CM IMPACT Guidebook for Teachers
(With Important Questions and Answers)

Science

(New Course - NCERT Textbook)

Class X
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Section-A

Multiple Choice Questions (MCQs)

[Chemistry]

1. Which of the following is not a physical change?
   A. Boiling of water to give water vapour
   B. Melting of ice to give water
   C. Dissolution of salt in water
   D. Combustion of Liquefied Petroleum Gas (LPG)
   Ans – (D)

2. Which of the following statements about the given reaction is NOT correct?
   $3Fe(s) + 4H_2O(g) \rightarrow Fe_3O_4(s) + 4H_2(g)$
   A. Iron metal is getting oxidised
   B. Water is getting reduced
   C. Water is acting as reducing agent
   D. Water is acting as oxidizing agent
   Ans – (C)

3. A colorless gas that smells like burning sulphur and causes coughing is
   (A) hydrogen (B) sulphur dioxide
   (C) sulphur trioxide (D) nitrogen dioxide
   Ans- (B)

4. Barium chloride on reacting with ammonium sulphate forms barium sulphate and ammonium chloride. Whichof the following correctly represents the type of the reaction involved?
   (A) Displacement reaction (B) Oxidation reaction
   (C) Combination reaction (D) Double displacement reaction
   Ans – (D)

5. Electrolysis of water is a decomposition reaction. The mole ratio of hydrogen and oxygen gases liberatedduring electrolysis of water is
   (A) 1:1 (B) 2:1
   (C) 4:1 (D) 1:2
   Ans – (B)

6. Which of the following is (are) an endothermic process(es)?
   A. Dilution of sulphuric acid B. freezing of water
   C. Condensation of water vapours D. Evaporation of water
   Ans – (D)

7. Which of the following gases can be used for storage of fresh sample of an oil for a long time?
   A. Carbon dioxide or oxygen
   B. Nitrogen or oxygen
   C. Carbon dioxide or helium
   D. Helium or nitrogen
   Ans – (D)

8. Which one of the following processes involve 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 presence of air at high temperature
   Ans – (D)

9. What happens when a solution of an acid is mixed with a solution of a base in a test tube?
   (A) Fumes of gas will emerge
   (B) The temperature of the solution decreases
   (C) The temperature of the solution remains the same
   (D) Salt formation takes place
   Ans – (D)

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

11. Acid rain has a pH less than
   (A) 7.8 (B) 5.6
   (C) 10.5 (D) 6.4
   Ans – (B)

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

13. Sodium carbonate is a basic salt because it is a salt of
   A. strong acid and strong base
   B. weak acid and weak base
   C. strong acid and weak base
   D. weak acid and strong base
   Ans – (D)

14. Calcium phosphate is present in tooth enamel. Its nature is
   (A) basic (B) acidic
   (C) neutral (D) amphoteric
   Ans – (A)

15. If a few drops of a concentrated acid accidentally spill 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)

16. Common salt besides being used in kitchen can also be used as the raw material for making
   (i) washing soda (ii) bleaching powder
   (iii) baking soda (iv) slaked lime
   (A) (i) and (ii) (B) (i), (ii) and (iv)
   (C) (i) and (iii) (D) (i), (iii) and (iv)
   Ans – (C)

17. One of the constituents of baking powder is sodium hydrogen carbonate, the other constituent is
   (A) hydrochloric acid (B) tartaric acid
   (C) acetic acid (D) sulphuric acid
   Ans – (B)

18. 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)

19. Which of the following statements is correct about an aqueous solution of an acid and of a base?
    (i) Higher the pH, stronger the acid
    (ii) Higher the pH, weaker the acid
    (iii) Lower the pH, stronger the base
    (iv) Lower the pH, weaker the base
    (A) (i) and (iii) (B) (ii) and (iii)
    (C) (i) and (iv) (D) (ii) and (iv)
    Ans – (D)

20. 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)

21. Which of the following phenomena occur, when a small amount of acid is added to water?
    (i) Ionisation (ii) Neutralisation
    (iii) Dilution (iv) Salt formation
    (A) (i) and (ii) (B) (i) and (iii)
    (C) (ii) and (iii) (D) (ii) and (iv)
    Ans – (B)

22. 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) Petunia leaves
    Ans: (C)

23. Which of the following property is generally not shown by metals?
    (A) Electrical conduction (B) Sonorous in nature
    (C) Dullness (D) Ductility
    Ans – (C)

24. The ability of metals to be drawn into thin wire is known as
    (A) ductility (B) malleability
    (C) sonority (D) conductivity
    Ans: (A)

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

26. Which of the following type at medication is need in treating indigestion?
    (A) Antibiotic (B) Analgesic
    (C) Antacid (D) Antiseptic
    Ans - (C)

27. Sodium hydrogen Carbonate is the chemical name of which of the following?
    (A) Bleaching Powder (B) Baking Soda
    (C) Gypsum (D) None of the
    Ans – (B)

28. Which of the statements about the reaction below are incorrect?

$2PbO(s) + C(s) \rightarrow 2Pb(s) + CO_2(g)$

(i) Lead is reduced (ii) Carbon dioxide is oxidised

(iii) Lead oxide is reduced (iv) Carbon is oxidised

(A) (i) and (ii) (B) (i) and (iii)

(C) (ii) and (iii) (D) (iii) and (iv)

Ans – (D)

29. $Fe_2O_3 + 2\,Al \rightarrow Al_2O_3 + 2\,Fe$

The above reaction is an example of

(A) Double displacement reaction

(B) Combination reaction

(C) Displacement reaction

(D) Decomposition reaction

Ans – (C)

30. What happens when dilute hydrochloric acid is added to Iron filing? Tick the Correct answer

(A) Hydrogen gas and Iron chloride are produced

(B) Chlorine gas and Iron hydrochloride are produced

(C) No reaction take place

(D) Iron salt and water are produced

Ans -(A)

31. Lime water is

(A) CaO (B) $Ca(OH)_2$

(C) $CaCO_3$ (D) $CaCl_2$

Ans – (B)

32. Which of the following is used to oxidise ethanol to ethanoic acid?

A. Alkaline $KMnO_4$
B. Conc. H_2SO_4
C. Acidified $K_2Cr_2O_7$
D. Conc. HCl

Ans – (B)

33. What is observed when copper is exposed to the air

A. The surface of copper is coated with Cu_2O
B. The surface of copper is coated with CuO
C. The surface of copper is coated with $CuCO_3$
D. The surface of copper is coated with $CuSO_4$

Ans – (B)

34. Ores that undergo Calcination are

(A) Sulphide ores (B) Sulphate ores

(C) Carbonate ores (D) Oxide ores

Ans: (C)

35. The correct order for the reactivity of the following metals is:

A. Fe> Ni> Pb> Sn> Cu> H> Au
B. Fe> Pb> Sn> Ni>H> Cu> Au
C. Fe> Ni>Pb>Sn>Cu>H>Au
D. Fe>Ni>Sn>Pb>H>Cu>Au

Ans – (D)

36. A metal 'A' which is used in the thermite process, when heated with oxygen gives an oxide 'B' which is amphoteric in nature. 'A' and 'B' are identified as

(A) Mg and MgO (B) Al and Al_2O_3
(C) Fe and FeO (D) Fe and Fe_2O_3
Ans – (B)

37. Graphite is formed by
(A) Hexagonal array (B) Tetragonal array
(C) Pentagonal array (D) Octagonal array
Ans – (A)

38. The main cause of rancidity of foods is the reaction of fats and oils by
(A) Hydrolysis (B) Substitution
(C) Oxidation (D) Reduction
Ans – (C)

39. Cinnabar is an ore of
(A) Mercury (B) Zinc
(C) Copper (D)Lead
Ans – (A)

40. Which of the following can be used as colour change acid base indicator?
(A) Onion juice (B) Vanilla essence
(C) Clove Oil (D) Petunia leaves
Ans – (D)

41. Which of the following substance will not give carbon dioxide on treatment with dilute acid
(A) Marble (B) Lime stone
(D) Lime (C) Baking soda
Ans: (D)

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

43. Which of the following used for dissolution of gold?
(A) Hydrochloric acid (B) Sulphur acid
(C) Nitric acid (D) Aqua- regia
Ans: (D)

44. Which of the following is not a mineral acid?
(A) Hydrochloric acid (B) Citric acid
(C) Sulphur acid (D) Nitric acid
Ans: (B)

45. Which of the following is not a base?
(A) NaOH (B) KOH
(C) NH_4OH (D) C_2H_5OH
Ans: (D)

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

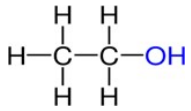
47. Which of the following is true for acids
(A) Bitter and change red litmus to Blue.
(B) Sour and change red litmus to blue.

(C) Sour and change blue litmus to red.
(D) Bitter and change blue litmus to red.
Ans: (C)

48. Which of the following are present in a dilute aqueous solution of hydrochloric acid?
(A) $H_3O^+ + CI^-$ (B) $H_3O + OH^-$
(C) $CI + OH^-$ (D) Unionised HCl
Ans: (A)

49. Water is removed when substance 'X' is heated, as well as its colours changes from green, then substance X=
(A) $Ca\ SO_4$ (B) $CuSO_4$
(C) $FeSO_4$ (D) $BaSO_4$
Ans: (C)

50. Name the below compound from its structure:



(A) Ethane (B) Ethanol
(C) Ethene (D) Propanol
Ans: (B)

51. Which of the following pairs will give displacement reactions?
(A) NaCl solution and copper metal.
(B) $MgCl_2$ solution and aluminium metal.
(C) $FeSO_4$ solution and silver metal.
(D) $AgNO_3$ solution and copper metal.
Ans: (D)

52. Which of the following methods is suitable for preventing an iron frying pan from rusting?
(A) Applying grease.
(B) Applying paint.
(C) Applying a coating of zinc
(D) Applying a coat of Lead
Ans: (C)

53. Which of the following oxides of iron would be obtained on 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)

54. Generally, metals react with acids to give salt and hydrogen gas. Which of the following acids does not give hydrogen gas on reacting
(A) H_2SO_4 (B) HCl
(C) HNO_3 (D)All of these
Ans: (C)

55. Which of the following metals are obtained by electrolysis of their chlorides in molten state
(A) Mg (B) Ag
(C) Zn (D) Cu
Ans : (A)

56. Generally, non- metals are not lustrous. Which of the following non metal is lustrous?
(A) Sulphur (B) Oxygen

(C) Nitrogen (D) lodine
Ans. (D)

57. An alloy is
(A) an element (B) a compound
(C) a homogenous mixture (D) a heterogeneous mixture
Ans: (C)

58. Silver articles become black on prolonged exposure to air. This is due to the formation of
(A) AgS (B) Ag_2O
(C) Ag_2S (D) Ag_2 and Ag_3
Ans: (C)

59. Galvanisation is a method of protecting iron from rusting by coating with a thin layer of
(A) Gallium (B) Aluminium
(C) Zinc (D) Silver
Ans: (C)

60. Stainless steel is very useful material for our life. In stainless steel Iron is mixed with
(A) Ni and Cr (B)Cu and Cr
(C) Ni and Cu (D)Cu and Au
Ans: (A)

61. If copper is kept open in air, it slowly loses its shining brown surface and gains green coating. It is due to the formation of
(A) $CuSO_4$ (B)$CuCO_3$
(C) $Cu(NO_3)_2$ (D)CuO
Ans: (B)

62. Generally, metals are solid in nature. Which one of the following metals is found in liquid state at room temperature?
(A) Na (B) Fe
(C) Cr (D) Hg
Ans: (D)

63. During electrolytic refining of zinc, it gets
(A) deposited on cathode
(B) deposited on anode
(C) deposited on cathode as well as anode
(D) remains in the solution
Ans: (A)

64. Alloys are homogenous 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)

65. Which among the following alloys contain mercury as one of its constituents?
(A) stainless steel (B) alnico
(C) solder (D) amalgam
Ans: (D)

66. Generally, non- metals are not conductors of electricity. Which of the following is a good conductor of electricity?
(A) diamond (B) graphite
(C) Sulphur (D) fullerene
Ans: (B)

67. Electrical wires have a coating of an insulting material. The material, generally used is

(A) Sulphur (B) Graphite
(C) PVC (D) Copper
Ans: (C)

68. Which the following non-metal is a liquid at room temperature?

(A) carbon (B) bromine
(C) phosphorous (D) Sulphur
Ans. (B)

69. Buckminsterfullerene has_____atoms in its molecule.

(A) 30 (B) 960
(C) 300 (D) 60
Ans: (D)

70. Many salts absorb water from atmosphere. This property is called

(A) crystallization (B) hydration
(C) deliquescence (D) efflorescence
Ans. (C)

71. Which of the following elements occur in free state

(A) phosphorus (B) sulphur
(C) silicon (D) copper
Ans .(B)

72. Na_2SO_4 + $BaCl_2$ → $BaSO_4$ + 2NaCl
The above reaction is an example of a

(A) combination reaction (B) double displacement reaction
(C) decomposition reaction (D) displacement reaction
Ans .(B)

73. Which of the following metals can replace copper from a solution of copper sulphate?

(A) Silver (B) Zinc
(C) Gold (D) Platinum

Ans. (B)

[Biology]

74. In a flower, the parts that produce male and female gametes (germ cells) are

(A) stamen and anther (B) filament and stigma
(C) anther and ovary (D) stamen and style
Ans – (C)

75. Which of the following is the correct sequence of events of sexual reproduction in a flower?

(A) pollination, fertilisation, seedling, embryo
(B) seedling, embryo, fertilisation, pollination
(C) pollination, fertilisation, embryo, seedling
(D) embryo, seedling, pollination, fertilization
Ans – (C)

76. Characters transmitted from parents to offspring are present in

(A) cytoplasm (B) ribosome
(C) golgi bodies (D) genes
Ans – (D)

77. Characters that are transmitted from parents to offspring during reproduction show

(A) only similarities with parents
(B) only variations with parents

(C) both similarities and variations with parents
(D) neither similarities nor variations
Ans – (C)

78. A feature of reproduction that is common to Amoeba, Spirogyra and Yeast is that
(A) they reproduce asexually
(B) they are all unicellular
(C) they reproduce only sexually
(D) they are all multicellular
Ans – (A)

79. In Spirogyra, asexual reproduction takes place by
(A) breaking up of filaments into smaller bits
(B) division of a cell into two cells
(C) division of a cell into many cells
(D) formation of young cells from older cells.
Ans – (A)

80. The ability of a cell to divide into several cells during reproduction in *Plasmodium* is called
(A) budding (B) reduction division
(C) binary fission (D) multiple fission
Ans – (D)

81. The correct sequence of reproductive stages seen in flowering plants is
(A) gametes, zygote, embryo, seedling
(B) zygote, gametes, embryo, seedling
(C) seedling, embryo, zygote, gametes
(D) gametes, embryo, zygote, seedling
Ans – (A)

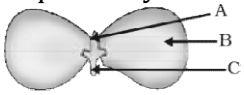
82. The number of chromosomes in parents and offsprings of a particular species remains constant due to
(A) doubling of chromosomes after zygote formation
(B) halving of chromosomes during gamete formation
(C) doubling of chromosomes after gamete formation
(D) halving of chromosomes after gamete formation
Ans – (B)

83. In Rhizopus, tubular thread-like structures bearing sporangia at their tips are called
(A) filaments (B) hyphae
(C) rhizoids (D) roots
Ans – (B)

84. Vegetative propagation refers to formation of new plants from
(A) stem, roots and flowers
(B) stem, roots and leaves
(C) stem, flowers and fruits
(D) stem, leaves and flowers
Ans – (B)

85. Length of pollen tube depends on the distance between
(A) pollen grain and upper surface of stigma
(B) pollen grain on upper surface of stigma and ovule
(C) pollen grain in anther and upper surface of stigma
(D) upper surface of stigma and lower part of style
Ans – (B)

86. In Figure, the parts A, B and C are sequentially



(A) cotyledon, plumule and radicle
(B) plumule, radicle and cotyledon
(C) plumule, cotyledon and radicle
(D) radicle, cotyledon and plumule
Ans - (C)

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

88. Reproduction is essential for living organisms in order to
(A) keep the individual organism alive
(B) fulfill their energy requirement
(C) maintain growth
(D) continue the species generation after generation
Ans – (D)

89. During adolescence, several changes occur in the human body. Mark one change associated with sexualmaturation in boys
(A) loss of milk teeth (B) increases in height
(C) cracking of voice (D) weight gain
Ans – (C)

