SOLUTIONS & ANSWERS FOR NEET 2019
VERSION – P3
[CHEMISTRY, BIOLOGY & PHYSICS]

CHEMISTRY

1. For the second period elements the **correct** increasing order of first ----

Ans: Li < B < Be < C < O < N < F < Ne

Sol: Ionisation enthalpy increases from left to right across a period. Ionisation enthalpy of half filled and completely filled configuration are generally high

2. The method used to remove temporary hardness ----

Ans: Clark's method

Sol: Clark's method (using lime) is a method to remove temporary hardness of water

3. Which of the following is an amphoteric hydroxide? ----

Ans: $Be(OH)_2$

Sol: $Be(OH)_2$ is an amphoteric hydroxide

4. Among the following, the narrow spectrum ----

Ans: Penicillin G

Sol: Penicillin G is a narrow spectrum antibiotic

5. Which mixture of the solution ----

Ans: 50 mL of 1 M $AgNO_3$ + 50 mL of 1.5 M KI
50 mL of 1 M $AgNO_3$ + 50 mL of 2 M KI

Sol: When $AgNO_3$ is mixed with excess of KI, a negative sol of AgI is obtained
(1) 50 millimoles $AgNO_3$ is mixed with 75 millimoles of KI
(2) 50 millimoles $AgNO_3$ is mixed with 100 millimoles of KI

6. Conjugate base for Bronsted acids H_2O ----

Ans: OH^- and F^- respectively

Sol: Conjugate base = species − $H^{\oplus}$

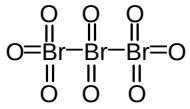
7. The number of sigma (σ) and pi (π) bonds ----

Ans: 10 σ bonds and 3 π bonds

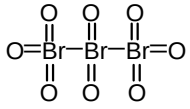
Sol: 10 σ bonds and 3 π bonds

8. The correct structure of tribromooctaoxide is: ----

Ans:



Sol: The correct structure is



9. pH of a saturated solution of $Ca(OH)_2$ ----

Ans: 0.5×10^{-15}

Sol: pOH = 5 $[OH^-] = 10^{-5}$

$$\underset{S}{Ca(OH)_2} \rightleftharpoons \underset{S}{Ca^{2+}} + \underset{2S}{2OH^-}$$

$2S = 10^{-5}$ $\therefore S = 0.5 \times 10^{-5}$

$K_{sp} = 4 \times S^3$
$= 4 \times (0.5 \times 10^{-5})^3$
$= 0.5 \times 10^{-15}$

10. The **correct** order of the basic strength of ----

Ans: $(CH_3)_2NH > CH_3NH_2 > (CH_3)_2N$

Sol: Order of basic strength in aqueous solution is $(CH_3)_2NH > CH_3NH_2 > (CH_3)_2N$

11. For a cell involving one electron ----

Ans: 1.0×10^{10}

Sol: $\log K = \dfrac{E^\circ}{0.059}$

$= \dfrac{0.59}{0.059} = 10$

$K = 1 \times 10^{10}$

12. Among the following, the one that is **not** a green house gas is: ----

Ans: sulphur dioxide

Sol: SO_2 is not a green house gas

13. The mixture that forms maximum boiling azeotrope is----

Ans: Water + Nitric acid

Sol: Maximum boiling azeotrope shows negative deviation from Raoult's law
Water + mineral acid shows negative deviation

14. Which one is malachite from the following? ----

Ans: $CuCO_3.Cu(OH)_2$

Sol: Malachite is $CuCO_3.Cu(OH)_2$ which is basic copper carbonate

15. Match the following ----

Ans: (iv) (iii) (ii) (i)

Sol: Pure nitrogen − Sodium azide or Barium Azide
Haber process − Ammonia
Contact process − Sulphuric acid
Deacon's process − Chlorine

16. Which is the **correct** thermal stability order for H_2E ----

Ans: $H_2Po < H_2Te < H_2Se < H_2S < H_2O$

Sol: Thermal stability decreases down the group of hydrides of group 16

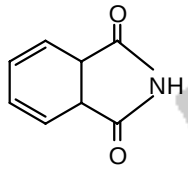
17. Identify the **incorrect** statement related to PCl_5 from the following: ----

Ans: PCl_5 molecules is non-reactive

Sol: When heated, it sublimes and decomposes on stronger heating

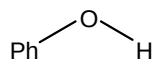
$PCl_5 \rightarrow PCl_3 + Cl_2$

18. The major product of the following reaction is: ----

Ans: 

Sol: Phthalic acid on strong heating with NH_3 gives phthalimide

19. The compound that is most difficult to protonate is: ----

Ans: 

Sol: Since lone pair of electrons in phenol is delocalized by resonance, protonation is difficult

