180^{0.}$ During lateral inversion the image turns through an angle of 180^{0} through vertical axis rather than horizontal axis.

5. Write the uses of concave mirror?

Ans: (i) It is used as a shaving mirror.

(ii) It is used as a reflector in the head lights of automobiles, such as car, trucks motor bikes.

(iii) Concave mirror is used as a reflector in dish type solar cookers and solar furnace.

6. What do you understand by the term power of lens? State and define the unit of power of a lens.

Ans: The reciprocal of focal length in metres is called power of lens.

$$\text{Power of lens} = \frac{1}{\text{Focal length of the lens (in metres)}}$$

$$\text{Or} \quad P = \frac{1}{f(in\ m)}$$

The SI unit of power of lens is called Dioptre. A lens is said to have a power of one dioptre, if its focal length is one metre.

7. What do you mean by lens? Name the two broad classes of lens.

Ans: A lens is defined as a portion of a transparent optical material, having one or two spherical surfaces.

Two broad classes of lens are:

(a) Converging lens or convex lens

(b) Diverging lens or concave lens

8. Give the characteristics of the image formed when the object is placed between the principal focus and the pole of a concave mirror.

Ans: (i) The image is Virtual.
(ii) The image is erect.
(iii) The image is magnified.
(iv) The image is formed behind the concave mirror.

9. Why is convex mirror preferred over plane mirror for rear view?

Ans: Convex mirror is used as a rear view mirror in automobiles, because it can cover a very wide field behind the driver and hence enables to see the traffic behind him without turning his head. A plane mirror is not useful as a rear view mirror, because its field of view is very small.

10. What do you understand by the term myopic eye? How can it be corrected?

Ans: A short-sighted (myopic) person can see objects at the point of distinct vision clearly but cannot see objects which are far-off.

Short-sightedness or Myopia can be corrected by using a Concave lens of appropriate focal length.

11. What do you understand by the term hypermetropic eye? How can it be corrected?

Ans: A long-sighted (hypermetropic) person can see far-off objects clearly but cannot see objects at the point of distinct vision clearly.

Long-sightedness or Hypermetropia can be corrected by using a Convex lens of appropriate focal length.

12. State two causes of the Myopia defect.

Ans: (i) Due to elongation of eye ball.
(i) Weakening a ciliary muscles.

13. State two causes of the hypermetropia defect.

Ans: (i) Due to shortening of the eye ball.
(ii) Stiffness of ciliary muscles.

14. What do you mean by the terms (i) Spectrum; (ii) Dispersion

Ans: (i) The bond of seven colours obtained on the screen when a white light splits into its component colours is called the spectrum.

(ii) The phenomenon due to which a whit light splits into its component colours when passed through a prism is called dispersion.

15. What do you understand by monochromatic light and polychromatic light?

Ans: Monochromatic light of a single colour or single wavelength is called monochromatic light.

And Polychromatic light that made of two or more colours is called polychromatic light.

16. (a) What is rainbow?
(b) Name the light sensitive and colour sensitive cell in retina of human eye.

Ans: (a) Rainbow is produced just after the rain, due to the dispersion of sunlight by tiny droplets of water suspended in air.
(b) The Rod is the light sensitive cell and Cone is the colour sensitive cell in retina.

17. A student sitting at the back of a regular classroom could not see what is written on the board. What defect of the eyes is he suffering? What type of lens should he wears to correct the defect?

Ans: Myopia is the defect of the eye with which the student is suffering.

To correct this defect, the student should wear spectacle (contact lens) fitted with concave lens of suitable focal length.

18. State and define S.I. unit of electric current.

Ans-: When a charge of one coulomb flows through a conductor in one second, them the current flowing the conductor is said to be one ampere.

S.I. unit of electric current is Ampere (A).

19. What do you understand by the term electric potential? Write the S.I. unit of potential difference?

Ans: The amount of work done in moving a unit positive charge from infinity to a given point in an electric field is called the electric potential at that point.

S.I. unit of potential difference is Volt (V).

20. State unit of electric potential and define it.

Ans: S.I. unit of electric potential is Volt (V) when one coulomb of an electric charge is brought from infinity to a given point in an electric field. Such that the work done is one joule them the electric potential at that point is one volt.

21. State and define the unit of electric resistance.

Ans: S.I unit of electric resistance is Ohm (Ω)

When a current of one Ampere flows through a conductor at a potential difference of one Volt across its ends. Then the resistance of the conductor is said to be one Ohm.

22. Name two devices which can produce continuous current.

Ans: (i) Chemical cell or cell

(ii) Electric generator or dynamo.

23. Four resistors of 1Ω, 2Ω, 3Ω, and 4Ω are connected is series. Calculate the total resistance of the circuit.

Solution: Here, $r_1 = 1\Omega$, $r_2 = 2\Omega$, $r_3 = 3\Omega$, $r_4 = 4\Omega$

We know that, resistance is a series circuit is given by the expression.

$$R = r_1 + r_2 + r_3 + r_4$$
$$= 1\Omega + 2\Omega + 3\Omega + 4\Omega$$
$$= 10\Omega$$

Therefore, total resistance (R) = 10Ω

24. What do you understand by the term closed electric circuit and open electric circuit?

Ans: An electric circuit in which all the components of the circuit are joined to one another, such that a continuous current flows through them is called a closed electric circuit.

An electric circuit in which electric contact is broken at some point such that no current flows through the components of the circuit is called an open electric circuit.

25. What do you understand by the term electric circuit? Name an instrument used for measuring the current.

Ans: A continuous conducting path between the terminals of a source of electric energy conducting wire and other electrical components, along with the electric current flow is called an electric circuit.

The instrument used for measuring the current is Ammeter.

26. What do you understand by the term Series Circuit? Write an expression for the total resistance R when resistor r_1, r_2 and r_3, are connected in series.

Ans: When a number of resistors are connected end-to-end such that the tail end of one resistor is connected to the initial end of the other resistor so as to form a closed circuit then such a circuit is called the series circuit.

$R_s = r_1 + r_2 + r_3$

27. How can the power of an electric motor be increased? (Write any four points)

Ans: The power of an electric motor can be increased by

(i) By increasing the number of turns in the coil.
(ii) By increasing the area cross-section of the coil.
(iii) By increasing the strength of the magnetic field.
(iv) By increasing the magnitude of the current flowing through the coil.
(v) By laminating the soft iron core.

28. What is an electric motor? State the principle of an electric motor.

Ans: An electric motor is a device which converts electric energy into mechanical energy. When a rectangular coil is placed in a magnetic field and current is passed through it, the coil rotates as a result of the forces acting on the coil.

29. What is meant by the term magnetic field lines? List any two properties of magnetic field lines.

Ans: The curved lines along which the iron filings align themselves are called magnetic field lines.

Characteristics of magnetic field lines are:

(i) Magnetic field lines are closed curves.
(ii) Magnetic field lines repel each other.

30. What is an electromagnet? Give two practical uses of electromagnets.

Ans: A Solenoid which has an iron core within it is called an electromagnet.

Electromagnets are employed:

(i) In electrical appliances like electric bell, electric fan, relays etc.
(ii) In electrical motors and generators.

31. What do you mean by the term (i) Solenoid and (ii) Magnetic field.

Ans: An insulated copper wire wound on some cylindrical card board or plastic tube, such that its length is greater than its diameter and it behaves like a magnet when a current is made to flow through it is called a solenoid.

The space surrounding a bar magnet in which its influence in the form of magnetic force can be detected is called magnetic field.

32. Differentiate between overloading and short-circuiting.

Ans: When a large number of appliances are connected in a particular electric circuit. This leads to flow of large amount of current in the electric circuit, which in turn melts the fuse.

When the live wire due to mishandling or some other reason gets connected to the neutral wire. This in turn increases the magnitude of current in the circuit and hence fuse wire melts.

33. State the Fleming's left-hand rule.

Ans: Stretch the thumb, the forefinger and the middle finger of your left hand mutually at right angles to each other, such that the forefinger points in the direction of the magnetic field and the middle finger in the direction of flow of current. Then the thumb gives the direction of motion of conductor.

[Chemistry]

34. What is combination reaction? Give an example.

Ans: When two elements or compounds react chemically to form a single new compound then the chemical reaction that takes place is called a chemical combination reaction.

Example: $2H_2(g) + O_2(g) \rightarrow 2H_2O(l) + \Delta$

Hydrogen Oxygen Water

35. What happens when iron is dipped in Copper sulphate solution? Write down the balanced chemical equation involved.

Ans: When iron is dipped in copper sulphate solution, the blue colour of copper sulphate will slowly turn to light green due to the formation of iron sulphate. The reason is that iron displaced copper from copper sulphate as it is more reactive than copper.

$CuSO_4 + Fe \rightarrow FeSO_4 + Cu$

Blue colour Light green

36. What happens chemically when quicklime is added to water? Give the equation.

Ans: Calcium oxide (Quick lime) reacts vigorously with water to form calcium hydroxide (slaked lime), with the release of large amount of heat energy.

$CaO(s) + H_2O(l) \rightarrow Ca(OH)_2(aq) + \Delta$

Quick lime Slaked lime

37. Give two characteristics of a chemical reaction.

Ans: The characteristics of a chemical reaction are:

a. A chemical reaction is characterized by a change in state.
b. New products are formed during a chemical reaction.
c. There can be change in colour during a chemical reaction.
d. There can be evolution of gases during a chemical reaction.
e. Heat energy released or absorbed during a chemical reaction.

38. What is an oxidation reaction? Give an example of oxidation reaction.

Ans: Oxidation reaction is a reaction in which oxygen is added or hydrogen is removed from a substance.

Example: $2Cu(s) + O_2(g) \rightarrow 2CuO(s)$

Copper Oxygen Copper oxide

39. Give one example of chemical decomposition reaction that is carried out by:
(i) Electric energy and (ii) heat energy

Ans: (i) Chemical decomposition reaction by electric energy/current is

$2H_2O(aq) \rightarrow 2H_2(g) + O_2(g)$

Acidulated water Hydrogen (at cathode) Oxygen (at anode)

(ii) Chemical decomposition reaction by heat energy is

$2HgO(s) \rightarrow 2Hg(l) + O_2(g)$

Mercury (II) oxide Mercury Oxygen

40. What is reducing agent? Give example.

Ans: The substance that causes the addition of hydrogen or removal of oxygen is called a reducing agent.