90. In human females, an event that reflects onset of reproductive phase is
(A) growth of body (B) changes in hair pattern
(C) change in voice (D) menstruation
Ans – (D)

91. In human males, the testes lie in the scrotum, because it helps in the
(A) process of mating (B) formation of sperm
(C) easy transfer of gametes (D) all the above
Ans – (B)

92. The correct sequence of organs in the male reproductive system for transport of sperms is
(A) testis, vas deferens, urethra
(B) testis, ureter, urethra
(C) testis, urethra, ureter
(D) testis, vas deferens, ureter
Ans – (A)

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

94. Exchange of genetic material takes place in
(A) vegetative reproduction (B) asexual reproduction
(C) sexual reproduction (D) budding
Ans – (C)

95. Two pink coloured flowers on crossing resulted in 1 red, 2 pink and 1 white flower progeny. The nature of thecross will be
    (A) double fertilization (B) self-pollination
    (C) cross fertilization (D) no fertilization
    Ans – (B)

96. A cross between a tall plant (TT) and short pea plant (tt) resulted in progeny that were all tall plants because
    (A) tallness is the dominant trait
    (B) shortness is the dominant trait
    (C) tallness is the recessive trait
    (D) height of pea plant is not governed by gene 'T' or 't'
    Ans – (A)

97. Which of the following statement is incorrect?
    (A) For every hormone there is a gene.
    (B) For every protein there is a gene.
    (C) For production of every enzyme there is a gene.
    (D) For every molecule of fat there is a gene
    Ans – (D)

98. If a round, green seeded pea plant (RR yy) is crossed with wrinkled, yellow seeded pea plant, (rr YY) the seeds produced in F1 generation are
    (A) round and yellow (B) round and green
    (C) wrinkled and green (D) wrinkled and yellow
    Ans – (A)

99. In human males all the chromosomes are paired perfectly except one. This/these unpaired chromosome is/are
    (i) large chromosome (ii) small chromosome
    (iii) Y-chromosome (iv) X-chromosome
    (A) (i) and (ii) (B) (iii) only
    (C) (iii) and (iv) (D) (ii) and (iv)
    Ans – (C)

100. The maleness of a child is determined by
    (A) the X chromosome in the zygote
    (B) the Y chromosome in zygote
    (C) the cytoplasm of germ cell which determines the sex
    (D) sex is determined by chance
    Ans – (B)

zygote which has an X-chromosome inherited from the father will develop into a
    (A) boy
    (B) girl
    (C) X- chromosome does not determine the sex of a child
    (D) either boy or girl
    Ans – (B)

102. Select the incorrect statement
    (A) Frequency of certain genes in a population change over several generations resulting in evolution
    (B) Reduction in weight of the organism due to starvation is genetically controlled
    (C) Low weight parents can have heavy weight progeny
    (D) Traits which are not inherited over generations do not cause evolution
    Ans - (B)

basket of vegetables contains carrot, potato, radish and tomato. Which of them represent the correct homologous structures?

(A) Carrot and potato (B) Carrot and tomato
(C) Radish and carrot (D) Radish and potato
Ans – (C)

104. Bile juice is stored in

(A) liver (B) pancreas
(C) gall bladder (D) kidney
Ans – (C)

105. Which of the following is a plant hormone?

(A) Insulin (B) Thyroxin
(C) Oestrogen (D) Cytokinin
Ans – (D)

106. Which of the following statements is not true with respect to variation?

A. All variations in a species have 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 minimum in asexual reproduction
Ans – (A)

trait in an organism is influenced by

A. paternal DNA only
B. maternal DNA only
C. both maternal and paternal DNA
D. neither by paternal nor by maternal DNA
Ans – (C)

108. Select the group which shares maximum number of common characters

A. two individuals of a species
B. two species of a genus
C. two genera of a family
D. two genera of two families
Ans – (A)

109. The gap between two neurons is called a

(A) Axon (B) Synapse
(C) dendrite (D) Cell body
Ans – (B)

110. From the list given below, select the character which can be acquired but not inherited

(A) colour of eye (B) colour of skin
(C) size of body (D) nature of hair
Ans – (C)

111. The number of pair (s) of sex chromosomes in the zygote of humans is

(A) one (B) two
(C) three (D) four
Ans – (A)

112. Embryo sac is found in

(A) endosperm (B) embryo
(C) ovule (D) seed
Ans – (C)

113. The normal Systolic Pressure is about
(A) 120 mm of Hg (B) 100 mm of Hg
(C) 115 mm of Hg (D) 125 mm of Hg
Ans: (A)

114. The main organ for control and coordination in animals
(A) Nerve (B) Muscle tissue
(C) Brain (D) Blood
Ans: (C)

115. Which change occurs in the respiratory rate due to the construction of the diaphragm and rib muscles?
(A) Increases (B) Decreases
(C) Remain the same (D) None of the above
Ans: (A)

116. How many copies of DNA are made in reproduction?
(A) one (B) Two
(C) Three (A) Four
Ans: (B)

117. The kidneys in human beings are a part of the system for
(A) Nutrition (B) Respiration
(C) Excretion (D) Transportation
Ans: (C)

118. The Xylem in plants are responsible for
(A) Transport of water (B) Transport of food
(C) Transport of amino acid (D) Transport of oxygen
Ans: (A)

119. The autotrophic mode of nutrition requires
(A) Carbon dioxide and water (B) Chlorophyll
(C) Sunlight (D) All of the above
Ans: (D)

120. The breakdown of pyruvate to give carbon-dioxide, water and energy take place in
(A) Cytoplasm (B) Mitochondria
(C) Nucleus (D) chloroplast
Ans: (B)

121. Which of the following constitute food chain?
(A) Grass, Wheat and Mango (B)Grass, Goat and human
(C) Grass, Cow and Elephant (D) Gras, Fish and Goat
Ans: (B)

122. Which of the following, are Environment Friendly Practices?
(A) Carrying cloth bags to put purchases in while shopping
(B) Switching off unnecessary lights and fans
(C) Walking to school instead of getting your mother to drop you on her scooter.
(D) All of the above
Ans: (D)

123. Which of the following statements is correct about receptors?
(A) Gustatory receptor detect taste while olfactory receptors detect smell.
(B) Both Gustatory and olfactory receptors detect smell
(C) Auditory receptor detect smell and olfactory receptors detect taste.
(D) Olfactory receptor detect taste and Gustatory receptors detect smell.
Ans: (A)

124. Electrical impulse travels in a neuron from
(A) Dendrite→ axon→ axonal end→ cell body
(B) Cell body→ Dendrite → axon→ axonal end
(C) Dendrite →Cell body→ axon→ axonal end
(D) Axonal end→ axon → Cell body→Dendrite
Ans: (C)

125. In a synapse, chemical signal is transmitted from
(A) Dendrite end at one neuron to axonal end at another neuron.
(B) Axon to cell body at same neuron.
(C) Cell body to axonal end at the same neuron.
(D) Axonal end at neuron to dendrite end at another neuron.
Ans: (D)

126. In a neuron, conversion of electrical signal to a chemical signal occurs at/ in
(A) Cell body. (B) Axonal end.
(C) Dendrite end. (D) Axon
Ans: (B)

127. Biotic components of an ecosystem consists of:
(A) Producers (B) consumers
(C) decomposers (D) All of the above
Ans: (D)

128. The brain is responsible for:
(A) Thinking. (B) Regulating the heart beat.
(C) Balancing the body. (D) All of the above
Ans: (D)

129. Posture and balance of the body is control by
(A) Cerebrum (B) Cerebellum
(C) Medulla oblongata (D) Pons
Ans: (B)

130. Spinal cord originate from
(A) Cerebrum (B) Medulla oblongata
(C) Pons (D) Cerebellum
Ans: (B)

131. The main function of absisic acid in plants is to
(A) Increase the length of cells (B) Promote cell division
(C) Inhibit growth (D) Promote of stem growth
Ans: (C)

132. Choose the incorrect statement about Insulin
(A) It is produced from pancreas
(B) Its regulates growth and development of the body
(C) It regulates blood sugar level
(D) Insufficient secretion of insulin will cause level of glucose to rise
Ans: (B)

133. Select the mis-match pair
(A) Adrenaline : Pituitary (B) Testosterone :Testes
(C) Estrogen : Ovary (D) Thyroxine :Thyroid gland
Ans: (A)

134. The growth of tendril in pea plants is due to
(A) effect of light
(B) effect of gravity

(C) rapid cell division in tendriller cells that are away from the support
(D) rapid cell division in tendriller cells in contact with the support.
Ans: (C)

135. The growth of pollen tubes towards ovule is due to
(A) Hydrotropism (B) Chemotropism
(C) Geotropism (D) Phototropism
Ans: (B)

136. The movement of sunflower in accordance with the path of sun is due to
(A) Phototropism (B) Geotropism
(C) Chemotropism (D) Geotropism
Ans: (A)

137. Involuntary actions in the body are controlled by
(A) Medulla in fore brain (B) Medulla in mid brain
(C) Medulla in hind brain (D) Medulla in spinal cord.
Ans: (C)

138. Which of the following is not involuntary action?
(A) Vomiting (B) Salivation
(C) Heart beat (D) Chewing
Ans: (D)

139. In which of the following groups of organisms, food material is broken down outside the body and absorbed?
(A) Mushroom, green plants, Amoeba
(B) Yeast, mushroom, bread mould.
(C) Paramecium, Amoeba, Cuscuta
(D) Cuscuta, lice, tapeworm
Ans: (B)

140. Which one of the following is an artificial ecosystem?
(A) Pond (B) crop field
(C) lake (D) forest
Ans: (B)

141. An eco-system includes
(A) all living organisms
(B) non-living organisms.
(C) both living and non-living organisms.
(D) sometimes living organisms and sometimes non-living organisms.
Ans: (C)

142. Depletion of ozone is mainly due to
(A) chlorofluorocarbon compound (B) carbon monoxide
(C) methane (D) pesticides
Ans: (A)

143. Alveoli are found in
(A) lungs (B) heart
(C) kidney (D) stomach
Ans: (A)

144. Saliva contains an enzyme called
(A) amylase (B) lipase
(C) pepsin (D) trypsin
Ans: (A)

145. Rings of cartilage are present in
(A) oesophagus (B) bile duct
(C) trachea (D) small intestine
Ans: (C)

[Physics]

146. The part of the eye which controls and regulates the amount of light entering the eye is
(A) crystalline lens. (B) cornea.
(C) Iris. (D) pupil.
Ans: (C)

147. A full length image of a distant tall building can definitely be seen by using
(A) a concave mirror
(B) a convex mirror
(C) a plane mirror
(D) both concave as well as plane mirror
Ans – (B)

148. In torches, search lights and headlights of vehicles the bulb is placed
(A) between the pole and the focus of the reflector
(B) very near to the focus of the reflector
(C) between the focus and centre of curvature of the reflector
(D) at the centre of curvature of the reflector
Ans – (B)

149. The laws of reflection hold good for
(A) plane mirror only (B) concave mirror only
(C) convex mirror only (D) all mirrors irrespective of their shape
Ans – (D)

150. 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
Ans – (C)

151. Twinkling of stars is due to atmospheric
(A) dispersion of light by water droplets
(B) refraction of light by different layers of varying refractive indices
(C) scattering of light by dust particles
(D) internal reflection of light by clouds
Ans – (B)

152. The clear sky appears blue because
(A) blue light gets absorbed in the atmosphere
(B) ultraviolet radiations are absorbed in the atmosphere
(C) violet and blue lights get scattered more than lights of all other colours by the atmosphere
(D) light of all other colours is scattered more than the violet and blue colour lights by the atmosphere
Ans – (C)

153. Which of the following statements is correct regarding the propagation of light of different colours of white light in air?
(A) Red light moves fastest

(B) Blue light moves faster than green light
(C) All the colours of the white light move with the same speed
(D) Yellow light moves with the mean speed as that of the red and the violet light
Ans – (C)

154. The danger signals installed at the top of tall buildings 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
Ans – (B)

155. The resistivity does not change if
(A) the material is changed
(B) the temperature is changed
(C) the shape of the resistor is changed
(D) both material and temperature are changed
Ans – (C)

156. In an electrical circuit two resistors of 2Ω and 4Ω respectively are connected in series to a 6 V battery. The heat dissipated by the 4 resistor in 5 s will be
(A) 5 J (B) 10 J (C) 20 J (D) 30 J
Ans – (C)

157. An electric kettle consumes 1 kW of electric power when operated at 220 V. A fuse wire of what rating must be used for it?
(A) 1 A (B) 2 A (C) 4 A (D) 5 A
Ans – (D)

158. Two resistors of resistance 2 Ω and 4 Ω when connected to a battery will have
(A) same current flowing through them when connected in parallel
(B) same current flowing through them when connected in series
(C) same potential difference across them when connected in series
(D) different potential difference across them when connected in parallel
Ans – (B)

159. A constant current flows in a horizontal wire in the plane of the paper from east to west. The direction of magnetic field at a point will be North to South
(A) directly above the wire
(B) directly below the wire
(C) at a point located in the plane of the paper, on the north side of the wire
(D) at a point located in the plane of the paper, on the south side of the wire
Ans – (B)

160. The strength of magnetic field inside a long current carrying straight solenoid is
(A) more at the ends than at the centre
(B) minimum in the middle
(C) same at all points
(D) found to increase from one end to the other
Ans – (C)

161. To convert an AC generator into DC generator
(A) split-ring type commutator must be used
(B) slip rings and brushes must be used
(C) a stronger magnetic field has to be used
(D) a rectangular wire loop has to be used
Ans – (A)

162. Electric fuse is connected with:
(A) live wire in series (B) neutral wire
(C) earthing (D) live wire in parallel
Ans – (A)

163. Which one of the following materials cannot be used to make a lens?
(A) water (B) glass (C) plastic (D) clay
Ans: (D) Clay

164. Which of the lenses would you prefer to while reading small letters found in a dictionary?
(A) a convex lens of focal length 50 cm.
(B) a concave lens of focal length 50 cm.
(C) a convex lens of focal length 5cm.
(D) a concave lens of focal length 5cm.
Ans – (C)

165. Myopia occurs due to
(A) increase in the focal length of the eye lens
(B) decrease in the focal length of the eye lens
(C) contraction of the eye ball
(D) decrease in distance between the retina and the eye lens.
Ans – (B)

166. You are given water, mustard oil, glycerine and kerosene. In which of these media a ray of light incident obliquely at same angle would bend the most?
(A) Kerosene (B) water (C) glycerine (D) mustard oil
Ans – (C)

167. A material medium having the lowest optical density is:
(A) water (B) air (C) glass (D) diamond
Ans – (B)

168. When the image is virtual, erect and of the same size as the object, then, magnification is:
(A) +1 (B) – 1
(C)) 0 (D) +2.
Ans – (A) +1

169. The Image of an object placed in front of a concave mirror of focal length 15cm is of the same size as the object. The distance between the object and its image is
(A) 15cm (B) 30cm (C) 60cm (D) Zero
Ans- (D) Zero

170. Which of the following mirror is used by a dentist to examine a small cavity in a patient's teeth
(A) Convex mirror (B) Plane mirror
(C) Concave mirror (D) Any spherical mirror
Ans- (C) Concave mirror

171. Which of the following can make a parallel beam of light when light from a point source is incident on it?
(A) Concave mirror as well as convex lens
(B) Convex mirror as well as concave lens
(C) Two plane mirrors placed at 90 ^{o} to each other
(D) Concave mirror as well as concave lens
Ans- (A) Concave mirror as well as convex lens

172. An object is placed in front of a concave lens. For all positions of the object, the image formed is always

a) Real, diminished and inverted
b) Virtual, diminished and erect
c) Real, enlarged and erect
d) Virtual, erect and enlarged

Ans- (B) Virtual, diminished and erect

173. In the human eye the part which allows light to enter into the eye is
a) retina (B) pupil (C) eye lens (D) Cornea
Ans- (B) pupil

174. Which of the following part of the eye is responsible for changing the shape of the lens to focus light onto the retina?
a) Pupil (B) Iris (C) ciliary muscles (D) cornea
Ans- (C) ciliary muscles

175. The far point of eye of a person is 2m. The type of the lens needed in spectacles to increase the far point infinity is
(a) Concave lens (B) Convex lens
(C) Cylindrical lens (D) Bifocal lens
Ans- (A) Concave lens

176. A person cannot see distinctly object kept beyond 2m. This defect cannot be corrected using a lens of power
(A) +0.5 D (B) -0.5 D (C) +0.2 D (D) +0.4 D
Ans- (B) -0.5 D