20. The manganate and permanganate ions are tetrahedral, due to ----

Ans: The π-bonding involves overlap of p-orbitals of oxygen with d-orbitals of manganese

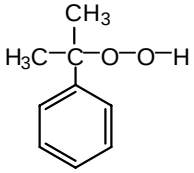
Sol: The π-bonding takes place by overlap of p-orbitals of oxygen with d-orbitals of manganese

21. The most suitable reagent for the following----

Ans: H_2, Pd / C, quinoline

Sol: H_2 in presence of Lindlar's catalyst will convert but-2-yne to cis-but-2-ene

22. The structure of intermediate A in the following reaction, is: ----

Ans: 

Sol: Cumene hydroperoxide is the intermediate in the given reaction

23. If the rate constant for a first order reaction is k, the time (t) required for the ----

Ans: t = 4.606 / k

Sol: $k = \frac{2.303}{t}\log\frac{A_0}{A_t}$

$t_{99\%} = \frac{2.303}{k}\log 100$

$= \frac{4.606}{k}$

24. Which of the following reactions are disproportionation reaction? ----

Ans: (a) and (b) only

Sol: (a) $\underset{(+1)}{Cu^{+}} \rightarrow \underset{(+2)}{Cu^{+2}} + \underset{(0)}{Cu}$

(b) $\underset{(+6)}{MnO_4^{-2}} \rightarrow \underset{(+7)}{MnO_4^{-}} + \underset{(+4)}{MnO_2}$

(d) $\underset{(+7)}{MnO_4^{-}} + \underset{(+2)}{Mn^{2+}} \rightarrow \underset{(+4)}{MnO_2}$

(a) and (b) are disproportionation reactions, while , (d) is comproportionation reaction

25. In which case change in entropy is negative? ----

Ans: $2H_{(g)} \rightarrow H_{2(g)}$

Sol: $2H_{(g)} \rightarrow H_{2(g)}$
ΔS is −ve as the number of particles decreases

26. The biodegradable polymer is: ----

Ans: Nylon-2-nylon 6

Sol: Nylon-2-nylon6 is a biodegradable polymer

27. A gas at 350 K and 15 bar has molar volume----

Ans: Z < 1 and attractive forces are dominant

Sol: $Z = \frac{V_{real}}{V_{ideal}}$

Here it is given that $V_{real} < V_{ideal}$

Hence Z < 1 and attraction dominates

28. A compound is formed by cation C ----

Ans: C_3A_4

Sol: For one A in the lattice there will be one octahedral void and $\frac{3}{4}^{th}$ of these are occupied by C

Hence the formula is $C_{\frac{3}{4}}A$ or C_3A_4

29. Enzymes that utilize ATP in phosphate transfer ----

Ans: Mg

Sol: All enzymes that utilize ATP in phosphate transfer require magnesium as the co-factor

30. 4d, 5p, 5f and 6p orbitals are arranged in the order of ----

Ans: 5f > 6p > 5p > 4d

Sol: According to (n + ℓ) rule

31. For the cell reaction ----

Ans: −46.32 kJ mol^{-1}

Sol: $\Delta G° = -nFE°$
$= -2 \times 96500 \times 0.24$
$= -46.32$ kJ

32. For an ideal solution, the correct **option** is ----

Ans: $\Delta_{mix}H = 0$ at constant T and P

Sol: $\Delta_{mix}H = 0$, for an ideal solution
Also $\Delta_{mix}V = 0$,
For all solutions, $\Delta_{mix}S > 0$ and $\Delta_{mix}G < 0$

33. The non-essential amino acid ----

Ans: alanine

Sol: Alanine is a non-essential amino acid

34. What is the **correct** electronic configuration of the central atom ----

Ans: $t_{2g}^6e_g^0$

Sol: $Fe^{2+} \rightarrow [Ar]\ 3d^6$
Since CN^- is a strong ligand, pairing takes place
Electronic configuration is $t_{2g}^6e_g^0$

35. Which of the following is **incorrect** statement? ----

Ans: PbF_4 is covalent in nature

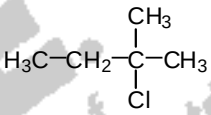
Sol: PbF_4 is ionic in nature

36. Match the Xenon compounds in ----

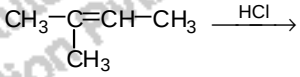
Ans: (ii) (iii) (iv) (i)

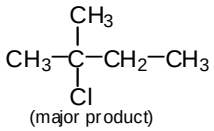
Sol: XeF_4 − Square planar
XeF_6 − Distorted octahedral
$XeOF_4$ − Square pyramidal
XeO_3 − Pyramidal

37. An alkene "A" on reaction with O_3 and $Zn-H_2O$ ----

Ans: 

Sol: Alkene is 2-methylbut-2-ene




(major product)