Example: Hydrogen (H_2), Carbon (C), Carbon monoxide (CO) etc.

41. What are alkalis? Give two examples of alkalis.

Ans: An alkali is a compound which on dissolving in water gives hydroxyl [$OH^+(aq)$] ions as the only negatively charged ions.
Example: NaOH, KOH, $Ca(OH)_2$

42. Name four natural plant materials that can be used as indicators.
Ans: (i) Red cabbage leaves
(ii) Turmeric
(iii) Hydrangea and
(iv) Geranium.

43. What are basic salts? Give two examples.
Ans: The salts formed by the action of weak acids and strong alkalis are called basic salts.
Examples: Na_2CO_3, $NaHCO_3$, K_2CO_3

44. (a) Write the chemical formula for washing soda.
(b) Name any two uses of washing soda, other than washing clothes.
Ans: (a) The chemical formula of washing soda is $Na_2CO_3.10H_2O$
(b) Uses of washing soda are:
(i) It is a common household cleansing agent.
(ii) It is used in the manufacture of caustic soda, borax, sodium phosphate and water glass.

45. Write the uses of Plaster of Paris? (Any two)
Ans: (i) It is used for making blackboard chalk.
(ii) It is used for making fireproof materials.
(iii) It is used in panelling of the roofs in houses.

46. How will you prepare bleaching powder? Give relevant chemical equation.
Ans: It is prepared by passing chlorine gas through freshly prepared slaked lime [$Ca(OH)_2$] paste, till the gas stop reacting with it.

$$Ca(OH)_2 + Cl_2 \rightarrow \underset{\text{Bleaching powder}}{CaOCl_2} + H_2O$$

47. Define the term Salt. What do you mean by family of salts?
Ans: An ionic compound containing a positive ion other than hydrogen ion and a negative ion other than hydroxyl ion or oxide ion is called a salt.
Salts belonging to the same positive or negative radicals are said to belong to a family.

48. A compound that is prepared from gypsum has a property of hardening when mixed with proper quantity of water.
(i) Identify the compound.
(ii) Write the chemical name of the compound.
(iii)What happens when it is heated above 393K?
Ans: (i) The compound name is Plaster of Paris.
(ii) The chemical name of the compound is Calcium sulphate hemihydrate
(iii) When it is heated above 393K, and then its water of crystallisation is lost and formation of anhydrous calcium sulphate takes place which is also known as dead burnt plaster

49. Compound X and aluminium are used to join railway tracks.

(a) Identify the compound X.
(b) Name the reaction.
(c) Write down the reaction.

Ans: (a) Iron (III) Oxide or Fe_2O_3.
(b) Thermite reaction.
(c) $Fe_2O_3 + Al \rightarrow 2Fe + Al_2O_3 + Heat$

50. Why do ionic compounds have high melting points?

Ans: This is linked to strong electrostatic forces which bind the oppositely charged ions. As a lot of energy is required to weaken strong electrostatic forces, therefore, ionic compounds are non-volatile and have very high melting points.

51. Write balanced chemical equation for the reaction taking place
(i) when steam is passed over red-hot iron
(ii)when steam is passed over hot aluminium.

Ans: (i) $3Fe + 4H_2O \rightarrow Fe_3O_4 + 4H_2$
(ii) $2Al + 3H_2O \rightarrow Al_2O_3 + 3H_2$

52. Give reason as to why sodium and potassium are kept immersed in kerosene oil.

Ans: Sodium and potassium are highly reactive elements. They can easily catch fire even in contact with air. Hence, to prevent accidental fires, they are kept immersed in kerosene oil.

53. Define the term 'alloy.' Write two advantages of making alloys.

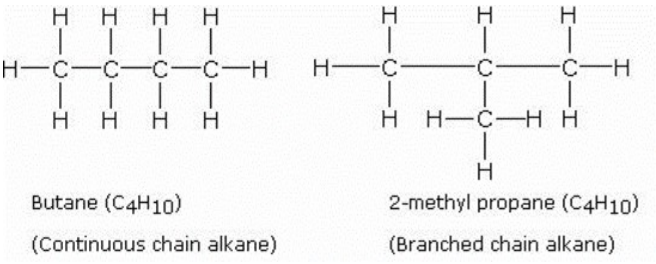
Ans: A homogeneous mixture of two or more metals (or a non- metal) obtained by melting them together, is called an alloy.
The advantages are: (i) Change in hardness and (ii) Resistance to corrosion.

54. Write the IUPAC names of the following:
(a) CH_3OH
(b) CH_3COOH
(c) HCHO
(d) CH_3COCH_3

Ans: (a) Methanol
(b) Ethanoic acid
(c) Methanal
(d) Propanone

55. What are isomers? Write the structural formula of two isomers of butane

Ans: Organic compounds having the same molecular formula but different structural formulae, and hence, different physical and chemical properties are called isomers.
Two isomers of butane are n-butane and isobutane(2-methyl propane).



56. What is allotropy? Name two allotropes of carbon.

Ans: The existence of a chemical element in two or more forms, which may differ in the arrangement of atoms is allotropy. Graphite and diamond are the two allotropes of carbon.

57. What is meant by the term functional group? Write the names of the following functional group (i) – OH (ii) –COOH.

Ans: The functional group in an organic compound is an atom or a group of atoms bonded together in such a unique fashion, that it is usually the site of chemical reactivity of an organic molecule. The names of the functional group are (i) Alkanol (ii) Alkanoic acid

58. What are hydrocarbons? State one difference between saturated and unsaturated hydrocarbons.

Ans: The compounds made of carbon and hydrogen only are known as hydrocarbons.

The compounds of carbon in which each valency is satisfied by a single covalent bond are called saturated carbon compounds, wheras, the compounds of carbon in which the valency between two carbon atoms is satisfied by double or triple covalent bond are called unsaturated carbon atoms.

59. Write two uses of ethanol.

Ans: (1) It is used as a fuel in spirit lamps and stoves.

(2) It is used for sterilising wounds, and, hence, is used as an antiseptic.

60. Give two uses of ethanoic acid.

Ans: i) It is used in the production of vinegar which is used in the food processing industry.

ii) It is used in the formation of esters which is used in the perfume making process.

61. State two differences between soaps and detergents.

SOAPS	DETERGENTS
1. Soaps are the sodium salts of long chain carboxylic acid	1.Detergents are sodium salts of long chain benzene sulphonic acid
2.Soaps are biodegradable	2.Detergents are non-biodegradable.

62. State the modern periodic law. How many groups and periods are there in the modern periodic table?

Ans: 'Properties of elements are the periodic function of their atomic number.'

There are 18 groups and 7 periods in the periodic table.

63. How does the valency vary (i) on going down a group and (ii) in a period on going from left to right?

Ans: (i) On going down a group, valency of all elements remains the same.

(ii) On going from left to right across a period, the valency of elements increases from 1 to 4 and then falls to 1.

64. An element P belongs to group 2 and element Q belongs to group 17 of the long form of the periodic table.

(i) How many valence electrons are there in P?

(ii) What is the valency of P?

(iii) What is the valency of Q?
(iv) Write the chemical formula of the compound of P and Q.

Ans: (i) P has 2 valence electrons.
(ii) The valency of P is 2.
(iii) The valency of Q is 8-7=1
(iv) The formula of the compound is PQ_2.

65. How does the metallic character of elements change (i) on moving down a group and (ii) on moving across a period?

Ans: (i) While moving down a group, the metallic character of the elements increases.
(ii) On moving from left to right across a period, the metallic character of the element gradually decreases.

66. State Mendeleev's periodic law. State one limitation of Mendeleev's classification.

Ans: 'The physical and chemical properties of all elements are the periodic function of their atomic masses.'
One limitation is that the position of hydrogen in his table was not justified.

[Biology]

67. What is sphygmomanometer? What is its purpose?

Ans: Blood pressure is the force that blood exerts against the wall of vessel. It is measured with the help of an instrument called sphygmomanometer.

68. Name the four major chambers of the human heart.

Ans: The four major chambers of the human heart are
(i) Left Atrium
(ii) Right Atrium
(iii) Left Ventricle and
(iv) Right Ventricle

69. What is respiration? Write the full form of ATP?

Ans: Respiration may be defined as a metabolic process in which stepwise breakdown of respiratory substrate occurs with the liberation of energy in the form of ATP.
Full form of ATP is Adenosine Triphosphate.

70. Which enzyme present in saliva breaks down starch? What is the role of saliva in the digestion of food?

Ans: Salivary amylase.
Saliva helps in wetting the food so as that it can easily pass through the soft inner lining of the alimentary canal.

71. State two functions of Lymph.

Ans: Two functions of Lymph are:
(a) It carries digested and absorbed fat from the intestine.
(b) It drains the excess fluid from extra cellular space back into the blood.

72. (i) Define Translocation.
(ii) Name the plant tissue that transports the following:
(a) Water and minerals

(b) Food

Ans: (i) Translocation is process by which prepared food is transported in plants.

(ii) (a) Xylem moves water and minerals from the soil up to the leaves.

(b) Phloem transports product of photosynthesis from leaves to other parts of the plant.

73. Name the process by which autotrophs prepare their own food. List two events which occur during the above process.

Ans: Photosynthesis is the process by which autotrophs prepare their own food.
Light reaction and dark reaction occur during the photosynthesis

74. What are the basic raw materials for photosynthesis other than Light?

Ans: Carbon dioxide (CO_2), water (H_2O), Chlorophyll and Temperature

75. What is the role of (a) teeth and (b) tongue in digestion?

Ans: (a) The teeth help in crushing the food so it can easily pass through the digestive tract.

(b) The tongue helps in mixing the food to form into a bolus.

76. Write any two functions of Liver?

Ans: (a) It secretes a fluid called bile.

(b) It regulates vitamin storage

(c) It produces red blood cells in the embryo.

(d) It removes excess amino acids by the process of deamination.

77. What do you mean by systolic pressure and diastolic pressure?

Ans: Systolic pressure is the pressure of blood inside the artery during ventricular contraction.

Diastolic pressure is the pressure of blood inside the artery during ventricular relaxation.

78. What is excretion? Name the parts of the excretory system in human.

Ans: Excretion is the biochemical process that removes harmful metabolic wastes from the body of living organisms

The parts of the excretory system in human being are Kidney, Ureter, Urinary bladder and Urethra

79. What are villi? Where are they present?

Ans: The digested food is also absorbed by the wall of the small intestine which is lined on the inner side by numerous finger-like projections called Villi.