177. 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) Reflection of light from the earth
d) total internal reflection
e) *Ans*- (B) Scattering of light

178. The band of the coloured components of a light beam is called its
(A) spectrum (B) dispersion (C) reflection (D) refraction
Ans: (A)

179. The focal length of the eye lens increases when eye muscles
a) Are relaxed and lens becomes thinner
b) Contract and lens become thicker
c) Are relaxed and lens becomes thicker
d) Contract and lens become thinner
Ans- (A) Are relaxed and lens becomes thinner

180. When light rays enters the eye, most of the refraction occurs at the
(A) Crystalline lens (B) Outer surface of the cornea
(C) Iris (D) Pupil
Ans- (B) Outer surface of the cornea

181. If the size of scattering particles is large enough, then

(A) The light will not get scattered
(B) The scattered light may appear blue
(C) The scattered light may appear white
(D) None of the above

Ans- (C) The scattered light may appear white

182. The current of 4.8 A is flowing in a conductor. The number of electrons passing per second through the conductor will be

(A) $3x10^{20}$ (B) $76.8x\ 10^{20}$ (C) $7.68x\ 10^{-19}$ (D) $3x10^{19}$

Ans - (D) $3x10^{19}$

183. A current of 1 A is drawn by a filament of an electric bulb. Number of electrons passing through a cross-section of the filament in 16s would be roughly

(A) 10^{20} (B) 10^{16} (C) 10^{18} (D) 10^{23}

Ans – (A) 10^{20}

184. A complete circuit is left on for several minutes, causing the connecting copper wire to become hot. As the temperature of the wire increases the electrical resistance of the wire

(A) Decreases (B) Remains the same

(C) Increases (D) Increases for some time and the decreases

Ans- (C) Increases

185. Tow LED bulbs of 10 W and 5W are connected in series. If the current flowing through 5W bulb is 0.005 A the current flowing through 10W bulb is

(A) 0.02A (B) 0.01A (C) 0.005A (D) 0.0025

Ans –(C) 0.005A

186. The maximum resistance which can be made using four resistors, each of resistance 1/2Ω is

(A) 2Ω (B) 1Ω (C) 2.5Ω (D) 8Ω

Ans- (A) 2Ω

187. The resistance of a resistor is reduced to half of its initial value if other parameters of the electrical circuit remain unaltered, the amount of heat produced in the resistor will become

(A)Four times (B) Two times (C) Half (D) $1/4^{th}$

Ans- (B) Two times

188. In an electrical circuit two resistors of 2Ω and 4Ω are connected in series to a 6V battery. Find the heat dissipated by the 4Ω resistor in 5s.

(A) 5J (B)10J (C) 20J (D) 30J

Ans – (C) 20J

189. In domestic electric circuits, the wiring with 15A current rating is for the electric devices which have

a) Higher power ratings such as geyser
b) Lower power ratings such as fan
c) Metallic bodies and low power ratings
d) Non-metallic bodies and low power ratings

Ans- (A) Higher power ratings such as geyser

190. If the current through a resistor is increased by 100% (assume that temperature remains unchanged) the increase in power dissipated will be

(A) 100% (B) 200% (C) 300% (D) 400%

Ans- (C) 300%

191. Electrical resistivity of a given metallic wire depends upon

(A) Its length (B) Its thickness

(C) Its shape (D) Nature of the material

Ans- (D) Nature of the material

192. A cylindrical conductor of length L and uniform area of cross-section A has resistance R. Another conductor of length 2 L and resistance R of the same material has area of cross-section

(A) A/2 (B) 3A/2 (C) 2A (D) 3A

Ans – (C) 2A

193. The resistivity does not change if
a) The material is changed
b) The temperature is changed
c) The shape of the resistor is changed
d) Both material and temperature are changed
Ans- (C) The shape of the resistor is changed

194. An electric kettle consumes 1kW of electric power when operated at 220V. A Fuse wire of what rating must be used for it?
(A) 1A (B) 2A (C) 4A (D) 5A
Ans- (D) 5A

195. Two resistors of resistance 2 ohm and 4 ohm when connected to a battery will have
a) Same current flowing through them when connected in parallel
b) Same current flowing through when connected in series
c) Same potential difference across them when connected in series
d) Different potential difference across them when connected in parallel
Ans- (B) Same current flowing through when connected in series

196. Unit of electric power may also be expressed as
(A) Volt Ampere (B) Kilowatt Hour
(C) Watt second (D) Joule second
Ans- (A) Volt Ampere

197. An electric refrigerator rated 400W operates 8h per day. The cost of the energy to operate it for 30 days at Rs 3 per kWh is
(A) Rs 288 (B) Rs 320 (C) Rs 430 (D) 190
Ans- (A) Rs 288

198. An electric heater is rated 100W and 220V. If it is operated in 110V, the power consumption will be
(A) 10W (B) 25W (C) 15W (D) 100W
Ans-(B) 25W

199. The strength of magnetic field inside a long current carrying straight solenoid is
a) More at the ends than at the center
b) Minimum in the middle
c) Same at all points
d) Found to increase from one end to the other
Ans – (C) Same at all points

200. Which of these devices works due to the magnetic effect of electric current
(A) LED bulb (B) Electric bell
(C) Electric heater (D) Mobile charger
Ans- (B) Electric bell

201. Force on a current carrying conductor in a magnetic field depends on
(A) Direction of current (B) Direction of magnetic field
(C) Both a and b (D) Length of the wire
Ans-(C) Both a and b

202. The most important safety method used for protecting home appliances from short circuiting or over loading is
(A) Earthing (B) Use of fuse
(C) Use of stabilizers (D) Use of electric meter
Ans-(B) use of fuse

203. To avoid risk of electrical shock which phenomena is used?
(A) Over loading (B) Short circuiting

(C) Earthing (D) None of the above
Ans- (C) Earthing

204. On which part of human eye, the image at on object is formed?
(A) Retina (B) Cornea (C) Eyeball (D) Iris
Ans: (A)

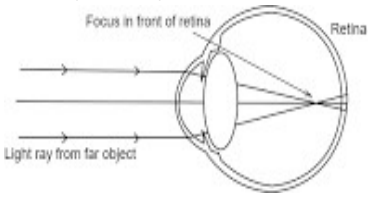
205. S.I unit af electric charge is :
(A) Watt (B) Kilowatt (C) Coulomb (D) Ampere
Ans: (C)

206. The human eyes can focus on objects at different distances by adjusting the focal length of the eye lens. This is due to
(A) accommodation (B) Presbyopia
(C) near sightedness (D) Far sightedness
Ans - (A)

207. The least distance of distinct vision for a young adult with normal vision is about
(A) 25m (B) 2.5 cm (C) 2.5 cm (D) 25 cm
Ans: (D)

208. The device used to measure the intensity and direction of current in a circuit is
(A) Ammeter (B) Voltmeter (C) Galvanometer (D) Battery
Ans (C)

209. Observe the given figure. Identify the eye defect indicated in this figure.



(A) Presbyopia (B) Hypermetropia (C) Myopia (D) Cataract
Ans (C)

210. A piece of wire of resistance R is cut into five equal parts are then connected in parallel. If the equivalent resistance of this combination is R, then the ratio R/R' is
(A) 1/25 (B) 1/5 (C) 5 (D) 25
Ans (D)

211. Which of the following term does not represent electrical power in a circuit?
(A) I^2R (B) IR^2 (C) VI (D)V^2/R
Ans (B)

212. An electric bulb is rated 220V and 100W. When it operated on 110V, the power consumed will be
(A) 100W (B) 75W (C) 50W (D)25W
Ans (D)

213. The image formed by a convex mirror is always
(A) real and magnified (B) real and diminished
(C) virtual and diminished (D) virtual and magnified
Ans (C)

214. Kilowatt hour is the unit of
(A) Resistivity (B) Conductivity (C) Electrical energy (D) Electrical power
Ans :(C)

215. A 10 mm length pin is placed vertically in front of a concave mirror . A 5mm long image of the pin is formed at 30 cm in front of the mirror. The focal length of the mirror is

(A) -30 cm. (B) -20 cm.
(C) - 40 cm. (D) - 60 cm.
Ans: (B)

216. A light ray enters from medium "A" to medium "B". The refractive index of medium "B" relative to "A" will be
(A) greater than unity (B) less than unity
(C) equal to unity (D) zero
Ans: (A)

217. The speed of light in air is
(A) 3×10^{8} m/s (B) 3×10^{-8} m/s
(C) 3×10^{18} m/s (D) 3 x 10 m/s
Ans. (A)

218. The radius of curvature of a spherical mirror is 3 cm. What is its focal length?
(A) 1.5 cm (B) 3 cm (C) 4.5 cm (D) 6 cm
Ans: (A)

219. At the time of short circuit, the current in the circuit
(A) reduce substantially (B) does not change
(C) increases heavily (D) vary continuously
Ans: (C)

220. One milliampere (1 mA) is equal to
(A) 10^{-3}A (B) 10^{-6}A (C) 10^{3}A (D) 10^{6}A
Ans: (A)

* * *

Section-B

Short Answer Questions (2 Marks)

[Physics]

1. State the laws of reflection of light.
Ans:

- The angle of incidence is equal to the angle of reflection, ∠i = ∠r
- At the point of incidence, the incident ray, the reflected ray and the normal lie in the same plane.

2. Why do we prefer a convex mirror as a rear-view mirror in vehicles? Give two reasons.
Ans:

- Convex mirror always gives an erect, virtual, full size diminished image of distant objects.
- It can cover a wider field of view. Thus, it enable the driver to view much larger area than would be possible with a plane mirror.

3. The radius of curvature of a spherical mirror is 20 cm. What is its focal length?
Ans:

Given, radius of curvature R = 20cm, f is the focal length
we know, R = 2f,

$$f = \frac{r}{2}$$

or, $$f = \frac{20}{2}$$

∴ f = 10 cm.

4. Define power of a lens. Write its mathematical expression. State the SI unit of power of a lens.
Ans. Power of a lens is defined as the reciprocal of focal lens in meters.
Mathematically, $p = \frac{1}{f}$; f in meters
The SI unit of a lens is called dioptre.

5. A doctor has prescribed a corrective lens of power +1.5 D. Find the focal length of the lens. Is the prescribed lens diverging or converging?
Ans. Since Power = +1.5 D
Using the relation,
P = $1/f$; f is in meters
Or, +1.5 = 1 /f
Or, f = 1/ +1.5
Or, f = +0.67 m
Therefore, f = + 0.67m or 67 cm.
Finally, since focal length is positive.
So, the lens is converging.

6. State the laws of refraction of light.
(i) The incident ray, the refracted ray and the normal to the surface of the separation of the 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 of given colour, for the given pair of media.

7. Define the following terms: (*only two will be asked in exam*)
(a) Refractive index (b) Magnification (c) Reflection (d) Refraction

Ans.

a) The ratio between the sine of angle of incidence in one medium to the sine of angle of refraction in another medium is called refractive index of the second medium with respect to the first medium.
b) The ratio between the height of the image produced by the mirror to the height of the object is called linear magnification.
c) When a ray of light travelling through a certain medium strike an opaque but a smooth surface, it bounces off the surface into the original medium, this phenomenon is called reflection of light.
d) The phenomenon due to which a ray of light deviates from its path, at the surface of separation of two media, when the ray of light is travelling from one optical medium to another optical medium, is called refraction.

8. The speed of light in the glass is $2x10^8$ m/s and the speed of light in vacuum is $3x\ 10^8$ m/s. Find the refractive index of glass.

Ans. Given,

Speed of light in glass (v) = 2×10^8 m/s.

Speed of light in vacuum (c) = 3×10^8 m/s.

Using the relation,

refractive index (μ) = c/v

$\mu = c/v$

$\mu = 3x10^8 / 2x\ 10^8$

$\mu = 1.5$

9. State any two uses of a concave mirror.

Ans.

(i) It is used as shaving mirror. The reason being that when the face of a person is between pole and the principal focus of a concave mirror, an erect, enlarged and virtual image is formed behind the mirror.
(ii) It is used as a reflector in the headlights of automobiles. The bulb is placed close to the principal focus of the concave mirror when a powerful parallel beam of light is formed.

10. An object is placed at a distance of 10 cm from a convex mirror of focal length 15 cm. Find the position of the image formed by the mirror.

Ans. Since the mirror is convex, therefore,

Object distance 'u' = – 10 cm.

Focal length 'f' = + 15 cm.

According to mirror formula,

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

$$\frac{1}{(-10)}+\frac{1}{v}=\frac{1}{15}$$

$$-\frac{1}{10}+\frac{1}{v}=\frac{1}{15}$$

$$\frac{1}{v}=\frac{1}{15}+\frac{1}{10}$$

$1/v = 25/150$

$v = 150/25$

$v = 6$ cm

Since 'v' is + ve the image is formed behind the mirror.

11. What is meant by power of accommodation of the eye? What is the far point and near point of the human eye with normal vision?

Ans:

- The process by which the ciliary muscles alter the focal length, so as to focus nearer or far-off objects clearly on the retina is called the power of accommodation of the eye
- Far point of a normal eye is infinity and the near point of the eye is 25 cm.

12. Why do stars twinkle?

Ans. The twinkling of a star is due to atmospheric refraction of starlight. The starlight, on entering the earth's atmosphere undergoes refraction continuously before it reaches the earth.

13. Why does the sky appear dark instead of blue to an astronaut?

Ans. This is because at such huge heights of the astronaut, there is no atmosphere to scatter the sunlight. Therefore, the sky appears dark.

14. What is presbyopia? How is the defect corrected?

Ans. The power of accommodation of the eye usually decreases with ageing. For most people, the near point gradually recedes away. They find it difficult to see nearby objects comfortably and distinctly without corrective eye- glasses. This defect is called Presbyopia. This defect is corrected by using convex lens of proper focal length.

15. Why does the sun appear yellowish?

Ans. When the violet, indigo and blue colours scatter in the upper atmosphere, the resultant sunlight is yellowish in colour. When this light enters our eyes, then to us sun appears yellowish instead of white hot.

16. Why is the colour of the clear sky blue?

Ans. The clear sky appears blue because violet and blue lights get scattered more than lights of all other colours by the atmosphere. This is primarily because the wavelengths of these colours are smaller than those of other colours.

17. Name the factors which determine the resistance of a conductor.

Ans: The factors which determine the resistance of a conductor are

- length of the conductor;
- area of cross-section of the conductor;
- nature of the material of the conductor; and
- temperature of the conductor.

18. State Ohm's law. Write the mathematical expression.

Ans: *Ohm's law:* 'The potential difference, V, across the ends of a given metallic wire in an electric circuit is directly proportional to the current flowing through it, provided its temperature remains the same.'

The mathematical expression is V = IR,

Where V is the potential difference, I is the current and R is the resistance of the conductor.

19. What is heating effect of current? Name two electrical appliances which work on this effect.

Ans: When an electric current passes through a conductor for some time, heat is produced in it. This is called heating effect of electric current.

Two electrical appliances which work on this effect are electric iron and water heater.

20. Define resistivity of a material. Write the mathematical formula of resistivity.

Ans: Resistivity is defined as the resistance offered to current flow by a conductor of unit length having unit area of cross-section.

The mathematical formula of resistivity is $\rho = RA/l$, where ρ is the resistivity, R is the resistance of the conductor, A is the area of cross-section of the conductor and l is the length of the conductor.

21. Why is Tungsten used almost exclusively for filament of electric lamps?

Ans: Tungsten is used for making filament of electric bulbs due to the following reasons-

- It has a high melting point.
- It has high resistivity.
- It does not oxidize easily even at high temperature.

22. Why is the series arrangement not used for domestic circuits?

Ans: The series arrangement is not used for domestic electric circuits due to the following reasons:

- If any one of the component stops working, the circuit is broken and none of the devices work.
- All the appliances have only one switch due to which they cannot be turned on or off separately.
- The appliances do not get the same voltage (220V) as that of the power supply line.

23. A current of 0.5 A is drawn by a filament of an electric bulb for 10 minutes. Find the amount of electric charge that flows through the circuit.

Ans. Solution: Given, Current(I) = 0.5 A

Time(t) = 10 minutes =10x60 = 600 seconds

Charge(Q) = ?

Using, Q = It

= 0.5 x 600

= 300 Coulomb

24. An electric iron of resistance 20 Ω takes a current of 5A. Calculate the heat developed in 30 seconds.

Ans. Solution: Given, Current (I) = 5 A

Resistance (R) = 20 Ω

Time (t) = 30 seconds

Heat (H) = ?