Villi are present in the small intestine.

80. Define chemotropism. Mention one example of chemotropism?

Ans: The directional movement or orientation of the plants in response to chemical stimulus is known as chemotropism.

During the process of fertilization growth of pollen tube towards the ovule in the ovary.

81. What is reflex action? Give two examples

Ans: Reflex action is a rapid automatic response to stimulus nerve-mediated involuntary action that occurs without the will of an animal.

Example: Blinking of eyes, watering of mouth on seeing the food when hungry.

82. What are hormones? Name the hormones secreted by adrenal gland.

Ans: Chemical communication takes place by means of chemical substances called hormones.

Glucocorticoids and Adrenaline.

83. Name the hormones required for the following: -
    a) Functioning of mammary glands.
    b) Regulation of calcium and phosphate in blood.
    c) Lowering of blood glucose
    d) Development of moustache and beard in human male.

Ans: (a) Oestrogen
(b) Parathormone
(c) Insulin
(d) Testosterone

84. Mention the functions of diencephalon of the forebrain.

Ans: Diencephalon: It is distinguishable in two parts thalamus and hypothalamus. Thalamus controls various types of movement including facial muscles, chewing, swallowing, movement of tongue, etc. and hypothalamus controls hunger, thirst, fatigue, sleep, sweating, body temperature and emotions.

85. What are the major divisions of the fore-brain? Name the covering in brain and the fluid present in between.

Ans: (a) Cerebrum and (b) Diencephalon

The brain is protected by cranial bones and meninges. In between them cerebrospinal fluid are present.

86. Name the part of the brain which controls equilibrium and posture of the body. What is the function of cerebrospinal fluid?

Ans: Cerebellum.

It is serves as a shock absorbing medium and protects the brain and spinal cord against jerks and jolts.

87. Name the four plant hormones or phytohormones.

Ans: (i) Auxins
(ii) Gibberellins
(iii) Cytokinins
(iv) Ethylene

88. Mention one function for each of these hormones.
    (a) Thyroxine
    (b) Insulin

Ans: (a) Thyroxine: Promotes tissue metabolism, growth and differentiation.
(b) Insulin: Regulate lowers blood sugar level.

89. What is Pollination? Name two types of Pollination.

Ans: The transfer of Pollen grains from another to stigma is called Pollination. Two types of pollination are:

(i) Self- pollination
(ii) Cross pollination

90. What are sexually transmitted disease? Name two such diseases.

Ans: The infections disease which spreads from infected person to healthy person by sexual contact is called Sexually Transmitted Disease.

Example: Gonorrhoea and Syphilis.

91. What do you mean by bisexual flower? Give two Example of it.

Ans: A flower having both reproductive whorl is called bisexual flower.

Example: Mustard, tomato etc.

92. Write the full from of STDs, and AIDS.

Ans: STDs = Sexually Transmitted Diseases.

AIDS = Acquired Immune Deficiency Syndrome.

93. What is vegetative propagation? In which type of plant is it performed?

Ans: Many plants reproduce by means of vegetative parts such as stem, roots leaves and buds. The formation of a new individual from any vegetative part of the plant body is known as vegetative propagation.

Vegetative propagation performed in higher plants and Ornamental plants

94. In a complete flower, identify the following:

(i) Part that produces pollen grain.
(ii) Part that transfers male gametes to the female gametes.
(iii) Part that is sticky to trap the pollen grain.
(iv) Part that develops into a fruit.

Ans: (i). Anther or stamen / Androecium.
(ii) Style or pollen tube.
(iii) Stigma
(iv) Ovary

95. What is meant by Variation and Evolution?

Ans: Variation: The differences among the individuals of a plant or animal of a species are called variations.

Evolution: It is gradual process by which the present diversity of plants and animals arose from the earliest and primitive organisms.

96. The wings of a bird and the wings of a bat not considered homologous. Why?

Ans: The wings of a bat are skin fold between the elongated fingers, while the wings of bird are feathery covering all along the arms though the basic design of these wings are completely different, they look similar because they have a common function so the wings of bird and the wings of bat not considered homologous.

97. Discuss the monohybrid ratio given by Mendel's.

Ans: In an experiment a cross between purple flower and white flower produces the F_1 progeny all with purple flowers when the F_1 progeny were allowed for self pollination the F_2 progeny produced were showing both the purple and white flower in the radio of 3:1 this is called a monohybrid ratio.

98. Define the following terms: (i) Phenotype and (ii) Genotype.

Ans: (i) Phenotype: An external appearance or body character of an organism irrespective of its genetic make-up is said to be phenotype.

(ii) Genotype: The genetic constitution of an individual is said to be genotype.

99. Define inheritance or heredity? Who is known as the father of genetics?

Ans: Heredity is the transmission of traits from over generation to the following generation.

Gregor Johannes Mendel.

100. What is the common name and the scientific name of the plant on which Mendel performed his experiments? Give one reason why Mendel chose this plant for his experiments.

Ans: The common name is Garden Pea and scientific name is *Pisum sativum*.

Mendel chose the Pea plant for his experiments due to the following reasons:

a. The flowers of this plant are bisexual.
b. They are self- pollinating.
c. They are annual plants.
d. The different physical characteristics are easy to recognize and study.

Section-C
Short Answer Questions (3 Marks)

[Physics]

1. Distinguish between real image and virtual image.

Ans.

Real Image	Virtual Image
1.The rays of light after reflection or refraction actually meet at a point	1. The rays of light after reflection or refraction appear to meet at some other point or appear to diverge from some other point.
2.It can always be taken on the screen	2.It cannot be taken on a screen
3.It is always inverted	3.It is always erect, but laterally inverted

2. What is refraction of light? The velocity of light in air is $3X10^8$m/s and in glass is $2X10^8$ m/s. Find the refractive index of the glass.

Ans. The phenomenon due to which a ray of light deviates from its path, when the ray of light is travelling from one optical medium to another optical medium, is called refraction of light.

$$\text{Refractive index, } n = \frac{velocity\ of\ light\ in\ air}{velocity\ of\ light\ in\ glass}$$
$$= \frac{3\,X10^8}{2X10^8}$$
$$= 1.5$$

3. State Snell's law of refraction. State two factors on which lateral displacement of emergent ray depends.

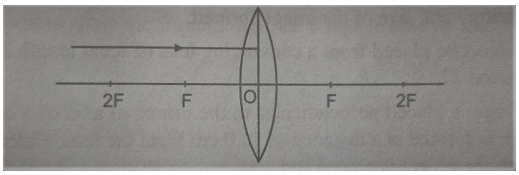
Ans. The ratio of the sine of angle of incidence to the sine of angle of refraction is a constant.

Lateral displacement depends on the following factors:

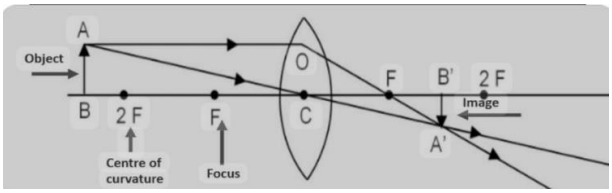
(a) It increases with the increase in the angle of incidence.

(b) It increases with the increase in the thickness of the glass slab.

4. In the diagram given, complete the path of light beyond the lens



Ans



5. Define Power of a lens. A convex lens has focal length of 40 cm. Calculate its power.

Ans. The reciprocal of focal length in metres is called power of a lens.

Here, f=40 cm=$\frac{40}{100}$=0.4m

$$P=\frac{1}{f}$$

$$P=\frac{1}{0.4}$$

$$= 2.5D$$

6. What is a prism? State the factors affecting angle of deviation.

Ans. Prism is a piece of glass or any other transparent material, bounded by two triangular and three rectangular surfaces.

Factors affecting angle of deviation are:

(i) Angle of incidence; (ii) Angle of prism; (iii) Refractive index of the material of prism; and (iv) Colour of light.

7. A person needs a lens of power -4.5D for correction of her vision.

(i)What kind of defect is she suffering from?

(ii)What is the focal length of the corrective lens?

(iii)What is the nature of the corrective lens?

Ans. (i)Myopia

(ii) f=$\frac{1}{P}$

$$f=\frac{1}{-4.5} = -0.22\ m\ or\ -22cm$$

(iii) The lens is a concave lens

8. Why does the sun appear bigger during sunset or sunrise?

Ans. During sunset or sunrise, the rays of light travel through maximum length of the atmosphere, therefore refraction is also maximum and hence the apparent position of the sun is very much closer to the eye. Thus, it appears bigger.

9. What is scattering of light? Why does the sky appear dark to an astronaut?

Ans. The phenomenon due to which a particular wave of light is absorbed by a particle, which is greater in diameter than the wavelength of light and then transmits in all possible directions is called scattering of light.

In space, there is no atmosphere thus no scattering takes place. Hence the sky appears darker to an astronaut.

10. What is a rainbow? How is it formed?

Ans. A rainbow is a natural spectrum, form due to dispersion of light in nature.

The rainbow is produced due to the dispersion of sunlight by tiny droplets of water suspended in air, just after rain.

11. Why do planets not twinkle?

Ans. Planets do not twinkle because they are very close to the earth compared to the stars. Their apparent positions also change with the change in density of different layers

of the atmosphere. However, the size of their apparent image is still large and hence they do not appear to twinkle.

12. (a)Define electric current and write its SI unit.
(b)An electric bulb draws a current of 0.2A when the voltage is 220V.Calculate the amount of electric charge flowing through it in one hour.

Ans. (a) The rate of flow of charge from a body at a higher potential to a body at lower potential is called electric current. Its SI unit is Ampere. (A)

(b) Using, $I=\frac{q}{t}$,

$q=It$

Here, I=0.2A and t= 1hr=1X60x60s

$q=0.2 \text{ X } 1x60x60$

$q=720$ C

13. (a)State the relationship between work, charge and potential difference for an electric circuit.
(b)Calculate the charge on one electron.

Ans. (a) Work = Charge X Potential difference

(b) $6.25 \text{ X } 10^{18}$ have a charge of = 1C

1 electron has a charge of $=\frac{1}{6.25X10^{18}}$ C

$= 0.16 \text{ X } 10^{-18}$ C

$= 1.6 \text{ X } 10^{-19}$C

14. (a)State Ohm's law.
(b) Give the factors of resistance of a wire on which it depends

Ans. (a) Ohm's law states that the current flowing through a conductor is directly proportional to the potential difference at its ends provided the physical conditions of the conductor remains the same.

(b) The resistance depends on the following factors:

(i) length of the wire, (ii) Area of cross section of the wire, (iii)nature of material of the conductor, (iv) temperature

15. An electric bulb draws a current of 0.8A and works on 250 V on the average eight hours a day. If the energy costs ₹ 3.00 per Kwh, calculate the monthly bill.

Ans. Electrical energy in a month (30days) = power x time x days

= current x potential x time x days

= 0.8 x 250 x 8 x30

= 48000 watt h

=48kWh

Monthly bill = ₹ 3.00 X 48

= ₹144.00

16. (a)What do you understand by the term electric fuse?
(b) How does a fuse wire protect an electric circuit?

Ans. (a) A fuse is a safety device in an electric circuit

(b) A fuse wire protects an electric circuit because of its low melting point and high resistance. When the electric circuit is overloaded, the fuse wire will melt and stop the flow of current in a given circuit.

17. State the factors on which the force on the rod pushed out of the magnetic field depends.

Ans. It depends upon:
(a)Strength of the current flowing through the rod
(b) Magnetic intensity of the magnet
(c) length of the rod within the magnet

18. State the function of (i) Coil (ii) Commutator (iii) Brush in an electric motor

Ans. (i)The function of the coil is to set up an electric field when the current flows.
(ii) The function of the commutator is to alter the direction of the current after every
half rotation
(iii) The function of the brushes is to supply a continuous current to the rotating coil.

19. List three characteristics of a magnetic field.

Ans.(a)Strength of a magnetic field is a vector quantity.
(b) The relative strength of a magnetic field is shown by the degree of closeness of magnetic field lines
(c) The strength of a magnetic field at a given point depends upon its distance from the poles of a bar magnet.

20. (a) What do you understand by the term earthing?
(b) How does earthing protect the user from getting an electric shock?

Ans. (a) By earthing, we mean that the metallic body of the appliance is connected to a thick copper wire which is buried in the earth to prevent from electric shock
(b) When an appliance is earthed, even if there is a short circuit, the current from its metal body flows into the earth instead of a user thus prevent the user from getting electric shock.

[Chemistry]

21. What changes are observed when hydrated ferrous sulphate is heated strongly? State the type of chemical reaction.

Ans: The following changes were observed:
i) When hydrated ferrous sulphate is heated strongly , its colour changes from green to brownish black mass of Ferric oxide.
ii) A colourless gas is evolved that smells like burning sulphur. This gas is sulphur dioxide.
The type of reaction is a Thermal decomposition reaction.

22. What are amphoteric oxides? Give a balanced equation for the reaction of an amphoteric oxide with a base and an acid.

Ans: An amphoteric oxide is an oxide that acts either as a base or an acid in a reaction to produce salt and water. An example of amphoteric oxide is aluminium oxide.

$Al_2O_3 + 6HCl \longrightarrow 2AlCl_3 + 3H_2O$

$Al_2O_3 + 2NaOH \longrightarrow NaAlO_2 + H_2O$

23. Name
i) Two elements that have a single electron in their outermost shell
ii) Two elements that have two electrons in their outermost shell
iii) Two elements with filled outermost shell

Ans: i) Lithium (Li) and Sodium(Na)
ii) Magnesium (Mg) and Calcium(Ca)
iii) Neon(Ne) and Argon(Ar)

24.During the extraction of metals, electrolytic refining is used to obtain pure metals..

i) Which material will be used as anode and cathode for refining of copper in this process?
ii) Suggest a suitable electrolyte.
iii) What is anode mud?

Ans: i) Anode is impure copper (containing impurities like sulphur or other metals) and the Cathode is Pure copper.
ii) Electrolyte is acidified copper sulphate.
iii) Anode mud is formed when the impurities present in the anode, such as sulphur and other metals are released during the electrolysis process. These impurities settle to the bottom of the electrolytic cell as a sludge- like material, hence the name "anode mud".

25. i) What is meant by pH of a substance?
ii) The pH of substance A is 5 and the pH of B is 1. Which substance basic and which one is acidic . Why?

Ans: pH which stands for power of hydrogen, is a quantitative measure of the acidity and basicity of aqueous or other liquid solutions.
Substance A is acidic and substance B is basic. This is because a pH less than 7 is acidic and pH greater than 7 is basic.

26. State the differences between oxidizing and reducing agents.

Ans:

OXIDISING AGENTS	REDUCING AGENTS
1. Substances that causes the addition of oxygen or removal of hydrogen.	1. Substances that causes the addition of hydrogen or removal of oxygen.
2. Reduction occ2rs in oxidizing agents during redox reactions.	2. Oxidation occurs in reducing agents during redox reactions.
3. Examples are H_2O_2 , HNO_3 .	3. Examples are C, CO .

27. What is water of crystallization? Write the name and formula of two salts containing water of crystallization.

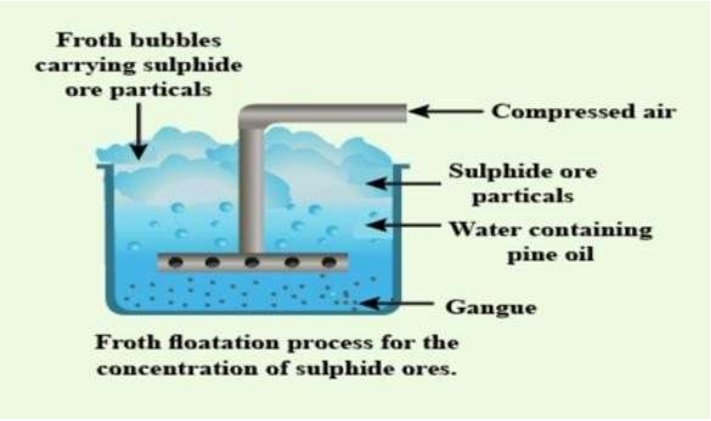
Ans: The fixed number of water molecules that are in loose combination with one molecule of a salt, is called water of crystallization.
Two examples of salts containing water of crystallization are:
i) Gypsum or calcium sulphate bihydrate ($CaSO_4 . 2H_2O$)
ii) Washing Soda or Sodium carbonate decahydrate ($Na_2CO_3 . 10H_2O$)

28.(i) Write down the chemical reaction that takes place between Lead nitrate and Potassium iodide
(ii)What is the colour of the precipitate formed in the above reaction? Name the precipitate.

Ans: (i) $PbNO_3$ (aq) + KI(aq) $\longrightarrow$ PbI_2 (↓) + $2KNO_3$ (aq)
(ii) The colour of the precipitate is yellow. The precipitate formed is Potassium Nitrate.

29. Draw a labeled diagram for the Froth Floatation Process

Ans:



Froth floatation process for the concentration of sulphide ores.

30. Write down the general formula of Ketones. Name the first member of this homologous series and mention its IUPAC name. What is its molecular formula? 1+1+1=3

Ans: The general formula of Ketones is R-CO-R'.

The first member of the Ketone family is Acetone and its IUPAC name is Propanone.

Its molecular Formula is CH_3-CO-CH_3.

31. i) Name the raw materials required to manufacture Baking Soda.

ii) Write the Overall equation involved in the manufacture of Baking Soda.

iii)Write down two characteristics of Baking soda

Ans: i) The raw materials required to manufacture Baking Soda are Sodium chloride, Ammonia, Limestone.

ii) The overall equation for the manufacture of Baking Soda is as follows:

$NaCl + H_2O + NH_3 + CO_2 \longrightarrow NH_4Cl + NaHCO_3$

iii) Baking Soda or Sodium bicarbonate or Sodium hydrogen carbonate is sparingly soluble in water.

Baking Soda is a fine white crystalline salt basic in nature.

32. Metal Compound 'A' reacts with dilute HCl to produce effervescence. The gas evolved extinguishes a burning candle. Write a balanced chemical equation for the reaction.

Ans: Since the gas evolved is with effervescence and extinguishes burning candle, it is expected to be CO_2 gas. As Calcium Chloride($CaCl_2$) is formed as one of the products, this means that the substance ' A' can be Calcium carbonate($CaCO_3$). It reacts with dilute hydrochloric acid as:

$CaCO_3(s) + 2HCl\ (aq) \longrightarrow CaCl_2(aq) + CO_2(g) + H_2O(l)$

33. An element A has atomic number 19.

i) Name this element and write its electronic configuration

ii) To which period does this element belong? How many elements are there in this period?

iii) To which group does this element belong to?

Ans: i) The element is Potassium (K) . Its electronic configuration is 2,8,8,1

ii) Potassium belongs to the fourth period as it has four shells. There are 18 elements in this period

iii) As there is one valence electron in the outermost shell, therefore it belongs to Group 1.

34. In Thermite welding

(i) What is the Thermite mixture?

(ii) What is the ignition mixture?

(iii) Write the chemical equation for the Thermite welding process.

Ans: (i) The thermite is a mixture of Ferric oxide (Fe_2O_3) and powdered Aluminium.

(ii) The ignition mixture is a mixture of Magnesium powder and Barium peroxide.