Using, $H= I^2Rt$

$= 5^2$ x 20 x30

= 25x 20 x30

= 15000 J

25. How much work is done in moving a charge of 2C across two points having a potential difference 12 V?

Ans. Solution: Given, Charge (Q) = 2C

Potential difference (V) = 12 V

Work = ?

Using, W = VQ

= 12 x 2

= 24 J

26. When a 12V battery is connected across an unknown resistor, there is a current of 2.5 mA in the circuit. Find the value of the resistance of the resistor.

Ans. Solution: Given, Potential difference (V) = 12 V
Current (I) = 2.5 mA = 2.5×10^{-3} A
Resistance (R) = ?

Using, V =IR
R = V/I
= $12/2.5 \times 10^{-3}$
= $12 \times 10^{3} / 2.5$
= 4800 Ω

27. List two properties of magnetic field lines.
Ans:
- Magnetic field lines are closed curves.
- Two magnetic field lines never intersect each other.

28. Why does a compass needle get deflected when brought near a bar magnet?
Ans: The magnetic field of the magnet exerts force on both the poles of the compass needle. The forces experienced by the two poles are equal and opposite. These two forces form a couple and deflect the compass needle.

29. Write two precautions that should be taken to avoid the overloading of domestic electric circuits?
Ans: To avoid overloading of domestic electric circuits, the following precautions should be taken:
- The wires used in the circuit must be coated with good insulating materials.
- High power appliances like air- conditioner, refrigerator, water heater, etc. should not be used simultaneously.

30. What is the function of an earth wire? Why is it necessary to earth metallic appliances?
Ans: The main function of earth wire is to protect appliances from sudden damage due to leakage of current.
The earthing of metallic appliances is necessary to prevent severe electric shock to the users. The metallic body of electric appliances is connected to earth wire so that any leakage of electric current is transferred to the ground.

31. State right hand thumb rule.
Ans: It states that, if you hold the current carrying straight wire in the grip of your right hand in such a way that the thumb points in the direction of current, then the direction of the curl of the fingers will give the direction of the magnetic field.

32. What is an electric fuse? What is its role in electric circuits?
Ans: Electric fuse is a safety device consisting of a thin wire made of an alloy of lead and tin having low melting point. It is used to prevent damage caused by overloading and short-circuiting.

[Chemistry]

33. Calcium oxide reacts with water. Justify your answer by giving balanced chemical equation for the chemical reaction?
Ans: Calcium oxide reacts vigorously with water to produce slaked lime (Calcium hydroxide) releasing a large amount of heat.

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

(Quick lime) (Slaked lime)

34. What do you mean by decomposition reaction? Give one example.

Ans: In which chemical reaction a single reactant breaks down to give simpler products are known as decomposition reaction.

e.g.: $CaCO_3(s) \rightarrow CaO(s) + CO_2(g)$

35. What would you observe when zinc is added to a solution of Ferrous Sulphate? Write the chemical reaction that takes place.

Ans: The chemical reaction will take place when zinc is added to the ferrous sulphate solution as we know zinc is more reactive than iron so it will replace iron from the salt solution and will lead to the formation of zinc salt and iron will be produced. This type of reaction is called a displacement reaction.

$Zn(s) + FeSO_4(aq) \rightarrow ZnSO_4(aq) + Fe(s)$

36. State two ways to prevent the rusting of Iron.

Ans: The rusting of Iron can be prevented by painting, oiling, greasing, galvanizing, chrome plating, anodizing or making alloys.

37. What is rust? Give the equation for the formation of rust.

Ans: When Iron exposed to moist air for a long time acquires a coating of a brown flaky substance is called rust.

The chemical reaction can be represented as:

$4\,Fe(s) + 3O_2(g) + 2H_2O(aq) \rightarrow 2Fe_2O_3.xH_2O$

38. (a) Define balanced chemical equation.

(b) Balance the following chemical equation:

$Fe + H_2O \rightarrow Fe_3O_4 + H_2$

Ans: (a) The equation in which number of atoms of each type involved in a chemical reaction are the same on the reactant and product sides of the equation, is known as balanced chemical equation.

(b) $3Fe + 4H_2O \rightarrow Fe_3O_4 + 4H_2$

39. Why do we store silver chloride in dark coloured bottles? Write chemical reaction involved.

Ans: We store silver chloride in dark coloured bottles because silver chloride turns grey in sunlight due to the decomposition of silver chloride into silver and chlorine by light.

$2\,AgCl \rightarrow 2\,Ag + Cl_2$

40. What is a neutralization reaction? Give one example.

Ans: The reaction between an acid and a base to give a salt and water is known as a neutralization reaction.

Example: (i) $NaOH(aq) + HCl(aq) \rightarrow NaCl(aq) + H_2O(l)$

(ii) $KOH + HCl \rightarrow KCl + H_2O$

41. Give the two important uses of Baking Soda.

Ans: The uses of Baking Soda are:

heat

- Sodium hydrogen carbonate is also an ingredient in antacids. Being alkaline, it neutralizes excess acid in the stomach and provides relief.
- It is also used in soda-acid fire extinguishers.

42. What is the common name of the compound $CaOCl_2$? Give its two uses.

Ans: The common name of the compound $CaOCl_2$ is Bleaching Powder. The uses of Bleaching Powder are as follows:

(i) To make drinking water free from germs.

(ii) As an oxidizing agent in many chemical industries.

43. Why does dry *HCl* gas not change the colour of the dry litmus paper?

Ans: The colour of litmus paper changes only in the presence of ions like hydrogen (H^+) or hydronium (H_3O^+) ions. *HCl* can produce these ions only in the form of aqueous solution. Hence dry *HCl* gas does not change the colour of dry litmus paper.

44. Why does the aqueous solution of an acid conduct electricity?

Ans: The presence of hydrogen ions in an aqueous acid solution causes it to conduct electricity. Only in the presence of ions can electricity be conducted. Their heated nature is the cause behind this.

45. Write an equation to show the reaction between plaster of Paris and Water? Give one use for medical purpose.

Ans: $CaSO_4.½\ H_2O + 1½\ H_2O \rightarrow CaSO_4.2H_2O$

(Plaster of Paris) (Gypsum)

Plaster of Paris use as for supporting fractured bones in the right position.

46. Give two important uses of Washing Soda.

Ans: The uses of Washing Soda are

- Washing soda is used in glass, soap and paper industries.
- It is used in the manufacture of sodium compounds such as borax.
- Sodium carbonate can be used as a cleaning agent for domestic purposes.
- It is used for removing permanent hardness of water.

(*Write any two in the exam*)

47. How bleaching powder can be prepared? Give chemical equation.

Ans: Bleaching powder is produced by the action of chlorine (Cl_2) on dry slaked lime [$Ca(OH)_2$].

Bleaching powder is represented as $CaOCl_2$.

$Ca(OH)_2 + Cl_2 \rightarrow CaOCl_2 + H_2O$

48. Explain the meanings of malleable and ductile.

Ans: Some metals can be beaten into thin sheets. This property is called malleability. The ability of metals to be drawn into thin wires is called ductility.

49. Give an example of a metal which

a) Is a liquid at room temperature.
b) Can be easily cut with a knife.
c) Is the best conductor of heat.
d) Is a poor conductor of heat.

Ans: (a) Mercury (Hg)
(b) Sodium (Na)
(c) Silver (Ag)
(d) Lead (Pb)

50. What happens when metals react with acids? Give one example.

Ans: When metals react with acids to produce salt and hydrogen gas.

$Zn + 2HCl \rightarrow ZnCl_2 + H_2$

(Zinc) (Hydrochloric acid) (Zinc chloride) (Hydrogen)

51. Why is Sodium kept immersed in Kerosene oil?

Ans: Sodium is high reactive element. If it is kept in open, it can explosively react with oxygen

to catch fire. Hence to prevent accidental damage sodium is immersed in kerosene oil.

52. Why do ionic compounds have high melting points?

Ans: The ionic compounds are made up of positive and negative ions which have the strong force of attraction between opposite charged ions. So, a lot of heat energy is required to break this force of attraction or ionic bond. That is why ionic compounds have high melting points.

53. What are the constituents of solder alloy? Which property of solder makes it suitable for welding electrical wires?

Ans:

- Solder is an alloy of Lead (Pb) and Tin (Sn). Its composition is 50% Lead (Pb) and 50% Tin (Sn).
- The melting point of Solder is very low and is even lower than its constituting metals (Pb and Sn). Thus, the low melting point of solder makes it suitable for welding electrical wires.

54. Write the chemical reaction of zinc metal and dilute H_2SO_4. In this reaction H_2 gas is produced, but the reaction between zinc metal and dil. HNO_3 do not produce H_2 gas. Why?

Ans: When we pour dilute sulphuric acid on zinc, zinc sulphate is formed and the hydrogen gas is evolved. On reaction of zinc with sulphuric acid the salt formed is a white colour substance which is zinc sulphate is also known as white vitriol.

The balanced chemical equation is given below:

$Zn\,(s) + H_2SO_4(aq) \rightarrow ZnSO_4(aq) + H_2(g)$

Nitric acid is a very strong oxidising agent and hence it leads to the addition of oxygen to another substance. Thus, when hydrogen is formed due to addition of nitric acid on zinc metal it oxidises hydrogen to water.

The balanced chemical equation is given below:

$Zn + 4HNO_3 \rightarrow (NO_3)_2 + 2NO_2 + 2H_2O$

55. Write two Physical properties of Metals?

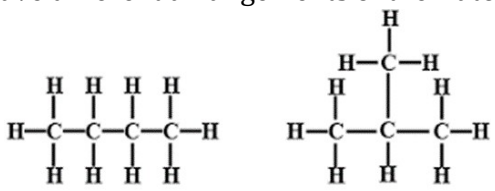
Ans: The Physical properties of Metals are as follows:

(i) Metals are malleable and ductile.
(ii) Metals are good conductors of heat and electricity.
(iii) Metals are lustrous (shiny) and can be polished.
(iv) Metals are solids at room temperature (except mercury, which is liquid).
(v) Metals are tough and strong.

(In exam write only two)

56. What are isomers? Write the formula of any two isomers of butane?

Ans: An isomer is a molecule with the same molecular formula as another molecule, but with a different chemical structure. That is, isomers contain the same number of atoms of each element but have different arrangements of their atoms.

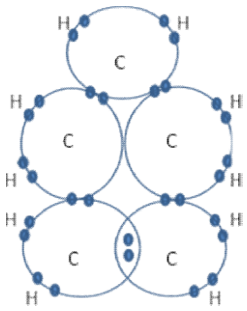


***n*-butane, $CH_3CH_2CH_2CH_3$ isobutane,$(CH_3)_3CH$**

57. What will be the formula and electron dot structure of cyclo-pentane?

Ans: The formula of Cyclo-pentane is C_5H_{10}

Electron dot structure is:



58. Why micelle formation take place when soap is added to water?

Ans: A soap molecule has two ends which have different properties, one end is polar, i.e., hydrophilic and is water soluble while the other end is non-polar, i.e. hydrophobic, and hence water insoluble. When soap is added to water, the polar ends dissolve in water while the non-polar end dissolve in each other. As a result, spherical ionic micelles are formed.

59. What is hydrogenation? What is its industrial application?

Ans: The addition of hydrogen to an unsaturated compound in the presence of nickel or palladium catalyst to obtain a saturated compound is called hydrogenation.
Hydrogenation is used in industry to prepare vegetable ghee from vegetable oils.

60. Why are covalent compounds generally poor conductors of electricity?

Ans: Covalent compounds generally poor conductors of electricity because a covalent bond is formed between non-metal atoms which combine together by sharing electrons. Covalent compounds have no free electrons and no ions so they don't conduct electricity.

61. Write the general formula of alkanes? Give the names of two alkanes having 3 carbon atoms and the other having 4 carbon atoms.

Ans: The general formula for alkanes is C_nH_{2n+2}
Where n stands for number of carbon atoms and 2n+2 for number of hydrogen atoms. The alkane having 3 carbon atoms is Propane (C_3H_8) and the alkane having 4 carbon atoms is Butane (C_4H_{10})

62. Why detergents are better cleansing agents than Soap? Explain.

Ans: Detergent is preferred over soaps due to the following reasons:

a. Detergent can be used in hard water for washing whereas soaps cannot be used in hard water as soaps form scums that stick to the fabric and make the cleaning difficult.
b. Detergent can be used in acidic solution nut soaps decompose in acidic solution and forms free fatty acids.

63. A gas is evolved when ethanol reacts with sodium. Name the gas evolved and also write the balanced chemical equation of the reaction involved.

Ans: When ethanol reacts with sodium, then hydrogen gas is evolved. This reaction can be given by following equation:

$$2Na + 2CH_3CH_2OH \rightarrow 2CH_3CH_2Ona + H_2$$

64. Why do acids not show acidic behavior in the absence of water?

Ans: Water helps in the dissociation of an acid to give hydronium ions (H_3O^+). In the absence of water, these ions are not produced. Hence, acids show acidic behavior only in the presence of water.

[Biology]

65. How doesthe embryo getnourishment and generate waste substance?

Ans. The embryo get nourishment from the mother's blood through placenta. Placenta attaches the foetus to the uterine wall. It also provides nutrients to the foetus and also

allows the foetus to transfer waste products to the mother's blood.

66. Name two bacterial infections and two viral infections of sexually transmitted diseases.
Ans. The bacterial infections are gonorrhea and syphilis and two viral infections are Warts and HIV-AIDS

67. What is the function of digestive enzymes?
Ans. Enzymes are proteins which catalyse the biological reactions. Digestive enzymes, secreted by digestive glands located in different parts of alimentary canal, help in the digestion of carbohydrates, proteins and fats.

68. Write the difference between dominant genes and recessive genes. (any two points)

Dominant genes	Recessive genes
1 The gene which decides the appearance of an organism even in the presence of an alternative gene is known as dominant gene	1 The gene which decides the appearance of an organism only in the presence of another identical gene is called recessive gene.
2. Dominant gene is denoted by a capital letter	2. Recessive gene is denoted by a small letter.

69. Define the term variation. Write the expanded form of DNA.
Ans. The differences among the individuals of a plant or animal of a species are called variations. Expanded form of DNA is "Deoxy ribo- Nucleic Acid".

70. Define heredity. Who is known as the Father of Genetics.
Ans: Heredity is the transmission of traits from one generation to the following generation.
Gregor Johann Mendel is known as the father of heredity (Genetics)

71. How will you differentiate between inherited traits and acquired traits by giving one example of each type?

Ans:

Inherited Traits	Acquired Traits
These are the characteristics that an individual inherits from his parents and can be passed into the next generation. These characteristics include eye color, skin complexion, hair color etc.	These are the characteristics that an individual develops during his life time and cannot be passed into the next generation. These characteristics include skills, knowledge, development of muscles etc.

72. Give the scientific name of the plant used by Mendel for his experiment. What type of progeny was obtained by Mendel in F_1 and F_2 generation when he crossed the tall and short plant?
Ans: The scientific name of the plant which Mendel used for his experiment on inheritance is Pisum Sativum (pea plant).

When Mendel performed a cross between tall plant and short plant, he found that all the plants in F_1 generation (first generation) were tall, whereas in F_2 generation (second generation) only one (25%) –forth (75%) of the plants were short. The ration obtained in both the generations was 3:1 (Tall:Short)

73. What is zygote? How is the sex of the child determined in human beings?
Ans: Fertilized egg that results from the union of a female gamete (egg) with a male gamete (sperm) is called zygote.

A child which inherits X chromosomes from the father will be a girl and one who inherits Y chromosomes from him will be a boy.

74. How does the creation of variations in a species promote survival? Write the full form of DNA.

Ans: Variations help to adapt in the changing environment which promote the survival of a species.

The full form of DNA is Deoxyribo Nucleic Acid

75. A man with blood group A marries a woman with blood group O and their daughter hasblood group O. Is this information enough to tell you which of the traits – blood group A or O isdominant? Why or Why not?

Ans: No, this information is not sufficient to determine which of the traits – blood group A or O – is dominant. This is because we do not know about the blood group of all the progency as blood group A can be genotypically AA or AO, which is incomplete to draw any such conclusion.

76. Which type of reproduction is best survival? Why?

Ans: Sexual reproduction.

Sexual reproduction produces a new combination of genes in the offspring that may enable them to survive in the changing environment and help in the survival of the species.

77. What is the role of decomposers in the ecosystem?

Ans: the role of the decomposers in the ecosystem are

a) They act as environment cleaners by decaying dead plants and animals.
b) They help in recycling of nutrients in the soil.

78. What are trophic levels? Give an example of a food chain and state the different trophic levels in it.

Ans: The various links or steps in a food chain at which the transfer of food and energy takes place care called trophic levels.

An example of a food chain:
Producers → First trophic level
Primary consumers → Second trophic level
Secondary consumers → third trophic level
Tertiary consumers → fourth trophic level

79. Give any two ways in which non-biodegradable substances would affect the environment.

Ans: Non-biodegradable substances would affect the environment in the following ways:

a) They cause soil, air and water pollution.
b) They can block the ecological balance of an ecosystem.

80. What changes can you make in your habits to become more environment friendly?

Ans: Habits to become more environment friendly are:

a) Using the 3 R's (Reduce, Reuse and Recycle)
b) Reducing the use of plastics.
c) Planting more trees in the surrounding.
d) Using the resources wisely.

81. If all the waste we generate in biodegradable, will this have no impact on the environment?

Ans: Biodegradable wastes can also affect the environment. During the process of decomposition, these wastes can be led to negative impacts like smell and possibility of sparking an epidemic, if they are dumped near a residential area.

82. What is systolic pressure? What is the normal systolic pressure in human beings?

Answer: The pressure of blood inside the artery during ventricular systole is called systolic pressure. The normal systolic pressure is about 120 mm of Hg.

83. What is diastolic pressure? What is the normal diastolic pressure in human beings?

Answer: The pressure of blood inside the artery during ventricular diastole is called diastolic pressure. The normal systolic pressure is about 80 mm of Hg.

84. Where is urine produced and stored?

Answer: Urine is produced in the kidneys. It is stored in the urinary bladder.

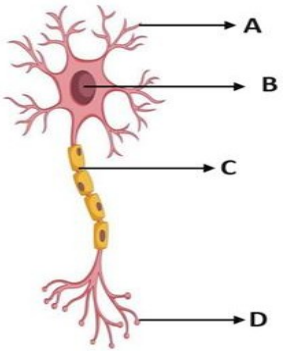
85. How are fats digested in our bodies?

Answer: Fats reach the small intestine in the form of large globules. Bile juice/salts breaks down large globules into smaller globules.The pancreatic enzyme, lipase acts and breaks down the globules into molecules. Intestinal juices finally convert these molecules into fatty acids and glycerol.

86. Name the three major parts or regions of the brain. Which part of the brain is the main thinking part?

Answer: The following are the three major parts or regions of the brain: Forebrain, Midbrain and Hindbrain. The cerebrum is the main thinking part of the brain.

87. Name the parts labeled as: A, B, C and D.



Ans: A – Dendrites, B – Nucleus, C – Axon, D – Nerve ending.

88. Define chemotropism. Give one example of chemotropism.

Answer: Movement of plants in response to chemical stimulus is known as chemotropism. One example of chemotropism is growth of pollen tubes towards ovules.

89. Name any four plant hormones.

Answer: The following are four plant hormones:

a)Auxins; b) Gibbberalins; c) Cytokinins; and d) Abscicic acid

90. How does our body respond when adrenaline is secreted into the blood?

Answer: When adrenaline is secreted directly into the blood and carried to different parts of the body:

- Our heart beats faster, resulting into more supply of oxygen to our muscles.
- The blood to the digestive system and skin is reduced due to contraction of muscles around small arteries in these organs.
- The breathing rate increases due to the contraction of the diaphragm and the rib

muscles.
- The body is ready to deal with any situation.

91. Give ANY TWO examples of organisms that reproduce by binary fission.
Answer: Amoeba and leishmania.

92. Write ANY TWO advantages of vegetative propagation.
Answer: The two advantages of vegetative propagation are:
- Plants raised by this method bear flowers and fruits earlier than those produced from seeds.
- All plants produced by this method are genetically similar enough to the parent plant and have all its characteristics.

93. What is pollination? Name the two types of pollination.
Answer: The transfer of pollen grain from the anther to the stigma of a flower is known as pollination.
The two types of pollination are: a) self pollination and b) Cross pollination.

94. What is the role of acid in our stomach?
Ans. The hydrochloric acid present in our stomach dissolves bits of food and creates an acidic medium which converts enzyme pepsinogen into pepsin, which is a protein digesting enzyme. It also kills the bacteria which enters our stomach through food.

95. Why is the use of iodised salt advisable?
Ans. Iodine is essential for the synthesis of thyroxine hormone in the thyroid gland. The thyroxine, in turn regulates carbohydrates, proteins and fat metabolism in the body for growth. Deficiency of iodine results in goiter. Thus, use of iodised salt is advisable to prevent iodine deficiency in the body.

96. What is the function of medulla oblongata?
Ans. Medulla oblongata controls rate of heart beat, breathing movements,expansion and contraction of blood vessels to regulate blood pressure, swallowing, coughing, sneezing, vomiting etc.

97. How is the process of pollination different from fertilization?
Ans. Pollination is the transfer of pollen grains from the opened anther of the stamen to the receptive stigma of the carpel whereas fertilization is the fusion of male and female gametes resulting in the formation of zygote.

98. Why are traits acquired during the life- time of an individual not inherited?
Ans. This happens because an acquired trait involves in non- reproductive tissues (somatic cells) which cannot be passed on to germ cells or the progeny. Therefore, these traits cannot be inherited.

99. Why is DNA copying an essential part of the process of reproduction?
Ans. The process of reproduction results in the production of offsprings which are exactly similar to parents. The exact blue prints of body design is inherited in the offsprings due to DNA replication
in parent cell. Thus, DNA copying is an essential part of the process of reproduction.

100. What is ozone? Give its function.
Ans. Ozone is a form of oxygen, its molecule contains three oxygen atoms. It shields the earth's surface from ultra - violet radiation from the sun.

Section-C
Short Answer Questions (3 Marks)

[Chemistry]

1. What is the chemical name of Baking Soda? Write down its chemical formula. How is it produced? (Give relevant chemical equation)

Ans : The Chemical name of baking Soda is Sodium hydrogen carbonate. Its chemical formula is $NaHCO_3$.

It is produced by passing carbon dioxide through ammoniacal brine.

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

2. 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.

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

$Al_2O_3 + 2NaOH \longrightarrow NaAlO_2 + H_2O$

3.Plaster of Paris has to be stored in a moisture proof container . Why?

Ans: Plaster of Paris is Calcium sulphate hemihydrate, $CaSO_4 . ½ H_2O$ and when the water of crystallization is added to it , gympsum ($CaSO_4 . 2H_20$) is formed which is a hard material.

By storing Plaster of Paris in a moisture – proof container, it helps to prevent hardening and ensures its effectiveness and shelf life.

4.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”.

5. What is aqua regia? Write its characteristics.

Ans: Agua regia is a freshly prepared mixture of concentrated hydrochloric acid and concentrated nitric acid in the ratio of 3:1.

Aqua regia has the following characteristics:

- Aqua regia can dissolve gold and platinum even though neither of these acids can do so alone.
- Aqua regia is a highly corrosive fuming liquid.

6. What is corrosion ? Mention two ways of preventing corrosion.

Ans: Corrosion is a natural process that occurs when metals undergo a chemical reaction with substances around them such as moisture, air or acids. This results in deterioration and damage.

Two ways of preventing corrosion:

i) Galvanisation: A method of protecting steel and iron from rusting by coating them with a thin layer of zinc.
ii) Alloying: An Alloy is a homogenous mixture of a metal with one or more elements

(metal or non- metal) to create a new material with enhanced properties, including corrosion resistance.

7. i) Name the acid present in the atmosphere of Venus.
ii)Why does dry HCl gas not change the colour of a dry litmus paper?

Ans: i) The acid is Sulphuric Acid.
ii)Litmus paper is a weak acid-base indicator that responds to aqueous solution and not respond to dry gases. Dry HCl is not in aqueous solution, so it does not trigger a colour change in the dry litmus paper.

8. Write down the chemical reaction that takes place between sodium sulphate and barium chloride. What is the colour of the precipitate formed in this reaction? Name the precipitate.

Ans:

- $Na2SO4\ (aq) + BaCl2(aq) \longrightarrow BaSO4\ (s) + 2NaCl(aq)$
- The colour of the precipitate is white. The precipitate formed is Barium sulphate.

9. Write the molecular formula of bleaching powder. How is bleaching powder prepared?

Ans: The molecular formula of bleaching powder is $CaOCl_2$.
Bleaching powder is synthesized by the action of Chlorine gas (produced from the chlor-alkali process) on dry slaked lime, $Ca(OH)_2$. The chemical equation is as follows:

$$Ca(OH)_2 + Cl_2 \longrightarrow CaOCl_2 + H_2O$$

10. Why are carbon and its compounds used as fuels for most applications?

Ans: Carbon and its compounds are used as fuels for most applications due to the following reasons:

- Carbon and its compounds give out a lot of heat energy and light energy when they are burnt in air.
- Carbon and its compounds are easy to handle.
- Carbon and its compounds burn with a clean flame and no smoke is produced.

11.i)The pH of a sample of tomato juice is 4.6. How is this juice likely to be in taste? Give reason to justify your answer.
(ii) How do we differentiate between strong and weak acids and bases in terms of ion formation in aqueous solution?
(iii) Why do HCl , HNO_3 etc show acidic characters in aqueous solutions while solutions of compounds like alcohol and glucose do not show acidic character.

Ans: i) The tomato juice with a pH of 4.6 is considered to be an acid and therefore will taste sour .
ii) The strength of acids and bases depends on the number of H^+ ions and OH^- ions produced respectively.
iii) HCl, $HNO3$, etc show acidic nature because they get dissolved in the aqueous solution and produce the hydrogen ions. The hydrogen ions are responsible for the acidic nature of the compounds.

12. 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:

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

13. Name the gas used by chips manufacturers to flush into bags of chips. Why is this done?

Ans: The gas used is Nitrogen(N_2) gas.

When food materials prepared in oils and fats are kept for a long time, they undergo a process called Rancidity which gives them a stale smell. This happens due to oxidation of oils and fats by the oxygen present in the air. To prevent rancidity, nitrogen gas is flushed into bags of chips as it prevents oxidation of fats and oils.

14. What is a precipitate? Give an example of a reaction in which a precipitate is formed.

Ans: Insoluble salts can be produced by precipitation reaction when aqueous solutions of two ionic compounds react by exchanging their radicals/ ions. Such an insoluble salt formed is called a precipitate.

Example: $Na_2SO_4\,(aq) + BaCl_2\,(aq) \longrightarrow 2NaCl\,(aq) + BaSO_4\,(\downarrow)$

15. What would you observe when zinc is added to a solution of Iron (II) sulphate? What type of reaction is this? Write the chemical reaction involved.

Ans: Zinc is more reactive than iron. Therefore, when zinc is added to the solution of Iron sulphate Zinc displaces iron from the Iron sulphate solution forming iron and a colourless solution of zinc sulphate.

This reaction is an example of a single displacement reaction.

The reaction is: $FeSO_4 + Zn \longrightarrow Fe + ZnSO_4$

16. Differentiate between Roasting and calcination.

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

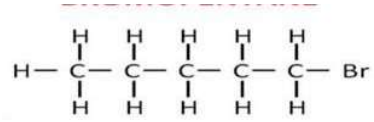
Calcination	Roasting
1. Calcination is a process in which ore is heated in the absence of air or limited supply of air	1. Roasting involves the heating of the ore in the presence of air or oxygen
2. Calcination involves the thermal decomposition of carbonate ores.	2. Roasting is carried out for sulphide ores
3. During calcination, carbon dioxide is given out.	3.During Roasting, large amounts of toxic , metallic and acidic compounds are released.

17. Draw the structure of the following compounds:

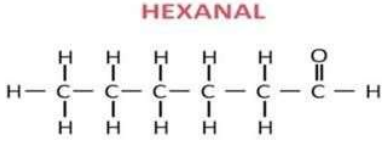
(i) Bromopentane
(ii) Hexanal
(iii) Butanone

Ans:

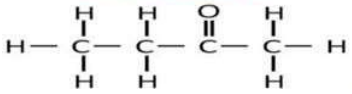
(i)



(ii)



(iii) BUTANONE



18. How are coal and petroleum formed?

Ans:

- **Coal** was formed from dead plants that got buried under soil during natural disasters such as flooding. As more soil deposited over them, they were compressed. The temperature also rose as they sank deeper. Under high temperature and pressure, dead plants got slowly converted to coal.
- **Petroleum** was formed from living organisms living in the sea. As these organisms died, their bodies settled at the bottom of the sea and got covered with layers of sand and clay. Over millions of years, absence of air , high temperature and pressure transformed the dead organisms into petroleum and natural gas.

19. Explain in brief the mechanism of cleansing action of soap.

Ans: Soaps are molecules in which the two ends have different properties , one is hydrophilic , that is it interacts with water and the other end is hydrophobic, that is it interacts with hydrocarbons. When soap is dissolved in water, its hydrophobic ends attach themselves to the dirt .Then the molecules of soap arrange themselves in micelle formation and trap the dirt at the centre of the cluster. Soap in the form of micelle is therefore able to clean because of this unique orientation. The micellesstay in solution and the dirt particles are the easily rinsed away by water.

20. How does ethanoic acid react with carbonates and hydrogen carbonates? Write a chemical equation for each reaction.

Ans: Ethanoic acid reacts with carbonates and hydrogen carbonates to form salt, carbon dioxide and water. The salt produced is commonly called sodium acetate.

The chemical reactions are shown below:

Reaction of ethanoic acid with sodium carbonate:

$$2CH_3COOH + Na_2CO_3 \longrightarrow 2CH_3COONa + H_2O + CO_2$$

Reaction of ethanoic acid with sodium hydrogen carbonate:

$$CH_3COOH + NaHCO_3 \longrightarrow CH_3COONa + H_2O + CO_2$$

[Biology]

21. Give three events that occur during the process of photosynthesis.

Ans:- The three events that occur during the process of photosynthesis are:

- Absorption of light energy by chlorophyll
- Conversion of light energy to chemical energy and splitting of water molecules into hydrogen and oxygen.
- Reduction of carbon dioxide to carbohydrates.

22. Name the glands present in the walls of the stomach. What enzyme does it produce? Give two functions of HCl produced in the stomach.

Ans:-

- The glands present in the walls of the stomach are the gastric glands.
- It produces the enzyme Pepsin.
- Two functions of HCl are :-
  i. It creates an acidic medium which facilitates the action of the enzyme Pepsin

ii. It kills the germs that might have entered the stomach along with the food.

23. What are the differences between Autotrophs and Heterotrophs? Give one example for each.

Ans:- Autotrophs are organism which use carbon dioxide and water to form carbohydrates in the presence of sunlight and chlorophyll. Example plants.

Heterotrophs are organism that depends on other organism for their food. Example animals.

24. Name the organ that produces Bile. Give two functions of Bile.

Ans:- Liver produces Bile.

The two functions of Bile are

i. Food that comes from stomach are acidic and has to be made alkaline for pancreatic enzyme to act. This is made alkaline by Bile.

ii. Bile helps in the emulsification of fat globules i.e. breaking fats into smaller globules.

25. Why is it necessary to separate oxygenated and deoxygenated blood in mammals and birds?

Ans:- It is necessary to separate oxygenated and deoxygenated blood in mammals and birds because of the following reasons:

- Mammals and birds are warm blooded animals that constantly need to maintain their body temperature.
- These organisms need a large amount of oxygen foe cellular respiration to bring out more energy to maintain their body temperature

In animals, like amphibians that do not use energy for these purposes can tolerate mixing of oxygenated and deoxygenated blood.

26. Give three differences between Arteries and Veins.

Ans:- The three differences between Arteries and Veins are :

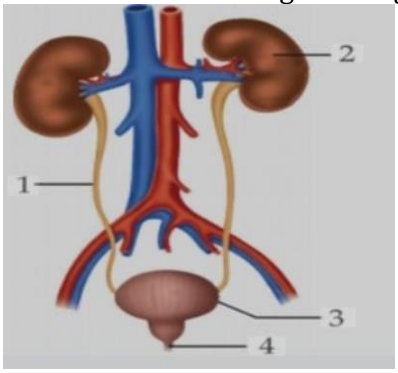
Arteries	**Veins**
1.They carry oxygenated blood	1.They carry deoxygenated blood
2.They carry blood from the heart to various organs	2.They collect blood from different organs and bring it to the heart
3.They have thick elastic walls	3.They have thin walls

27. What is insulin? What is its function? What happens if insulin is not secreted in proper amount?

Ans:-

- Insulin is a hormone which is produced by pancreas.
- It helps in regulating blood sugar levels.
- If it is not produced in proper amount, the sugar level in the blood rises causing many harmful effects.