(iii) The equation is as follows:

$$Fe_2O_3 + 2Al \xrightarrow{\Delta} 2Fe\ (l) + Al_2O_3(s) + Heat$$

35. Explain esterification with the help of a chemical equation.

Ans: A chemical reaction in which an alcohol reacts with carboxylic acid to form a sweet smelling ester. This process of formation of esters is called Esterification.

$$\underset{\text{Ethanoic acid}}{CH_3COOH} + \underset{\text{Ethanol}}{C_2H_5OH} \xrightarrow{\text{conc. } H_2SO_4} \underset{\text{Ethyl Ethanoate}}{CH_3COOC_2H_5} + \underset{\text{Water}}{H_2O}$$

36. Differentiate between Roasting and calcination.

Ans: The major differences between Calcination and Roasting are as follows:

CALCINATION	ROASTING
1. Calcination is a process in which ore is heated in the absence of air or limited supply of air	1. Roasting involves the heating of the ore in the presence of air or oxygen
2. Calcination involves the thermal decomposition of carbonate ores.	2. Roasting is carried out for sulphide ores
3. During calcination, carbon dioxide is given out.	3.During Roasting, sulphur dioxide is produced

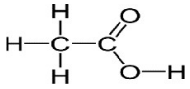
37. Draw the structure of the following compounds: 1+1+1=3

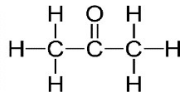
(i) Ethanoic acid

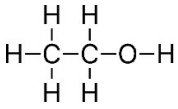
(ii) Propanone

(iii) Ethanol

Ans:

(i) ETHANOIC ACID 

(ii) PROPANONE 

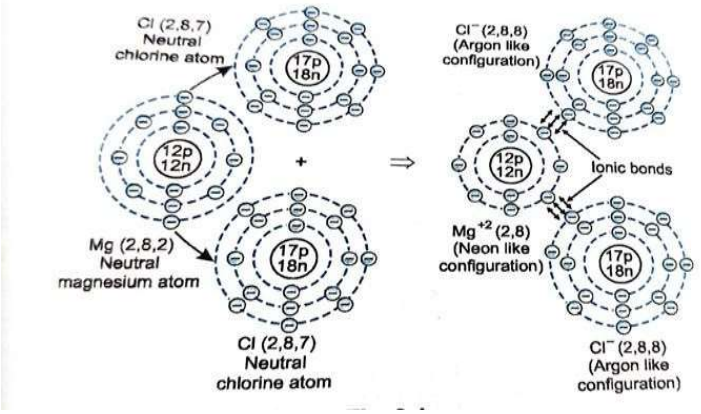
(iii) ETHANOL 

38. Explain the formation of $MgCl_2$ with the help of a geometric diagram.

Ans: The electronic configuration of Magnesium atom is 2,8,2. It is an electropositive element which can donate two electrons from its valence shell to form Mg^{+2}.

$Mg - 2e \longrightarrow Mg^{+2}$

The electronic configuration of Chlorine atom is 2,8,7. It is an electronegative element which can accept one electron. Thus Magnesium will donate its electrons to two chlorine atoms and therefore form Magnesium chloride . This formation can be represented by a geometric diagram as follows:



39. What happens when Ethanol and excess Concentrated Sulphuric acid are mixed? Write the chemical equation for the reaction. What is the function of sulphuric acid in this reaction?

Ans: When ethanol is mixed with excess of concentrated Sulphuric acid and heated to 170◦ C , the sulphuric acid removes a molecule of water from its molecule to form unsaturated ethene gas.

$CH_3\text{-}CH_2\text{-}OH + H_2SO_4\,(conc) \longrightarrow CH_2{=}CH_2 + H_2SO_4.H_2O$

Ethanol — Sulphuric acid — Ethene — Hydrated sulphuric acid

In this reaction, Concentrated Sulphuric acid acts as a Dehydrating agent.

40. In the extraction of Aluminium from Aluminium oxide,

i) Write the formula of Cryolite. Why is it added to aluminium oxide ?

ii) Write the reactions that occur at the cathode and anode during this process

Ans: i) The formula of Cryolite is Na_3AlF_6 . Cryolite is added to lower the melting point of Alumina and make alumina a good conductor of electricity for the electrolysis process.

ii) <u>Reactions at cathode:</u>

$Al^{+3} + 3e^- \longrightarrow Al$

Aluminium ion — electron — Aluminium atom

<u>Reactions at anode</u>:

$O^{2-} - 2e^- \longrightarrow O$

Oxide ion — electron — Oxygen atom

$C + 2O \longrightarrow CO_2$

Carbon — Oxygen — Carbon dioxide

[Biology]

41. (a) Define Respiration.

(b) Give reasons for the following

i) The lung alveoli are covered with blood capillaries.

ii) The walls of trachea is supported by cartilage rings.

Ans: (a) Respiration is defined as the catabolic process in which stepwise breakdown of respiratory substrate (mainly glucose) occurs with the liberation of energy in the form of ATP.

(b) (i) The lung alveoli are covered with blood capillaries because the thin walled capillaries help in easy gaseous exchange.

(ii) The walls of trachea is supported by cartilage rings to prevent the air passage from collapsing.

42. State the functions of the blood vessels of human circulatory system.

Ans: The functions of the blood vessels of human circulatory system are

i. Arteries carry blood away from the heart to various organs.
ii. Veins collect blood from different organs and bring it back to the heart.
iii. Capillaries help in the exchange of materials between blood and surrounding tissues across their thin walls.

43. (a) Name the three pairs of salivary glands in humans. Where do they open?
(b) Which enzyme present in saliva breakdowns starch?

Ans: (a) The three pairs of salivary glands in humans are Parotid glands, Submandibular glands and Sublingual glands.

They open into the buccal cavity (mouth).

(b) Salivary amylase present in the saliva helps in breaking down starch.

44. State the difference between Transpiration and Translocation.

Ans:

Transpiration	Translocation
1. It is the loss of water vapour from the aerial parts of the plant.	1. It is the transport of food materials from one part of the plant to another.
2. It occurs through xylem .	2. It occurs through phloem.
3. It involves physical forces.	3. It requires metabolic energy.

45. (a) Define excretion. Name two excretory organs in humans.
(b) Give the functional unit of Kidney and Nervous system.

Ans: (a)Excretion is the biological process that removes harmful metabolic wastes from the body of living organisms.

Two excretory organs in humans are Lungs and Kidneys

(b) The functional unit of Kidney are Nephrons.

The functional unit of nervous system is Neuron.

46. What are stomata? Write down two functions of stomata.

Ans: Stomata are tiny pores present on the surface of the leaves.

Two functions of stomata are

i. Gaseous exchange in plants takes place through stomata.
ii. Plants lose large amount of water through stomatal pores.

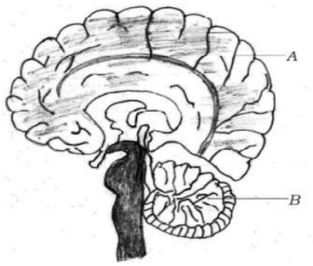
47. Differentiate between aerobic and anaerobic respiration

AEROBIC RESPIRATION	ANAEROBIC RESPIRATION

Ans

1. It takes place in the presence of oxygen	1.It takes place in the absence of oxygen.
2. It takes place in the cytoplasm and mitochondria	2.It takes place only in the cytoplasm.
3. Pyruvate breaks down into carbon dioxide, water and energy	4.Pyruvate breaks down into carbon dioxide, ethyl alcohol / lactic acid and energy

48. In the given diagram of human brain, name the parts labelled A and B and write their functions (any one function for each)



Ans: A – Cerebrum- Cerebrum helps in thinking.
B- Cerebellum – Cerebellum helps in maintaining posture.

49. Name the animal hormone responsible for
(a) Regulating protein metabolism and body growth
(b) Lowering blood sugar level
(c) Regulating calcium and phosphorus metabolism.

Ans: (a)Regulating protein metabolism and body growth – Growth hormone
(b) Lowering blood sugar level-Insulin
(c) Regulating calcium and phosphorus metabolism –Parathormone

50. (a) Define nerve impulse.
(b) Which structure in a neuron helps to conduct a nerve impulse
(i) Towards the cell body
(ii) Away from the cell body
(c) Define Synapse.

Ans: (a) A nerve impulse is an electrical signal that travels along an axon.
(b) (i). Towards the cell body -Dendrites
(ii). Away from the cell body -Axon
(c) Synapse is the point of contact between the terminal branches of the axon of one neuron with the Dendrites of another neuron.

51. What are plant hormones? Write down two important functions of Cytokinins.

Ans: Plant hormones or Phytohormones are naturally occurring chemical substances present in plants and bring about control and coordination various activities in plants.
Two important functions of Cytokinins are:
i. It promotes cell division in plants and also helps in breaking the dormancy of seeds and buds.
ii. It also delays ageing in leaves and also promote opening of stomata.

52. State the functions of sensory neuron, motor neuron and connector neuron.

Ans: The functions of :
Sensory neuron - To transmit impulses from the receptors to the brain and spinal cord.
Motor neuron – Carry instructions from the brain and spinal cord to various organs.

Connector neuron – Interconnect the sensory neuron and motor neuron.

53. Give three advantages of vegetative propagation.

Ans. Three advantages of vegetative propagation are:

1. Plants raised by vegetative propagation can bear flowers and fruits earlier than those produced from seeds.
2. Some plants like bananas, seedless grapes, potato, rose which cannot produce viable seeds.
3. It is an easier, less expensive and rapid method of propagation.

54. (a) Differentiate between self and cross pollination.

(b) Name two agents of pollination.

Ans. (a) Self-pollination: The transfer of pollen grains from the another of a flower to the stigma of the same flower or of another flower borne on the plant is called self-pollination.

Cross pollination: The transfer of pollen grains from anther of a flower of one plant to the stigma of a flower of another plant of the same species is called cross pollination.

(b) Two agents of pollination are: wind and water.

55. Give three differences between pollination and fertilization.

Ans.

Pollination	Fertilization
It is the transfer of pollen grains from anther to the stigma of a flower.	It is the fusion of male and female gametes.
It is a physical process	It is a physico-chemical (biological) process.
It occurs in seed plants	It occurs in plants and animals of various types

56. Define: (a) Implantation; (b) Placenta; (c) Parturition

Ans: (a)After fertilization, the embryonic development begins in the fallopian tube. The zygote moves from fallopian tube to the uterus and gets implanted in the lining of the uterus. This process is called implantation.

(b) The organ by which the embryo is attached to the walls of the uterus is called placenta.

(c) The act of giving birth to a baby is known as parturition.

57. Give three differences between Acquired and Inherited traits.

Ans:

Acquired traits	Inherited traits
These are somatic variations	These are genetic variations
These develop due to the effect of environmental factors, use and disuse of organs and special efforts	These develop due to reshuffling of genetic material and mutations.
Eg: learning of dance, music etc.	Eg: Attached or free earlobe and curly hair

58. State Darwin's theory of natural selection

Ans: (i) All animals and plants have a natural tendency to produce offsprings.

(ii) The number of offspring is maintained at a constant level.
(iii) Struggle for existence.
(iv) Variation and heredity.
(v) Survival of the fittest.
(vi) Origin of species.

59. What are homologous organs? Give examples.

Ans: The organs which are similar in basic structure and embryonic origin but perform different functions in different species are called homologous organs.

Example: The fore limbs of human are used for holding objects, forelimbs of a bird are modified for flying purpose, forelimbs of lizard are modified for creeping and the forelimbs of a frog act as shock absorbers after a leap.