28. What is excretion? In the given diagram, identify the parts 1,2,3,4



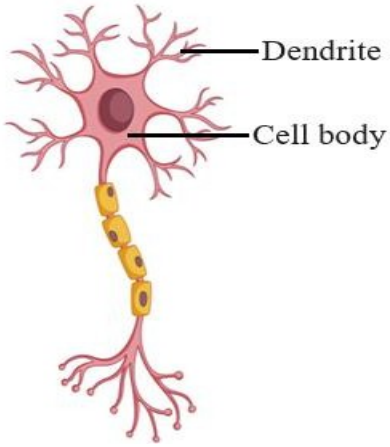
Ans: The biological process involved in the removal of harmful metabolic waste from the body is called excretion.

Parts in the given diagram:

1- Right ureter 2 – Left Kidney 3 – Urinary bladder 4 – Urethra

29. What is neuron? Draw the structure of a neuron and name the parts: (i) Cell body and (ii) Dendrites

Ans:- Neuron is the structural and functional unit of the nervous system.



30. Differentiate between self pollination and cross pollination. Name two agents of pollination.

Ans:-

- If the transfer of pollen grains occur in the flowers of the same plant, it is called self-pollination.
- If the transfer of pollen grains occurs in the flowers of a different plant, it is called cross pollination.
- The two agents of pollination are wind and insects.

31. Give three advantages of vegetative propagation.

Ans:- The three advantages of vegetative propagation are:

i. Plants raised by vegetative propagation can bear flowers and fruits earlier than those produced from seeds.

ii. It makes possible the propagation of plants such as banana, orange, rose, and jasmine that have lost the capacity to produce seeds.

iii. All plants produced are genetically similar enough to the parent plant to have all its characteristics.

32. What are the different methods of contraception?

Ans:- The different methods of contraception are:

i. By creating a mechanical barrier so that sperms do not reach the eggs. Condoms and other similar coverings can prevent sperms reaching the egg.

ii. By changing the hormonal balance of the body so that the eggs are not released and fertilization cannot occur. These are drugs that can be taken orally as pills.

iii. Surgical methods can be used to block vas deference in males and fallopian tubes in female which in both cases fertilization will not take place.

33. State three differences between Aerobic and Anaerobic respiration.

Aerobic respiration	**Anaerobic respiration**
It occurs in the presence of oxygen	It occurs in the absence of oxygen
Glucose is broken down into carbon dioxide and water	Glucose is incompletely oxidised to ethanol or lactic acid
A large amount of energy is released	Very little amount of energy

34. After fertilization, what happens to the Zygote? What happens to the ovule and ovary? What happens to the petals, sepals, stamens, style and stigma?

Ans:

- After fertilization, the zygote divides several times to form an embryo within the ovule.
- The ovule develops a tough coat and forms seeds. The ovary ripens to form a fruit.
- The petals, sepals, stamens and style may shrivel and fall off.

35. What is a reflex action? Trace the sequence of events which occur when a bright light is focuses on your eyes.

Ans:

- Reflex action is a rapid automatic response to a stimulus.
- When light is focuses in our eyes, the receptor relay impulses via sensory nerves to the central nervous system (CNS) and the CNS transmits message (in the form of impulses) to the effectors (muscles in the eye). These muscles reduce the size of the pupil and activates muscles to close the eyes.

36. What is fission? Differentiate between binary and multiple fission.

Ans: Fission is a mode of asexual reproduction in which unicellular organisms divide to create new individuals.

(B) Binary fission is a type of fission where the organism simply split into two equal halves during cell division eg. Amoeba.

Multiple fission is a type of fission where the organism divides into many daughter cells simultaneously. Eg. Plasmodium.

37. Different between Food chain and food web (any 3 points)

Food Chain	**Food Web**
1. It is a linear sequence of energy transfer	1. It is a complex network of inter connected food chains.
2. Food chain is a simple straight chain	2. It is a complex interconnected food chain

3. May consist of 4-6 trophic levels	3. Consists of numerous trophic levels.

38. How is the sex of the child determined in human beings?

Ans: Human beings have 23 pairs of chromosomes. 22 pairs are perfect pairs, but the sex chromosomes in men have one x (normal) and one Y (short one). Women have perfect pair of sex chromosomes both called X. All children will inherit X chromosomes from mother regardless of whether they are boys or girls. Thus, sex of children will be determined by what they inherit from their father. If they inherit and X chromosomes from their father, they will be girls. It they inherit a Y chromosome they will be boys.

39. How is ozone produced in the environment? What causes its depletion?

Ans: The UV radiation from the sun splits apart some molecular Oxygen (O_2) into oxygen atoms (O). The atoms then combine with molecular oxygen to form ozone.

$$O_2 \xrightarrow{UV} O + O$$
$$O + O_2 \longrightarrow O_3 \text{ (Ozone)}$$

Its depletion is caused by synthetic chemicals like chlorofluorocarbon (CFC) which are used in refrigerants and in fire extinguisher.

40. Differentiate between pollination and fertilization.

Ans.

Pollination	**Fertilization**
1 It is the transfer of pollen grain from anther to the stigma of a flower	1 It is the fusion of male and female gametes
2 It is a physical process	2 It is a biological process
3 It occurs only in seed plants	3 It occurs in plants and animals of various types

[Physics]

41. What is refraction of light? State the laws of refraction of light.

Ans. The bending of light when it passes from one medium to another medium is called refraction of light.

The following are the laws of refraction of light:

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

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

42. Give two uses of a concave mirror. Why do we prefer a convex mirror as a rear view mirror in automobiles?

Ans. Two uses of a concave mirror are:

- Concave mirrors are commonly used in torches, search-lights and vehicles headlights.
- Dentists use concave mirrors to see large images of the teeth of patients.

Convex mirrors enable the driver to view much larger area than would be possible with a plane mirror.

43. What is optical density? Light enters from air to glass having refractive index 1.50. What is the speed of light in the glass?

Ans. The ability of a medium to refract light is known as optical density.
Refractive index of a glass, n =1.50

Using the expression,

$$n = \frac{\text{speed of light in vacuum (c)}}{\text{speed of light in glass (v)}}$$

$$v = \frac{c}{n} = \frac{3x10^8}{1.5}$$

$v = 2 \times 10^8$ m/s

44. (i) Define 1 dioptre of power of a lens. (ii) A doctor has prescribed a corrective lens of power +1.5 D, find the focal length of the lens. Is the lens converging or diverging lens?

Ans. 1 dioptre is the power of a lens whose focal length is 1 metre

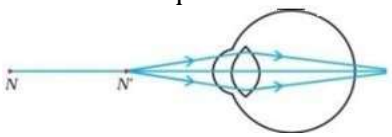
Power,

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

$$f = \frac{1}{P} = \frac{1}{1.5} = 0.66 \text{ m},$$

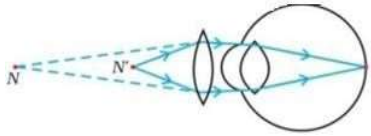
The lens is converging as it is positive.

45. Study the diagram below and answer the questions that follow.



a) Name the defect of vision shown in the diagram.
b) List one cause of this defect
c) With the help of a diagram, show how this vision can be corrected.

Ans. (a) Hypermetropia
(b)The focal length of the eye lens is too long.
(c)



46. (a)What is the far point and near point of human eye with normal vision?
(b) A student has difficulty reading the blackboard while sitting in the last row. What could be the defect the child is suffering from? How can it be corrected?

Ans. (a) The near point of the eye is the minimum distance of the object from the eye, which can be seen distinctly without strain. For a normal human eye, this distance is 25 cm. The far point of the eye is the maximum distance to which the eye can see objects clearly. The far point of the normal eye is infinity.
(b)He is suffering from myopia. This defect can be corrected by using a concave lens.

47. Explain why planets do not twinkle.

Ans. Planets do not twinkle because they appear larger in size than the stars as they are relatively closer to earth. Planets can be considered as a collection of a large number of point-size sources of light. The different parts of these planets produce either brighter or dimmer

effect in such a way that the average of brighter and dimmer effect is zero. Hence, the twinkling effects of the planets are nullified and they do not twinkle.

48. Why do stars twinkle?

Ans. Stars emit their own light and they twinkle due to the atmospheric refraction of light. Stars are very far away from the earth. Hence, they are considered as point sources of light. When the light coming from the stars enters the earth's atmosphere, it gets refracted at different levels because of the variation in the air density at different levels of the atmosphere. When the star light refracted by the atmosphere comes more towards us, it appears brighter than when it comes less towards us, therefore, it appears as if the stars are twinkling at night.

49. Define dispersion of light. Explain in brief the formation of a rainbow.

Ans. The splitting of white light into its component colours is called dispersion.

A rainbow is a natural spectrum appearing in the sky after a rain shower. It is caused by dispersion of sunlight by tiny water droplets, present in the atmosphere.

50. State Ohm's law. How much current will an electric bulb draw from a 220 V source, if the resistance of the bulb filament is 1100 **Ω**.

Ans. The potential difference, V, across the ends of a given metallic wire in an electric circuit is directly proportional to the current flowing through it; provided its temperature remains the same.

This is called Ohm's law.

Using,V=IR

$$220V = I \times 1100\Omega$$

$$I = \frac{220}{1100} = 0.2\ A$$

51. What are the advantages of connecting electrical devices in parallel with the battery instead of connecting them in series?

Ans. There is no division of voltage among the appliances when connected in parallel. The potential difference across each appliance is equal to the supplied voltage.

The total effective resistance of the circuit can be reduced by connecting electrical appliances in parallel.

52. Why does the cord of electric heater not glow while the heating element does?

Ans. The heating element of an electric heater is a resistor. The amount of heat produced by it is proportional to its resistance. The resistance of the heating element is very high. As the current flows through the heating element, it becomes too hot and glows red. On the other hand, the resistance of the cord is low. It does not become red when the current flows through it.

53. Which uses more energy, a 250 W TV set in 1 hour or a 1200 W toaster in 10 minutes?

Ans. Energy consumed by an electrical appliance is given by the expression,

E=Pt, where,

Power of the appliance=P; Time=t

Energy consumed by a TV set of power 250 W in 1 hour =250 W x1 hour

= 250 x 60 x 60 J

= $9x10^5$ J

Energy consumed by a toaster of power 1200 W in 10 minutes = 1200 W x10 min

= 1200x10x60 J

= $7.2x10^5$ J

Therefore, the energy consumed by a 250 W TV set in 1h is more than the energy consumed

by a toaster of power 1200 W in 10 minutes.

54. What is electrical resistivity? In a series electrical circuit comprising a resistor made up of a metallic wire, the ammeter reads 5A. The reading of the ammeter decreases to half when the Length of the wire is doubled. Why?

Ans. The inherent property of a conductor because of which it resists the flow electric current is called resistivity.

The resistance is directly proportional to its length of the conductor and current varies inversely proportional to the resistance. So, when the length of the wire is doubled its resistance becomes doubled. When the resistance becomes doubled, current becomes half.

55. What is the commercial unit of electrical energy? Represent it in terms of joules

Ans. The commercial unit of electrical energy is kilowatt-hour (KWh)

1 KWh = 1x1000W x 60x60 s= 3.6 x 10^6 J

56. (i) On what factors does the resistance of a conductor depend? (ii) Find the equivalent resistance of 1Ω and 10^6 Ω when they are connected in parallel.

Ans (i)The resistance of the conductor depend upon the following factors:

- Length of the conductor
- cross-sectional area of the conductor
- material of the conductor
- temperature of the conductor

(ii) When R_1 and R_2 connected in parallel, the equivalence resistance R is given by

$$\frac{1}{\mathrm{R}} = \frac{1}{R_1} + \frac{1}{R_2}$$

$$R = \frac{10^6}{10^6+1} \approx 1\ \Omega$$

57. (i)List two properties of magnetic field lines. (ii) Why two magnetic field lines cannot intersect each other?

Ans. (i) Two properties of magnetic field lines are

- Magnetic lines are closed curves.
- They merge at the south poles

(ii) The two filed lines cannot intersect each other because if they did so, it means that at the point of intersection, the compass needle would point towards two directions which are not possible.

58. (i)What is an electromagnet? (ii) Name two devices that use current – carrying conductors and magnetic fields.

Ans.

i. An electromagnet is a material which consists of a core of soft iron wrapped around with a coil of insulated copper wire whose current flows through the wire.
ii. Electric motors and Electric generators.

59. What is overloading? When can it occur?

Ans: A flow of large amount of current in a circuit beyond the permissible value of current is called overloading

Overloading can occur:

a. when the live wire and the neutral wire come into direct contact due to damaged wire insulation or there is fault in the appliance

b. due to accidental hike in the supply voltage

60. What is earthing?Why is earthing of electrical appliances necessary?

Ans: When the body of an electrical device is connected to the earth that is at zero potential by a wire it is called earthing.

The metallic body of appliances is connected to the earth wire,which provides a low resistance conducting path for the current.Thus it ensures that any leakage of current to the metallic body keeps its potential to that of the earth and the user may not get a severe electric shock.

* * *

Section-D
Long Answer Questions (4 Marks)

1.(i) What are amphoteric oxides? Give two examples.
(ii). Why platinum, gold and silver are used to make jewellery? Give reasons.

Ans: (i). The oxides which behave as both acidic and basic oxides are called amphoteric oxides.

Examples: Aluminium oxide (Al_2O_3), Zinc oxide (ZnO).

(ii). Gold, silver and platinum are least reactive metals. They do not react with air, water, acids, alkalis and other gases in the environment. Due to this reason their shine lasts for years. Due to bright lustre and resistance towards corrosion, gold, silver and platinum are used to make jewellery.

2. On adding a drop of barium chloride solution to an aqueous solution of sodium sulphate, white precipitate is obtained. Write a balanced chemical equation of the reaction involved. What other name can be given to this precipitation reaction? On adding dilute hydrochloric acid to the reaction mixture, white precipitate disappears. Why?

Ans: $Na_2SO_3(aq)$ + $BaCl_2(aq)$ → $BaSO_3(s)$ + 2 NaCl(aq)
(Sodium sulphate) (Barium chloride) (Barium sulphate) (Sodium chloride)

This reaction is also known as double displacement reaction. Barium sulphate when treated with dilute HCl forms barium chloride and liberates sulphur dioxide which has a characteristics odour of burning sulphur. This reaction occurs as follows:

$BaSO_3(s)$ + 2HCl → $BaCl_2(aq)$ + $H_2O(l)$ + $SO_2(g)$

Since $BaCl_2$ is soluble in water, the white precipitate disappears.

3. A dry pellet of a common base B, when kept in open absorbs moisture and turns sticky. The compound is also a by-product by chloroalkali process. Identify B. What type of reaction occurs when B is treated with an acidic oxide? Write a balanced chemical equation for one such solution.

Ans:

- Sodium hydroxide is a by product of chloroalkali process. When it is kept in open, it absorbs moisture and turn sticky.
- When sodium hydroxide is treated with carbon dioxide, it gives sodium carbonate. It is important to remember that carbon dioxide is an acidic oxide.
- $2NaOH + CO_2 \rightarrow Na_2CO_3 + H_2O$ ▪ Since this reaction is between a basic compound and an acidic compound, hence it is a neutralization reaction.
- B is sodium hydroxide.

4. Compound X and aluminium are used to join railway tracks: a) Identify the compound X; b)Name the reaction; and c) Write down its reaction.

Ans: a) Compound X is iron oxide.(Fe2O3).
b) This reaction is called thermite reaction.
c) This reaction is given by the following equation:

2Al + Fe_2O_3 → 2Fe + Al_2O_3 + Heat.

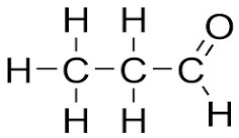
5. (i) Define homologous series of carbon compounds.
(ii) Why do we not see gradation in chemical properties of a homologous series compounds?

(iii) Write the name and structures of (a) Aldehydes and (b) ketones with molecular formula

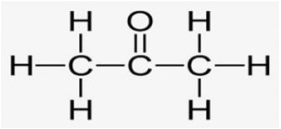
Ans: (i) A series of chemical compounds in which members differ from each other by CH_2 group is called a homologous series.

(ii) In homologues series we do not see the gradation in chemical properties, i.e, chemical properties remain the same because of the presence of the same functional group.

(iii) (a) ALDEHYDE --- PROPANAL



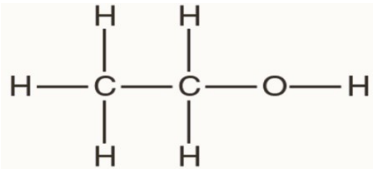
(b) KETONE------- PROPANONE



6. (i) write the name and structure of an organic compound ' X' having two carbon atoms in its molecule and its name is suffixed with '*—ol*'.

(ii) what happens when 'X' is heated with excess concentrated sulphuric acid at 443k? write the chemical equation for the reaction , stating the condition for the reaction also state the role played by concentrated sulphuric acid in the reaction.

Ans: i) Ethanol (C_2H_5OH)



ii) when X ,i.e, ethanol is heated with excess sulphuric acid at 443k, ethane is formed by the dehydration of ethanol

$C_2H_5OH \rightarrow CH_2{=}CH_2 + H_2O$

In the above reaction sulphuric acid acts as a dehydrating agent. it removes water from ethanol.

7. Esters are sweet smelling substances and are used in the making of perfumes. Suggest some activity and the reaction involved for the preparation of an ester with neat labelled diagram?

Answer: The following activity can be used for the preparation of Ester ---

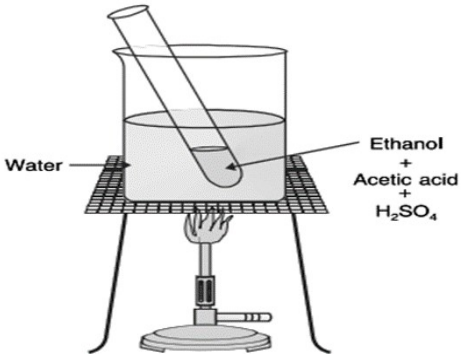
- Let us take 1ml ethanol and 1ml glacial acetic acid along with few drops of sulphuric acid in a test tube.
- The mixture is to be warmed in a water bath for five minutes.
- The mixture poured into a beaker containing 20-50ml of water and smell the resulting mixture.

The reaction is :

$CH_2COOH + CH_3CH_2OH \rightarrow CH_3COOCH_2CH_5 + H_2O$

(ethanoic acid) (ethanol) (ester)

$$CH_3COOH + C_2H_5OH \xrightarrow{\text{Conc. } H_2SO_4} CH_3COOC_2H_5 + H_2O$$



8. What are the major parts of the brain? Mention the function of Cerebellum.

Answer: The brain has three major parts or regions namely the fore brain, midbrain and hind brain. Cerebellum is a part of the hind brain, which is responsible for activities such as:-

i. Walking in a straight line.
ii. Riding a bicycle.
iii. Picking up a pencil.

It is responsible for precision of voluntary actions and maintaining the posture and balance of the body. It plays a major role in motor movement regulation and balance control.

9. What are reflex actions? Give two examples. Explain reflex arc.

Answer: Reflex action is an involuntary and sudden response to stimuli. They are sudden involuntary responses which does not involve thinking.

Example 1) When we touch a hot object we withdraw our hand immediately.

Example 2) Watering of mouth on seeing tasty food.

Reflex arcs are formed in the Spinal Cord. A reflex arc is the pathway that a reflex takes place in the body. Reflex arcs functions in order to maintain a balance and stable position. Reflex arcs starts when a sensory receptor picks up an external stimulation. This information is transmitted by a sensory neutron to the spinal cord.

10. Differentiate between inherited and acquired characteristics. Give an example of each type.

Answer:

- Acquired traits are the ones that a person develops during his life time. These are not passed from one generation to another.
- Examples of acquired skills are swimming, knowledge, cycling, etc. These traits cannot be passed on to their offspring.
- Inherited traits are traits that can be controlled by genes and inherited to the next generation from parents.
- The offspring born to the parents may have red curly hair, brown eyes, in humans. Fur patterns in animals are all inherited traits.

11. In the following crosses write the characteristics of progeny:-

Cross	Progeny
a) RRYY x RRYY	_____
b) RrYy x RrYy	_____
c) rryy x rryy	_____
d) RRYY x rryy	_____

Answer:

In the following crosses the characteristics of the progeny is

	Cross			Progeny
a)	RR YY Round yellow	x	RR YY Round yellow	Round ,yellow
b)	Rr Yy Round yellow	x	Rr Yy Round yellow	Round, yellow Round , green Wrinkled yellow Wrinkled green
c)	rr yy Wrinkled green	x	rr yy Wrinkled green	Wrinkled , green
d)	RR YY Round yellow	x	rr yy Wrinkled green	Round , yellow

12. Indicate the flow of energy in an ecosystem . Why is it unidirectional? Justify.

Ans: The flow of energy in an ecosystem happens in the following sequence:

Sun → Producers→ Herbivores → Carnivores.

The energy is passed from first trophic level down to carnivores and this is said to be unidirectional as herbivores is dependent on producers and carnivore is dependent on herbivores. Further, at each energy transfer, the biological useful energy goes on decreasing making it impossible for energy to flow in the reverse direction.

13. What are decomposers? What will be the consequence of their absence in an ecosystem?

Ans: Decomposers are micro-organisms such as bacteria and fungi that obtain nutrients by breaking down the remains of dead plants and animals.

In the absence of decomposers recycling of materials will not take place which would lead to the accumulation of dead plants and animals in the environment. Additionally the environment would be finally sapped of all its resources which are needed to maintain and sustain life.

14. Suggest any four activities in daily life which are eco-friendly.

Ans: Activities in daily life that are eco-friendly are listed below:

i. Walking or cycling for short distances.
ii. Turning off fans and light when not in use.
iii. Usage of cloth bags instead of plastic bags.
iv. Making a kitchen garden.

15.(i) Define electric power. Express it in terms of potential difference (V) and resistance (R)

(ii) An electric oven is designed to work on the mains voltage of 220 V . This oven consumes 11 unit of electrical energy in 5 hours. Calculate

a) Power rating of the oven.
b) Current drawn.
c) Resistance of the oven when it is red hot.

Answers:

(i) Electric power is defined as the rate at which work is done as energy is dissipated or consumed in an electric circuit.

The power is given by $P= V \times I = I^2 \times R = V^2 / R$

(ii) Given:

Main voltage, V = 220 V

Electrical energy consumed = 11 units
Time = 5 hours

(a) We know, Energy E = P x t
Or, P = E/t
Or, P = 11/5
Or, P = 2.2 watt

(b) P = V x I (power= potential difference X current)
Or, 2.2 = 220 x I
Or, I = 2.2/220
Or, I = 2.2/220 (cancellation shown)
Or, I = 1/100
Or, I = 0.01 Amp

(c) $P = I^2 \times R$ (power = square of current x resistance)
Or, $R = P/ I^2$
Or, R = 2.2/ 1.01 x 0.01
Or, R = 22000 Ω

16.(i) Write then relation between resistance (**R**) and electrical resistivity (**ρ**) of the conductor in the shape of a cylinder of length ***l*** and area of cross section **A** . Hence derive the S.I unit of electrical resistivity.
(ii) The resistance of a metal wire of length 3m is 60 Ω. If the area is cross section of the wire is $4x10^{-7}$ m^2, calculate the electrical resistivity of the wire.
(iii) State how the electrical resistivity be affected if the wire is stretched so that the length is doubled. Justify your answer.

Answer:

i) R = ρ x l/A
Where, R is the resistance
L is the length A is the area of cross section
P is the resistivity
R = ρ x l/A
$\Omega = \rho \times m/m^2$
Ωm= ρ
∴ The S.I. unit of resistivity is ohm metre or Ωm

ii) Length, l = 3m
Resistance, R = 60Ω
Area of cross section, $A = 4 \times 10^{-7}\ m^2$
Electrical resistivity, ρ = ?

$R = \rho \times \frac{1}{A}$

Or, $60 = \rho \times \frac{3}{4 \times 10^{-7}}$

or, $\frac{60 \times 4x10^{-7}}{3} = \rho$

Or, $80 \times 10^{-7} = \rho$
Or, $\rho = 8 \times 10^{-6}\ \Omega m$

iii) We know:-
R = ρ X l/ A

The resistivity of the material will not change i.e will remain same as it is independent of the length or of the area of cross-section.

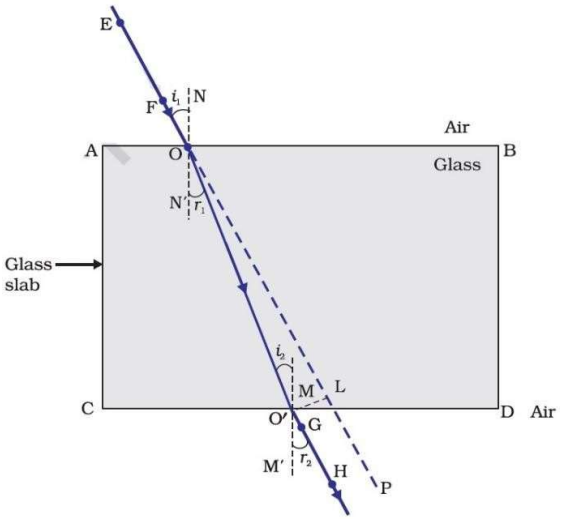
17. Write the laws of refraction of light. Explain the same with the help of ray diagram, when a ray of light passes through rectangular glass slab.

Answer:

The following are the laws of refraction of light :-

- The incident ray, the refracted ray and normal at the point of incidence, all lie in the same plane.
- The ratio of Sine of angle of incidence to the Sine of angle of refraction is a constant, for the light of given colour and for given pair of media.

$\frac{\sin i}{\sin r} = Constant$



In above figure, a ray EO is obliquely incident on surface AB, called incident ray. OO' is the refracted ray and O'H is the emergent ray. You may observe that the emergent ray is parallel to the direction of the incident ray.

Reason: The extent of bending of the ray of light at the opposite parallel faces AB (air-glass interface) and CD (glass-air interface) of the rectangular glass slab is equal and opposite. This is why the ray emerges parallel to the incident ray. However, the light ray is shifted sideward slightly.

18.Define power of a lens. What is its unit? One student uses a lens of focal length 50 cm and another of -50 cm. What is the nature of the lens and its power used by each of them?

Ans: Power of a lens is mathematically defined as the reciprocal of the focal length of the lens. SI unit of power of a lens is dioptre (D).

The focal length of the lens used by the first student is positive, so it is a convex lens. The lens used by the second student is negative so it is a concave lens.

$$P = 1/f$$
$$= 1/0.5$$
$$= 2$$

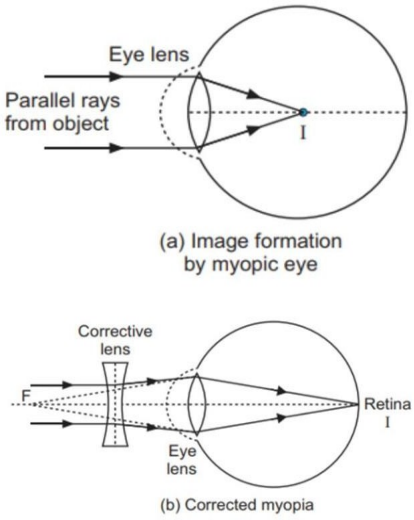
The power of lens used by first student = +2

The power of lens used by second student = – 2

19.When do we consider a person to be myopic or hypermetropic? Explain using diagrams how the defects associated with myopic and hypermetropic eye can be corrected?

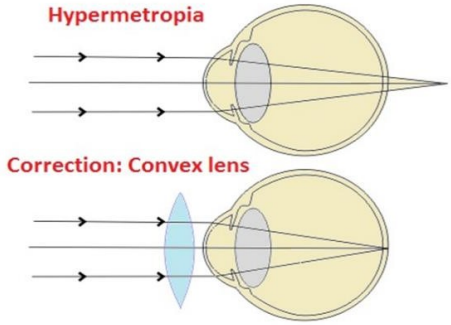
Ans: A person is considered to be myopic if he can see nearby or close objects but is unable to see the objects placed far away (short-sighted). A person is considered to be hypermetropic

if he is not able to see nearby or close objects but is able to see distant objects clearly (Long-sighted). The short sightedness is corrected by using a concave lens, which diverges and shifts the image to the retina.



(Short-sighted eye with correction using corrective concave lens)

Long-sightedness is corrected by using a convex lens, which converges and shifts the image to the retina.



(Long-sighted eye with correction using corrective convex lens.)

20. How can we explain the reddish appearance of sun at sunrise or sunset? Why does it not appear red at noon?

Ans: Since blue colour has shorter wavelength and red colour has a longer wavelength, the red colour is able to reach our eyes after the atmospheric scattering of light.

During noon hours, the distance to be travelled by the sun rays in atmosphere is less than when compared to morning and evening hours. Therefore all colours reached our eye without scattering. Hence light appear white in noon hours.

21. How does refraction take place in the atmosphere? Why do stars twinkle but not the planets? 4

Ans: When sunlight enters the earth's atmosphere, it continuously goes from rarer to the denser medium and hence refraction of light takes place. The refraction of light taking place in the atmosphere is known as atmospheric refraction.

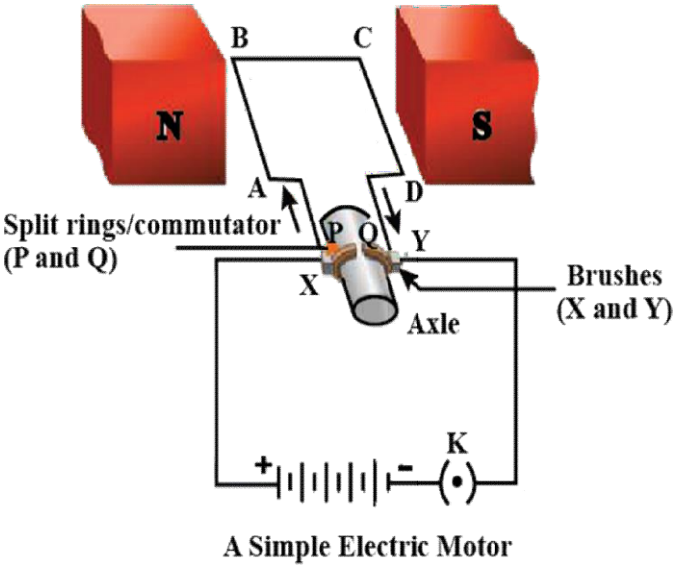
The twinkling of a star is due to atmospheric refraction. Distant stars act like a point source of light. As a beam of starlight keeps deviating from its path, the apparent position of stars keeps on changing because physical conditions of earth's atmosphere are not

constant.Hence, the amount of light which enter our eyes fluctuates from bright to faint. This is the " Twinkling effect of star". But planets are much closer to us than stars, so they are not point-sized objects to our eyes. Hence the fluctuations have a negligible effect and they don't seem to twinkle.

22. What is a rainbow? How is it caused?

Ans: A rainbow is a natural spectrum appearing in the sky after a rain shower. It is caused by dispersion of sunlight by tiny droplets, present in the atmosphere. A rainbow is always formed in a direction opposite to that of the sun. The water droplets act like small prisms. They refract and disperse the incident sunlight, then reflect it internally, and finally refract it again when it comes out of the raindrop. Due to the dispersion of light and internal reflection, different colours reach the observer's eye.

23. Draw a labelled circuit diagram of a simple electric motor and explain its working.



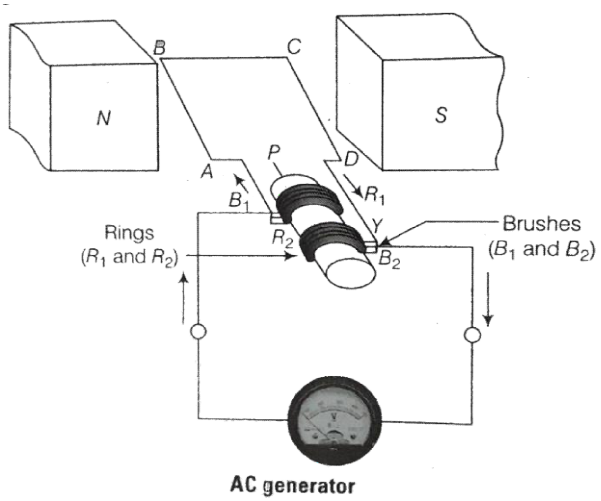
A Simple Electric Motor

Working of the Electric motor:

The coil when powered, a magnetic field is generated around the armature. The left side of the armature is pushed away from the left magnet and drawn towards the right, causing rotation. The coil turns through 90 degrees, the brushes lose contact with the commutator and the current stops flowing through the coil. However, the coil keeps turning because of its own momentum. Now when the coil turns through 180 degrees, the sides get interchanged. As a result, the commutator ring P is now in contact with brush Y and commutator ring Q is in contact with brush X. Therefore, the current continues to flow in the same direction.