60. Explain Mendel's law of dominance.

Ans: When a pair of contracting characters are present together, only one is able to express itself in the F1 generation while others remain suppressed.

A cross between purple flower and white flower produces the F1 progeny all with purple flowers. When the F1 progeny were allowed for self-pollination the F2 progeny produced were showing both the purple and white flowers in the ratio of 3:1.

Section-D
Long Answer Questions (4 Marks)

[Physics]

1. State any Four common characteristics of light?

Ans: The Four common characteristics of light are as follows:

(i) The velocity of light in vacuum is $3 \times 10^8\ m/s$
(ii) Light gets refracted when it travels from one medium to another medium.
(iii) Light is an invisible energy which on rebounding from the surface of matter cause sensation of vision.
(iv) Light travels along a straight-line path, but it is an electromagnetic wave which is transverse in nature.
(v) Light produces shadows, when obstructed by opaque objects.
(vi) The velocity of light changes while travelling from one transparent medium to another transparent medium.

2. (a) What is reflection of light?
(b) You are provided a convex mirror, a concave mirror and a plane mirror. How will you distinguish between them, without touching them or using any other apparatus?

Ans: (a) When a ray of light travelling through a certain medium strike on opaque, but a smooth polished surface, it bounces of the surface in to the original medium the phenomenon is called reflection of light.

(b) (i) If the image is erect and equal in size and it does not change its size and nature on moving the mirror closer or away from the face, the mirror is plane.

(ii) if the image is erect and magnified and it becomes inverted on moving the mirror away from the face, the mirror is concave.

(iii) If the image is erect and diminished and it remains erect on moving the mirror away from the face, the mirror is convex.

3. (a) Define spherical mirror?
(b) A convex lens produces a real and inverted image 2.5 times magnified at a distance of 25 cm from the lens. Calculate focal length of the lens.

Ans: (a) A mirror which is made from a part of a hollow sphere is called a spherical mirror.

(b) Solution: Magnification (m) = - 2.5 (real image)
Distance of the image from the lens (v) = 25 cm
Distance of the object from the lens (u) = ? (to be calculated)
Focal length of the lens (f) = ? (to be calculated)
We know that, $m = \frac{v}{u}$

$\Rightarrow -2.5 = \frac{25}{u}$

$\Rightarrow u = \frac{25}{-2.5}$

$\Rightarrow u = \frac{\cancel{25} \times 10}{-\cancel{25}}$

$\Rightarrow u = -10$ cm

Again, we know that: $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$

$\Rightarrow \frac{1}{25} - \frac{1}{-10} = \frac{1}{f}$

⇨ $\frac{1}{f} = \frac{2+5}{50}$

⇨ $\frac{1}{f} = \frac{7}{50}$

⇨ $f = \frac{50}{7}$

⇨ $f = 7.14$ cm

Thus, the focal length of the lens is 7.14 cm

4. (a) What do you understand by the term accommodation of eye?
   (b) What is presbyopia?
   (c) Why do we see a rainbow in the sky only after rainfall?
   (d) What is dispersion of light?

Ans: (a) The process by which the ciliary muscles alter the focal length of the crystalline lens,
so as to focus nearer or far-off objects clearly on the retina is called the accommodation of the eye.
(b) Presbyopia is an old age defect in which a person cannot see the near by object clearly but can see the far object clearly.
(c) The rainbow is produced due to the dispersion of sunlight by tiny droplets of water suspended in air, just after rain.
(d) The splitting-up of white light into its component colours is called dispersion.

5. (a) What causes dispersion of white light?
   (b) A person is advised to wear spectacles with convex lenses. What type of defect of vision is he suffering from?

Ans: (a) White light is a mixture of several waves of electromagnetic radiations, whose wavelengths vary from 700 nm to 400 nm. The highest wavelengths produce red sensation in the eye, whereas the lowest wavelengths produce violet sensation. The wavelengths between the 700 nm and 400 nm produce the effect of indigo, blue, green yellow and orange. These waves travel with same speed ($3\times10^8\ ms^{-1}$) in vacuum.
However, on passing through the prism, the waves of different wavelengths slow down, the red showing down the least and violet the maximum. This in turn bends the waves of different angles. Thus, the white light splits to component colours or the dispersion of white light take place.
(b) He is suffering in Long-sightedness or Hypermetropia

6. (a) Name an instrument used for measuring the current?
   (b) What do you understand by the term electric potential?
   (c) State unit of electric potential and define it.

   Ans: (a) Ammeter
   (b) The amount of work done in moving a unit positive charge from infinity to a given point in an electric field is called the electric potential at that point.
   (d) S.I. unit of electric potential is Volt (V). When one coulomb of an electric charge is brought from infinity to a given point in an electric field. Such that the work done is one joule them the electric potential at that point is one volt.

7. What do you understand by the term parallel Circuit. Give three characteristics of a parallel circuit.

   Ans: When a number of resistors are connected in such a way that they have a common positive terminal and a common negative terminal then the resistors are said to be connected in parallel.

Characteristics of a parallel circuit.

(a) The potential difference for all resistors in parallel remains constant i.e. it is same for all the resistors.

(b) The current branches in the inverse ratio of the resistances of the resistors from this it implies that more the resistance of a resistors less the current flowing through it.

(c) The total amount of current entering or leaving the parallel circuit is equal to the sum total of currents flowing in individual resistors.

i.e. $I = I_1+I_2+I_3$

8. Define the term resistivity of a material. Four resistors of resistance 24Ω, 12Ω, 8Ω and 4Ω are connected in parallel. Calculate the total resistance of the circuit.

Ans: Resistivity is the amount of resistance offered by a conductor of unit length and unit area of cross-section, such that current enters and leaves from its opposite faces is called its resistivity or specific resistance.

Here, $r_1 = 24\Omega$, $r_2 = 12\Omega$, $r_3 = 8\Omega$, $r_4 = 4\Omega$

We know that, Resistance in a parallel circuit is given by the expression,

$$\frac{1}{R} = \frac{1}{r_1} + \frac{1}{r_2} + \frac{1}{r_3} + \frac{1}{r_4}$$

$$= \frac{1}{24} + \frac{1}{12} + \frac{1}{8} + \frac{1}{4}$$

$$= \frac{\frac{1+2+3+6}{24}}{}$$

$$= \frac{12}{24}$$

$$= \frac{1}{2}$$

$$Hence, Total\ resistance(R_p) = 2\Omega$$

9. Give four differences between permanent magnet and an electromagnet.

Ans: The differences between permanent magnet and an electromagnet are:

Electromagnet	Permanent magnet
1. An electromagnet exhibits a much stronger magnet field.	1. A permanent magnet does not exhibit a very strong magnetic field.
2. The polarity of an electromagnet can readily be reversed by changing the direction of current.	2. The polarity of a permanent magnet is fixed.
3. An electromagnet can readily be demagnetized by stopping the current through the solenoid.	3. Permanent magnet cannot be readily demagnetized.
4. The strength of the electromagnet can be changed easily by adjusting the current or the number of turns.	4. In case permanent magnets, no such change can be done.

10. (i) What is an electric generator?

(ii) State the principle of an electric generator.

(iii) How can you convert an AC generator to a DC generator?

Ans: (i) An electric generator is a device which converts mechanical energy into electric energy.

(ii) It works on the principle of electromagnetic induction. The principle of electromagnetic induction states that the change in the magnetic field around the conductor generates electric current in the circuit.

(iii) An AC generator can be changed to a DC generator by replacing the slip rings with split rings.

[Chemistry]

11. (a) What do you understand by the term chemical equation?
(b) What is observed when a solution of potassium iodide is added to a solution of lead nitrate in a test tube?
(c) What type of reaction is this?
(d) Write a balanced chemical equation to represent the above reaction.

Ans: (a) A chemical equation is a statement that describes a chemical reaction in terms of symbols and formulae.

(b) Yellow Precipitate is formed when a solution of potassium iodide is added to a solution of lead nitrate in a test tube.

(c) Precipitation reaction.

(d) $Pb(NO_3)_2 + 2KI \rightarrow PbI_2 + 2KNO_3$

12. (a) Define precipitation reaction or Double displacement reaction?
(b) Identify (i) the substance oxidized and (ii) the substance reduced (iii) oxidising agent (iv) reducing agent in the following reaction:

$$ZnO + C \rightarrow Zn + CO$$

Ans: (a) When the aqueous solutions of two ionic compounds react by exchanging their ions/radicals, to form two or more new compounds, such that one of the products formed is an insoluble salt, and hence, forms a precipitate, that the double displacement reaction is said to be a precipitation reaction.

(b) (i) The substance oxidized → C
(ii) The substance reduced → ZnO
(iii) Oxidising agent → ZnO
(iv) Reducing agent → C

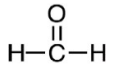
13. (a) What do you mean by water of crystallization?

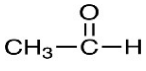
(b) A compound that is prepared from gypsum has a property of hardening when mixed with proper quantity of water.
(i) Identify the compound.
(ii) Write the chemical name of the compound.
(iii) For what purpose it is used in hospitals?

Ans: (a) The fixed number of water molecules that are in loose combination with one molecule of a salt, is called water of crystallization.

(b) (i) The compound name is Plaster of Paris.
(ii) The chemical name of the compound is Calcium sulphate hemihydrate.
(iii) Plaster of Paris when mixed with water rapidly sets into a hard mass. It is this property that is utilized to keep the fractured bones in a fixed position by applying Plaster of Paris around the affected bones.

14. (a) What do you understand by saturated and unsaturated hydrocarbons?
(b) Write down the common names of the following:

(i) 

(ii) 

Ans: (a) Saturated hydrocarbons are hydrocarbons which contain single bond between any two carbon atoms whereas unsaturated carbons are hydrocarbons which contain at least one double and triple bond between any two carbon atoms.

(b) (i) Formaldehyde

(ii) Acetaldehyde

15. (a) A non-metal X exists in two different forms Y and Z. Y is the hardest natural substance, whereas Z is a good conductor of electricity. Identify X, Y and Z.

(b) Give two physical properties of Z.

(c) X is considered to be versatile. Why?

Ans: (a) Amongst the allotropes of Carbon, diamond is the hardest naturally occurring substance, which does not melt. Graphite is another allotrope of carbon that has luster and a good conductor of electricity. Therefore, X is Carbon, Y is Diamond and Z is Graphite

(b) Z which is graphite, is a soft and is a good conductor of electricity.

(c) i. Carbon is versatile because it forms single double and triple covalent bonds.
ii. It shows catenation
iii. It is tetravalent in nature.

16. (a) Why there is a necessity for the Classification of elements? Give three reasons

(b) What are groups and periods in the periodic table?

Ans: (a) Following are the reasons for the classification of elements:

(i) Classification may help to study elements better.

(ii) Classification may lead to correlate the properties of elements with some fundamental properties, characteristic to all elements.

(iii) Classification may further reveal relationship between one element and another element.

(b) The vertical columns in the periodic table are called groups.
The horizontal rows in the periodic table are called periods

17. (a) Define functional group. Name the class of organic compound associated with the functional group —COOH.

(b) Atomic number of a few elements are 10, 20, 7, 14. Identify the elements.

Ans: (a) An atom or a group of atoms bonded together in such a unique fashion that it is usually, the site of chemical reactivity of an organic molecule.
The organic compound is Carboxylic acid.

(b)

Atomic Number	Name of Element
10	Neon
20	Calcium
7	Nitrogen
14	Silicon

18. (i) Why are metals considered malleable and ductile?

(ii) Name a metal that is most malleable and a metal that is most ductile.
(iii) Name a metal and a non-metal which are liquid at room temperature.

Ans: (i) Metals are considered to be malleable as they can be beaten into thin sheets. They are also ductile as they can be drawn into thin wires.
(ii) Gold is the most malleable metall and silver is the most ductile metal
(iii) Mercury is a metal which is liquid at room temperature and Bromine is a non-metal which is liquid at room temperature.

19. (i) Define Concentration of the ore.
(ii) Explain the Froth Floatation Process

Ans. (i) The process of removal of the gangue from an ore is known as concentration or dressing or benefaction of an ore.
(ii) In this process, sulphide ores are pulverized to powder and then taken into a tank filled with water. In the tank some pine oil is added and the mixture is agitated with
air. The pine oil wets the ores whereas the gangue particles are wetted with water. The air which is blown in the tank causes froth which rises up taking the ore particles to the surface while the gangue particles settle at the bottom of the tank. The froth is then skimmed off and dried which contains the ore particles.

20. Amongst the following, which will displace hydrogen from dilute sulphuric acid?
(i) Carbon (ii) Copper (iii) Sulphur (iv) Zinc

Ans: Only those metals, whose position is higher than hydrogen in the metal reactivity series, will displace hydrogen gas from dilute sulphuric acid.
(i) Carbon will not displace hydrogen from dilute sulphuric acid as it is a non-metal.
(ii) Copper will not displace hydrogen, as its position is lower than hydrogen in the metal reactivity series.
(iii) Sulphur will not displace as it is a non-metal.
(iv) Zinc will displace hydrogen from dilute sulphuric acid as its position is higher than hydrogen in the metal reactivity series.

[Biology]

21. Name the source gland and give one main action of the following hormones-
(i) prolactin; (ii) calcitonin; (iii) insulin; and (iv) parathormone.

Ans : (i) Prolactin – the source gland is anterior lobe of pituitary gland. The main action is it stimulates milk production and secretion.
(ii) Calcitonin – the source gland is thyroid gland and the main action is helps the movement of calcium ions from blood cells to bones.
(iii). Insulin – the source gland is pancreas and the main action is that it lowers blood sugar levels.
(iv).Parathormone – the source gland is parathyroid gland and the main action is it regulates calcium and phosphorus metabolism.

22. What are the different types of heterotrophic nutrition? Give one example of each.

Ans- There are four main types of heterotrophic nutrition-
(i). Holozoic nutrition – In this type the organisms eat their food whole. The complex food is broken into smaller particles in the digestive system and then absorbed. Example humans
(ii). Saprophytic nutrition – In this mode of nutrition organisms feed on dead and decaying organic matter. Example some types of bacteria.

(iii). Parasitic nutrition – In this type the organisms depend on another organism (host) for nutrition. The parasite may live in or on the body of the host. Example tapeworms.

(iv). Symbiotic nutrition – the organisms derive nutrition from living in close association with another organism. Example lichen (algae and fungi).

23. Write a note on the events which occur during light reaction of photo synthesis?

Ans. The main events are as follows:

(i) Light energy is absorbed by the chlorophyll that attains a higher energy state and releases an excited electron.

$$\underset{\text{(Reduced chlorophyll)}}{\text{Chlorophyll}} \xrightarrow{\text{Light energy}} \underset{\text{(oxidized chlorophyll)}}{\text{Chlorophyll 'a'}} + e^-$$

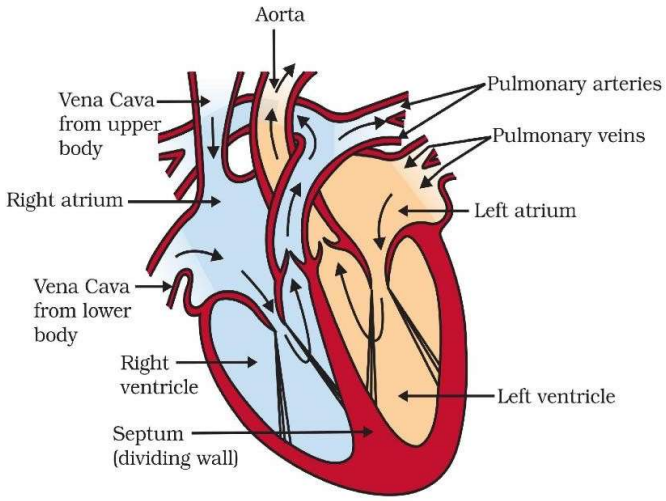
(ii) The excited electron then gets passed on from one electron acceptor to another in a series of oxidation-reduction reactions. This electron- flow is coupled to the formation of energy rich compounds that are used in dark reaction. This process also results in photolysis of water.

$$H_2O \rightleftharpoons 2e^- + \tfrac{1}{2} O_2 + 2H^+$$

This step results in conversion of light energy to chemical energy.

24. Draw the diagram of human heart and label the following parts, auricles, ventricles, pulmonary artery, aorta and vena cava.

Ans:



25. Write the differences between photosynthesis and respiration.
Ans:

Photosynthesis	Respiration
i. It is anabolic process	i. It is a catabolic process.
ii It converts light energy into chemical energy	ii. It liberates chemical energy that can be used.
iii. It can occur only in day time when light is available.	iii. It occurs all the time in the living cell.
iv. It liberates oxygen and uses carbon dioxide.	iv. It requires oxygen and releases carbon dioxide.

26. Elimination of waste products is completely different in case of plants. Justify the statement.

Ans: Elimination of waste products is completely different in case of plants. It can be summarised as:

(i) The excess water from plant is removed by transpiration.

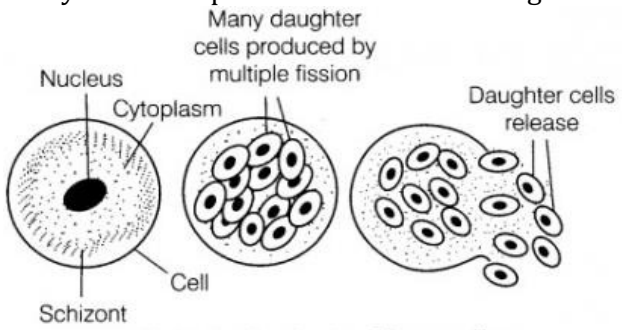
(ii) Some waste products can be stored within dead permanent tissues such as heart wood or barks of trees.

(iii) Some waste products may be stored in some plant like leaves, seeds and flowers that fall off.

(iv) Some waste products are stored as resins and gums in special type of tissues, e.g. resin ducts in old xylem of pine trees store resin.

27. Explain multiple fission in Plasmodium with a diagram.

Ans: Plasmodium divide into many daughter cells simultaneously, this type of fission is called multiple fission. First the nucleus divides repeatedly to form a number of daughter nuclei. Then cytoplasm gathers each nucleus to form daughter cells. The parent cell or cyst bursts open and releases the daughter individuals.



Multiple fission in *Plasmodium*

28. (a) Define gene.
(b) State Mendel's Laws of Inheritance.

Ans: (a) Gene is a segment of DNA which is responsible for the inheritance of a character from one generation to another.

(b) Mendel's Laws of Inheritance are:

(i) Law of Dominance: When a pair of contrasting characters are present together,
only one is able to express itself in the F_1 generation while others remain suppressed.

(ii) Law of Segregation: According to this law when a pair of allele comes together in a hybrid the members of the pair (alleles) stay together without mixing and separate (segregate) when hybrid forms.

(iii) Law of Independent Assortment: When two or more pairs of contrasting characters are brought together in an individual, the allele of one character separates independently.

29. (a) Define fossils.

(b) Why the wings of bird and wings of bat considered analogous organs?

Ans: (a) Fossils are the remains or traces and impressions of any organism that lived in the geological past.

(b) The organs which look alike and perform same functions but are quite different in basic structure and embryonic origin in different species are called analogous organs. For example, the wing of a bat and the wing of a bird are analogous organs because the wings of a bat are skin fold between the elongated fingers, while the wings of a bird are feathery covering all along the arms. Though the basic design of these wings are completely different, they look similar because they have a common function i.e. flying.

30. (a) Define plant hormones.

(b) Mention the role of auxins, gibberellins and abscisic acid.

Ans: (a) Chemical substances present in plants which bring about control and coordination of various activities in them are called plant hormones or phytohormones.

(b) Auxins: It promotes cell enlargement and cell differentiation in plants.
Gibberellins: It promotes the growth in stems, leaves, flowering and also increases the size and number of fruits.
Abscisic acid: It promotes the dormancy in seeds and buds.