24. Draw the circuit diagram of an AC generator. State the principle of an electric generator. What changes must be made in the arrangement to convert it to a DC Generator?

Ans:



Principle of an AC generator:
According to the Faraday's law of electromagnetic induction, a conductor whenever moves in a magnetic field EMF (electromagnetic force) gets induced across the conductor. If a close path is provided to the conductor, induced EMF causes current to flow in the circuit.

Conversion of AC generator to DC generator:
The split ring commutator can be used instead of the slip rings so that the direction of current is not reversed every half of the cycle and thus we can get DC current that flows only in the same direction.

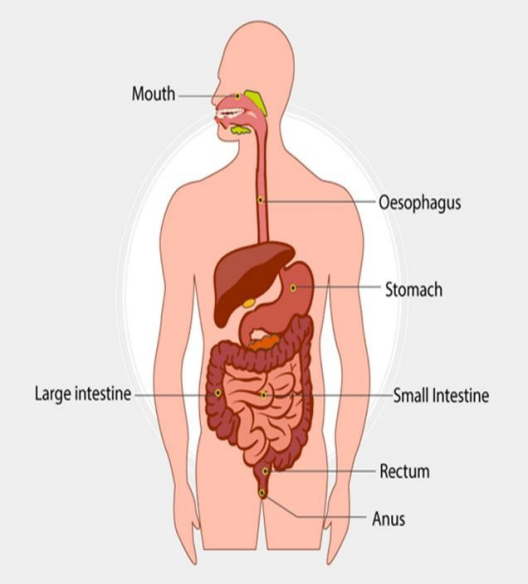
25. Explain the mechanism of photosynthesis.
Ans. Photosynthesis takes place in the green leaves of plant. It is the process by which green plants make their own food from carbon dioxide and water in the presence of chlorophyll and sunlight.

The chemical equation is:

$$6CO_2 + 12H_2O \rightarrow (CH_2O)_6 + 6H_2O + 6O_2$$

Mechanism of photosynthesis:
Carbon dioxide, water, sunlight is utilised in the presence of chlorophyll to form glucose, oxygen is evolved as a by product. Carbon dioxide required is taken from the atmosphere into the leaves through tiny pores called stomata. Water is absorbed from the soil by the roots and then transported to the leaves. The green pigment present in the leaves absorbs the sunlight. The absorbed light energy is used in splitting water into hydrogen and oxygen and then gets converted into chemical energy. The carbon dioxide is reduced by hydrogen to form carbohydrates like glucose by utilising chemical energy which is obtained by the transformation of light energy

26. Draw the diagram of alimentary canal of man and label the following parts: mouth , oesophagus,stomach, and intestine.
Ans.



27. Why are budding, fragmentation, regeneration all considered as a sexual type of reproduction? With neat diagram explain the process of regeneration in planaria.

Ans: Reproduction by which off spring arise from a single celled organism, and inherit the genes of that parent only, and does not involve fusion of gametes is known as a sexual reproduction. Budding, fragmentation and regeneration are considered as asexual types of reproduction because all of them involve only single parent unlike sexual reproduction and no formation of gametes.

Regeneration in Planaria-(Fig 7.3 text book page number117)

Here the body of planaria cut into pieces and each piece has the ability to grow into new organism. In the figure above planaria body is cut into 3 pieces which regenerates into 3 individual cells. The cells proliferate (multiplying or increasing in number) and make large number of cells. The mass of cells formed, different cells undergo changes to become various cell types and tissues. These changes take place in an organised sequence referred to as development

28. Write two points of difference between asexual and sexual types of reproduction. Describe why variation are observed in the offspring formed by sexual reproduction.

2+2=4

Ans.

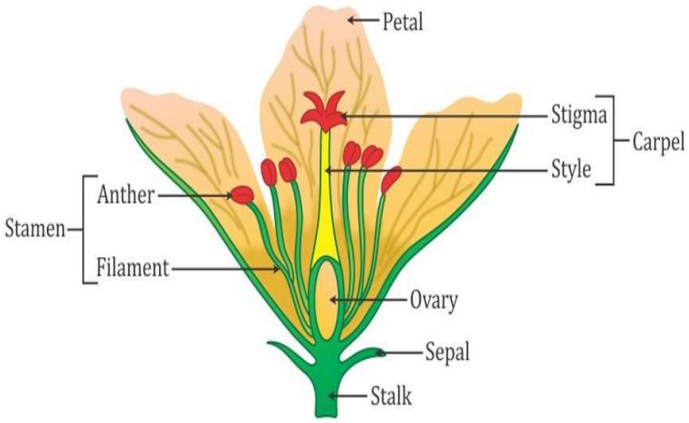
Asexual reproduction	**Sexual Reproduction**
Involves only one parent	Often involves two parents
Gametes are not produced	Gametes are produced
No fertilisation and zygote formation	Fertilisation and zygote formation is observed
Meiosis does not occur at anytime during reproduction	Meiosis occurs at the time of gamete formation

(A) In asexual reproduction ,single parents produce offspring
Offspring's are exact copy of their parents.
The fusion of gametes does not take place
Sexual reproduction, there is involvement of two parents.
This process causes mixing of characters and hence offspring are not like their parents.
In this method fusion of male and female gametes take place.

(B) Variations are seen in the offspring formed by sexual reproduction because, Though fusion
of male and female gametes takes place, it causes mixing of parent characters that is
Crossing over that occurs during meiosis result in additional variation where two parents contribute to the gene pool.

Variation is also influenced by DNA replication.

29. Draw the diagram of a flower and label it. Name the four whorls. Write the names of gamete producing organs in the flower.
Ans.



The four whorls of a flower are Calyx, Corolla, Androecium and Gynoecium.
Gamete producing organs of a flower
The anther (the male gamete producing organ) and ovary (female gamete producing organ) are the gamete producing organs in the flower.

30.(i) Give two differences between aerobic and anaerobic respiration; (ii) How are water and minerals transported in plants? (iii) What is excretion?

Ans. (i)

Aerobic Respiration	**Anaerobic Respiration**
1 It occurs in the presence of oxygen, where oxygen is utilised	1 It occurs in the absence of Oxygen
2 Energy released in larger amount.	2 Energy released in lesser amount.

(ii) Xylem transports water and Phloem transports food materials.

(iii) Excretion is the removal of harmful metabolic waste from the body of an organism.

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Sample Question Paper

(SSLC Examination 2024-25)

Science & Technology

(New course - NCERT Textbook)

by

Meghalaya Board of School Education (MBOSE)

A. The Scheme of Examination

	Maximum Marks	Pass Marks
Theory Examination	80	24
Internal Assessment	20	6
Total	100	30

B. 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**

C. Scheme of Internal Assessment

Marks for internal assessment can be internally assessed through anyone of the following:

1. Project Work
2. Written Tests
3. Assignments (Class or Home Work)

While Assessing, the weightage to different chapters may be given as provided in "D. Content Weightage in Theory Examination".

Different types of Projects Works

- Class/Interclass discussion and debates.
- Preparations of a reports, charts, posters and Diagrams based on lessons.
- Conducting Activities mentioned in the Textbook.

D. Content Weightage in Theory Examination

The chapter-wise weightage shown below is only indicative for the purpose of information of teachers while prioritising different chapters during teaching or assessment. Though the weightage in Theory Examination conducted by MBOSE would broadly follow the following pattern, there may still be some variation.

Syllabus	Marks (80)
Chapter 1: Chemical Reacions & Equations Chapter 2: Acids, Bases and Salts Chapter 3: Metals and Non-metals Chapter 4: Carbon and its Compunds	26
Chapter 5: Life Processes Chapter 6: Control and Coordination Chapter 7: How do Organisms Reproduce? Chapter 8: Heredity Chapter 13: Our Environment	28
Chapter 9: Light – Reflection and Refraction Chapter 10: The Human Eye and the Colourful World Chapter 11: Electricity Chapter 12: Magnetic Effects of Electric Current	26

Sample Question Paper

Science & Technology
(New Course – NCERT Textbook)
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. 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.
4. The Question Paper contains 4 sections, Section A, B, C and D.
5. 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.
6. Section-B contains Very Short Answer Questions. Answer the questions briefly, in not more than 30 (thirty) words.
7. Section-C contains Short Answer Questions. Answer the questions in not more than 50 (fifty) words each.
8. 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)

7. Which of the following is not a physical change?
   A. Boiling of water to give water vapour
   B. Melting of ice to give water
   C. Dissolution of salt in water
   D. Combustion of Liquefied Petroleum Gas (LPG)

8. Electrolysis of water is a decomposition reaction. The mole ratio of hydrogen and oxygen gases liberatedduring electrolysis of water is
   (A) 1:1 (B) 2:1
   (C) 4:1 (D) 1:2

9. What happens when a solution of an acid is mixed with a solution of a base in a test tube?
   (E) The temperature of the solution increases
   (F) The temperature of the solution decreases
   (G) The temperature of the solution remains the same
   (H) Salt formation takes place
   A. (i) only (B) (i) and (iii)
   (C) (ii) and (iii) (D) (i) and (iv)

10. An aqueous solution turns red litmus solution blue. Excess addition of which of the following solution would reverse the change?
    (E) Baking powder
    (F) Lime
    (G) Ammonium hydroxide solution
    (H) Hydrochloric acid

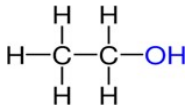
11. Which of the following salts does not contain water of crystallisation?
    (A) Blue vitriol (B) Baking soda
    (C) Washing soda (D) Gypsum

12. Which of the following property is generally not shown by metals?
    (A) Electrical conduction (B) Sonorous in nature
    (C) Dullness (D) Ductility

13. The ability of metals to be drawn into thin wire is known as
    (A) ductility (B) malleability
    (C) sonority (D) conductivity

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

15. Name the below compound from its structure:



(A) Ethane (B) Ethanol
(C) Ethene (D) Propanol

16. Buckminsterfullerene has_____atoms in its molecule.
(A) 30 (B) 960
(C) 300 (D) 60

17. Which change occurs in the respiratory rate due to the construction of the diaphragm and rib muscles?

(A) Increases (B) Decreases
(C) Remain the same (D) None of the above

18. The kidneys in human beings are a part of the system for
(A) Nutrition (B) Respiration
(C) Excretion (D) Transportation

19. The breakdown of pyruvate to give carbon-dioxide, water and energy take place in

(A) Cytoplasm (B) Mitochondria
(D) Nucleus (C) chloroplast

14. Electrical impulse travels in a neuron from
(A) Dendrite→ axon→ axonal end→ cell body
(B) Cell body→ Dendrite → axon→ axonal end
(C) Dendrite →Cell body→ axon→ axonal end
(D) Axonal end→ axon → Cell body→ Dendrite

15. Posture and balance of the body is control by
(A) Cerebrum (B) Cerebellum
(C) Medulla oblongata (D) Pons

16. Which of the following is the correct sequence of events of sexual reproduction in a flower?
(A) pollination, fertilisation, seedling, embryo
(B) seedling, embryo, fertilisation, pollination
(C) pollination, fertilisation, embryo, seedling
(D) embryo, seedling, pollination, fertilization

17. In Spirogyra, asexual reproduction takes place by
(A) breaking up of filaments into smaller bits
(B) division of a cell into two cells
(C) division of a cell into many cells
(D) formation of young cells from older cells.

18. If a round, green seeded pea plant (RR yy) is crossed with wrinkled, yellow seeded pea plant, (rr YY) the seeds produced in F1 generation are
(A) round and yellow (B) round and green
(C) wrinkled and green (D) wrinkled and yellow

19. In which trophic level autotrophs are placed?
    (A) First (B) Second
    (C) Third (D) Last

20. Which of the following group contain only biodegradable items?
    (A) grass, flowers and plastic (B) grass, wood and plastic
    (C) fruits peels, cake and lime juice (D) coke, wood and grass

21. Which of the following statements is true?
    (A) A convex lens has 4 dioptre power having a focal length 0.25 m
    (B) A convex lens has –4 dioptre power having a focal length 0.25 m
    (C) A concave lens has 4 dioptre power having a focal length 0.25 m
    (D) A concave lens has –4 dioptre power having a focal length 0.25 m

22. Magnification produced by a rear view mirror fitted in vehicles
    (A) is less than one
    (B) is more than one
    (C) is equal to one
    (D) can be more than or less than one depending upon the position of the object in front of it

23. In torches, search lights and headlights of vehicles the bulb is placed
    (A) between the pole and the focus of the reflector
    (B) very near to the focus of the reflector
    (C) between the focus and centre of curvature of the reflector
    (D) at the centre of curvature of the reflector

24. Twinkling of stars is due to atmospheric
    (A) dispersion of light by water droplets
    (B) refraction of light by different layers of varying refractive indices
    (C) scattering of light by dust particles
    (D) internal reflection of light by clouds

25. Which of the following statements is correct regarding the propagation of light of different colours of white light in air?
    (A) Red light moves fastest
    (B) Blue light moves faster than green light
    (C) All the colours of the white light move with the same speed
    (D) Yellow light moves with the mean speed as that of the red and the violet light

26. Which of the lenses would you prefer to while reading small letters found in a dictionary?
    (A) a convex lens of focal length 50 cm.
    (B) a concave lens of focal length 50 cm.
    (C) a convex lens of focal length 5cm.
    (D) a concave lens of focal length 5cm.

27. If the current I through a resistor is increased by 100% (assume that temperature remains unchanged), the increase in power dissipated will be
    (A) 100 % (B) 200 %
    (C) 300 % (D) 400 %

28. The resistivity does not change if
    (A) the material is changed
    (B) the temperature is changed
    (C) the shape of the resistor is changed
    (D) both material and temperature are changed

29. Choose the incorrect statement
    (A) Fleming's right-hand rule is a simple rule to know the direction of induced current
    (B) The right-hand thumb rule is used to find the direction of magnetic fields due to current carrying conductors
    (C) The difference between the direct and alternating currents is that the direct current always flows in one direction, whereas the alternating current reverses its direction periodically
    (D) In India, the AC changes direction after every second

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

Section-B

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

31. What do you mean by decomposition reaction? Give one example.
32. How bleaching powder can be prepared? Give chemical equation.
33. Write the general formula of alkanes? Give the names of two alkanes having 3 carbon atoms and the other having 4 carbon atoms.
34. Why does the aqueous solution of an acid conduct electricity?
35. How are fats digested in our bodies? Where does this process take place?
36. Write any two advantages of vegetative propagation.
37. What is zygote? How is the sex of the child determined in human beings?
38. What is ozone? Give its function.
39. What are trophic levels? Give an example of a food chain and state the different trophic levels in it.
40. What is the role of decomposers in the ecosystem?
41. Why do we prefer a convex mirror as a rear-view mirror in vehicles? Give two reasons.
42. Why do stars twinkle?
43. Name the factors which determine the resistance of a conductor.
44. An electric iron of resistance 20 Ω takes a current of 5A. Calculate the heat developed in 30 seconds.

Section- C

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

45. What would you observe when zinc is added to a solution of Iron (II) sulphate? What type of reaction is this? Write the chemical reaction involved.
46. Draw the structure of the following compounds: (i) Bromo-pentane; (ii) Hexanal; (iii) Butanone
47. Explain in brief the mechanism of cleansing action of soap.
48. Name the glands present in the walls of the stomach. Give two functions of HCl produced in the stomach.
49. Give three differences between Arteries and Veins.
50. What is a reflex action? Trace the sequence of events which occur when a bright light is focuses on your eyes.
51. What is optical density? Light enters from air to glass having refractive index 1.50. What is the speed of light in the glass?
52. List two properties of magnetic field lines. Why two magnetic field lines cannot intersect each other?
53. What is earthing? Why is earthing of electrical appliances necessary?

Section-D

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

54. Esters are sweet smelling substances and are used in the making of perfumes. Suggest some activity and the reaction involved for the preparation of an ester with neat labelled diagram?
55. Draw the diagram of alimentary canal of man and label the following parts mouth, esophagus, stomach, intestine.
56. Draw the structure of a neuron and label its parts.
57. Write the laws of refraction of light. Explain the same with the help of ray diagram, when a ray of light passes through rectangular glass slab.
58. Draw a labelled circuit diagram of a simple electric motor and explain its working.

*** End of the Question Paper ***