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Sample Question Paper

(SSLC Examination 2024-25)

Science & Technology

(Old Course)

by

Meghalaya Board of School Education (MBOSE)

A. Scheme of Theory Examination

Section	Type of Questions	Marks for Each Question	No. of questions to be attempted/ No. of questions given	Total Marks
Section-A	Multiple choice Questions (MCQs)	1	30/30	1x30=30
Section-B	Very Short Answer Questions	2	10/14	2x10=20
Section-C	Short Answer Questions	3	6/9	3x6=18
Section-D	Long Answer Questions	4	3/5	4x3=12
Total Marks				**80**

Sample Question Paper

Science & Technology
(Old Course)
Class-X

Question Paper Code: XY

Time: 3 hours **Max Marks: 80 (Pass Marks: 24)**

General Instructions:

1. Please check that this Question Paper contains 58 Questions.
2. Question Paper Code given above should be written on the Answer Book, in the space provided, by the Candidate.
3. For candidates without an Internal Assessment, their marks will be multiplied by 1.25 to adjust their total to a maximum of 100 marks.
4. 15 minutes time is given for the candidates to read the Question paper. The Question Paper will be distributed 15 minutes before the scheduled time of the examination. In these 15 minutes, the candidates should only read the instructions and questions carefully and should not write answers on the Answer Sheet.
5. The Question Paper contains 4 sections, Section A, B, C and D.
6. Section-A contains Multiple Choice Questions (MCQ). Choose the most appropriate answer from the given options. The answers to this Section must be provided in the boxes provided in the Answer Sheet. Answers provided anywhere else will not be counted for marking.
7. Section-B contains Very Short Answer Questions. Answer the questions briefly, in not more than 30 (thirty) words.
8. Section-C contains Short Answer Questions. Answer the questions in not more than 50 (fifty) words each.
9. Section-D contains Long Answer Questions. Answer the questions in not more than 70 (seventy) words each.

Section- A

Multiple Choice Questions: Attempt **ALL** Questions. (30 X 1 = 30 marks)

1. We can see in a room which is not directly illuminated by sunlight due to:
   (A). Regular reflection (B). Refraction
   (C). Irregular reflection (D). None of these

2. A ray of light incident perpendicularly on a glass slab:
   (A) Bends towards the normal
   (B) Bends away from the normal
   (C) Moves along the normal
   (D) None of these

3. The blind spot on retina has:
   (A) Few nerve endings
   (B) High concentration of nerve endings
   (C) No nerve endings
   (D) None of these

4. The focal length of the eye lens increases when eye muscles:
   (A) Are relaxed and lens become thinner
   (B) Contract and lens becomes thicker
   (C) Are relaxed and lens become thicker
   (D) Contract and lens become thinner

5. At noon the sun appears white as
   (A) light is least scattered
   (B) all the colours of the white light are scattered away
   (C) blue colour is scattered the most
   (D) red colour is scattered the most

6. A body is said to have one coulomb electric charge, if compared to protons, it has in excess or in deficit:
   (A) 6.25×10^{8} electron (B) 2.65×10^{8} electron
   (C) 6.25×10^{18} electron (D) 6.25×10^{19} electron

7. The work done in moving unit positive charge across two points in an electric circuit is measure of?
   (A) Potential difference (B) Current
   (C) Resistance (D) Galvanometer

8. Resistance of the wire is given by
   (A) R = V/I (B) R = I/V
   (C) R = IV (D) $R = 1^{2} V$

9. The strength of magnetic field inside a long current carrying straight solenoid is :
   (A) more at the end than a centre
   (B) minimum in the middle
   (C) same at all points

(D) found to increase from end to other

10. What is principle behind the working of an electric motor?
    (A) Magnetic effect of current
    (B) Heating effect of current
    (C) Chemical effect of current
    (D) Electrostatics

11. Which one amongst the following is a complete balanced equation?
    (A) $2Al(s) + 3H_2SO_4\ (aq) \rightarrow Al_2(S0_4)_3\ (l) + 3H_2(g)$
    (B) $2Al(s) + 3H_2SO_4(aq) \rightarrow Al_2(SO_4)_3\ (g) + 3H_2(g)$
    (C) $2Al(s) + 3H_2SO_4(aq) \rightarrow Al_2(SO_4)_3\ (aq) + 3H_2(g)$
    (D) $2Al(s) + 3H_2SO_4(aq) \rightarrow Al_2(SO_4)_3\ (aq) + 3H_2(g) + \Delta H$

12. Which of the following is (are) double displacement reaction(s)?
    (A) $Pb + CuCl_2 \rightarrow PbCl_2 + Cu$
    (B) $Na_2SO_4 + BaCl_2 \rightarrow BaSO_4 + 2NaCl$
    (C) $C + O_2 \rightarrow CO_2$
    (D) $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$

13. An aqueous solution turns red litmus blue. Excess addition of which of the following solutions would reverse the change?
    (A) Baking powder (B) Lime
    (C) Ammonium hydroxide (D) Hydrochloric acid

14. Which one of the following is not a neutral salt?
    (A) NaCl (B) $NaNO_3$
    (C) $Na_2\ SO_4$ (D) $Na_2\ CO_3$

15. Which of the following statements is not correct?
    (A) All metal carbonates react with an acid to give salt, water and carbon dioxide.
    (B) All metal oxides react with water to give salt and acid.
    (C) Some metals react with acid to give salt and hydrogen.
    (D) Some non-metal oxides react with water to form an acid.

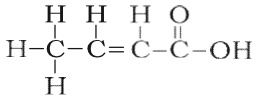
16. The conversion of metal oxide into metal is called
    (A) Froth floatation (B) Calcination
    (C) Roasting (D) Reduction

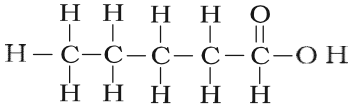
17. Long form of Periodic Table was reconstructed by
    (A) Moseley (B) Niels Bohr
    (C) J. J. Thomson (D) Rutherford

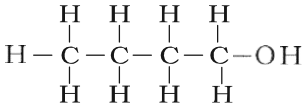
18. What is the other name for Group 18 elements?
    (A) Noble gases (B) Alkali metals
    (C) Alkaline earth metals (D) Halogens

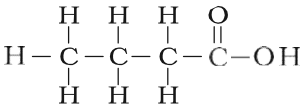
19. Buckminsterfullerene is an allotropic form of
    (A) Phosphorus (B) sulphur
    (C) carbon (D) tin

20. The correct structural formula of butanoic acid is

(A) 

(B) 

(c) 

(D) 

21. Plants store carbohydrates in the form of
(A) Glycogen. (B) Starch.
(C) Glucose. (D) Protein

22. The part of the respiratory tract supported by rings of cartilage to ensure air passage does not collapse is
(A) Trachea. (B) Nasal passage.
(C)Pharynx. (D) Nose

23. Vena cava are
(A) large veins that carry oxygenated blood.
(B) large veins that carry deoxygenated blood.
(C) large arteries that carry oxygenated blood.
(D) large arteries that carry deoxygenated blood.

24. Which of the following is the largest part of the brain?
(A) Cerebrum. (B) Cerebellum.
(C) Medulla. (D) Pons

25. Which of the following is an example of reflex action
(A) Running a race.
(B) Climbing a tree.
(C) Removal of hand on touching a hot object.
(D) Eating a fruit

26. Dwarfism results due to
(A) Excess secretion of thyroxine
(B) Less secretion of growth hormone
(C) Less of secretion of adrenaline hormone
(D) Excess secretion of growth hormone

27. "Reproduction is not an essential process for the survival of an individual. But it is important for -
(i) Continuation of life
(ii) Strength of life
(iii) Perpetuation of Species
(iv) Maintenance of cellular machinery
(A) (i)and (ii) (B) (i), (iii) and (iv)
(C) (i) and (iii) (D) (iii) and (iv)

28. The mature ovary develops into a

(A) Seed (B) Fruit
(C) Stamen (D) Pistil

29. Which of the following is an inherited trait?
    (A) Reduction in the weight of an organism due to starvation.
    (B) Removal of tail in mice by surgery.
    (C) Type of earlobe.
    (D) Development of muscles in athletes.

30. Random change in frequency of alleles in a population over successive generation due to error during DNA copying called
    (A) Acquired trait (B) Inherited trait
    (C) Genetics (D) Genetic drift

Section-B

Very Short Answer Questions: Answer **any 10 (ten)**. (2x10=20 marks)

31. What is an inverted image and a laterally inverted image?
32. What do you understand by the term myopic eye? How can it be corrected?
33. What is an electric motor? State the principle of an electric motor.
34. What is an electromagnet? Give two practical uses of electromagnets.
35. What do you understand by the term Series Circuit? Write an expression for the total resistance R when resistor r_1, r_2 and r_3, are connected in series.
36. Define the term, Salt. What do you mean by family of salts?
37. What is reducing agent? Give example.
38. Define the term 'alloy.' Write two advantages of making alloys.
39. What are isomers? Write the structural formula of two isomers of butane
40. State Mendeleev's periodic law. State one limitation of Mendeleev's classification.
41. Name the four major chambers of the human heart.
42. What is reflex action? Give two examples
43. What are sexually transmitted disease? Name two such diseases.
44. What a Pollination? Name two types of Pollination.

Section- C

Short Answer Questions: Answer **any 6 (six)**. **(**3x6=18 marks)

45. Define electric current and write its SI unit. An electric bulb draws a current of 0.2A when the voltage is 220V.Calculate the amount of electric charge flowing through it in one hour.
46. State Ohm's law. Give the factors of resistance of a wire on which it depends.
47. What do you understand by the term earthing? How does earthing protect the user from getting an electric shock?
48. During the extraction of metals, electrolytic refining is used to obtain pure metals. Which material will be used as anode and cathode for refining of copper in this process? Suggest a suitable electrolyte.What is anode mud?
49. Name the raw materials required to manufacture Baking Soda.Write the Overall equation involved in the manufacture of Baking Soda. Write down two characteristics of baking soda

50. What happens when Ethanol and excess Concentrated Sulphuric acid are mixed? Write the chemical equation for the reaction. What is the function of sulphuric acid in this reaction?
51. Define Respiration. Give reasons for the following. (i) The lung alveoli are covered with blood capillaries; and (ii) The walls of trachea is supported by cartilage rings.
52. State Darwin's theory of natural selection.
53. Explain Mendel's law of dominance.

Section-D

Long Answer Questions: Answer **any 3 (three)** **(**3x4=12 marks)

54. What do you understand by the term parallel Circuit. Given the three characteristics of a parallel circuit.
55. How can the power of an electric motor be increased? Explain with any four point.
56. You are given Calcium hydroxide and chlorine, how will you prepare bleaching powder? Mention two of its uses.
57. Why there is a necessity for the Classification of elements? Give three reasons? What are groups and periods in the periodic table?
58. Write a note on the events which occur during light reaction of photo synthesis?

*** End of the Question Paper ***