38. For the chemical reaction----

Ans: $\frac{-d[N_2]}{dt} = \frac{1}{2}\frac{d[NH_3]}{dt}$

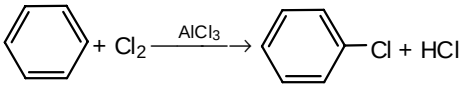
Sol: $\frac{-d[N_2]}{dt} = \frac{1}{3}\frac{-d[H_2]}{dt} = \frac{1}{2}\frac{d[NH_3]}{dt}$

39. Under isothermal condition, a gas at 300 K----

Ans: −30 J

Sol: $W = -P\Delta V$
$= -2 \times (0.25 - 0.1)$
$= -2 \times 0.15$ L-bar
$= -0.3 \times 100$ J
$= -30$ J

40. Among the following the reaction that proceeds ----

Ans: 

Sol: Halogenation of benzene in presence of Lewis acid catalyst is an electrophilic substitution reaction

41. Which of the following diatomic molecular species ----

Ans: C_2

Sol: M.O configuration is
$\sigma 1s^2, \sigma^*1s^2, \sigma 2s^2, \sigma^*2s^2, \pi 2p_x^2 = \pi 2p_y^2$
Bonding power is retained by the electrons in $\pi 2p_x$ and $\pi 2p_y$ M.Os

42. Which of the following species is not stable? ----

Ans: $[SiCl_6]^{2-}$

Sol: $[SiCl_6]^{2-}$ is not known because six large chloride ions cannot be accommodated around Si^{4+} due to limitation of its size. Also the interaction between lone pair of chloride ions and Si^{4+} is not very strong

43. Which will make basic buffer? ----

Ans: 100 mL of 0.1 M HCl + 200 mL of 0.1 M NH_4OH

Sol: 100 mL 0.1 M HCl = 10 m. mols +
200 mL 0.1 M NH_4OH = 20 m. mols $\Rightarrow$
10 m. mols NH_4Cl + 10 m. mols NH_4OH
Which is a basic buffer

44. Which of the following series of transitions ----

Ans: Balmer series

Sol: Balmer series appears in the visible region

45. The number of moles of hydrogen ----

Ans: 30

Sol: $N_2 + 3H_2 \rightarrow 2NH_3$
20 moles
No. of moles of H_2 required = 3×10
= 30 mols

BIOLOGY

46. Conversion of glucose to glucose-6- ------

Ans: Hexokinase

Sol: Hexokinase catalyses the conversion of glucose to glucose – 6 – phosphate.

47. What is the site of perception of photoperiod ------

Ans: Leaves

Sol: Leaves have phytochrome pigment which perceives red light and results flowering in plants.

48. Which of the foloiwng is true for Golden ------

Ans: It is Vitamin A enriched, with a gene from daffodil.

Sol: Golden rice is GMO having rich Vitamin A.

49. Identify the correct pair representing the------

Ans: *Salmonella typhi* / Widal test

Sol: *Salmonella typhi* causes typhoid disease and it is confirmed by Widal test.

50. Colostrum, the yellowish fluid, secreted by------

Ans: Immunoglobulin A

Sol: Colostrum consists of antibody as Immunoglobulin A

51. It takes very long time for pineapple plants------

Ans: Auxin and Ethylene

Sol: Auxin and ethylene application hasten uniform flowering and increase in yield in pineapple.

52. DNA precipitation out of a mixture of------

Ans: Chilled ethanol

Sol: Chilled ethanol is used for the precipitation of DNA for its isolation.

53. What triggers activation of protoxin to active------

Ans: Alkaline pH of gut

Sol: Alkaline pH of gut in cotton boll worm triggers the activation of protoxin in to active Bt.toxin.

54. The frequency of recombination between------

Ans: Alfred Sturtevant

Sol: Altred strutevant used the frequency of recombination between gene pairs on the chromosome as the measure of distance between genes.

55. Which of the following is the most important ------

Ans: Habitat loss and fragmentation

Sol: Habitat loss and fragmentation are the most important cause of extinction of animals and plants.

56. Identify the cells whose secretion protects------

Ans: Goblet cells

Sol: Goblet cells secrete mucus which acts along with bicarbonates protect the gastro-indestinal tract.

57. Match the column I with column II.------

Ans: (a) – iv (b) – i (c) – ii (d) - iii

Sol: Both the columns are correctly matched in the option (1).

58. Match the following structures with their------

Ans: (a) – iii (b) – iv (c) – i (d) - ii

Sol: Both the columns are correctly matched in the option 3.

59. Cells in G_0 phase: ------

Ans: exit the cell cycle

Sol: Heart cells and injured cells exit G_1 phase and enter into G_0 phase.

60. The Earth Summit held in Rio de Janeiro------

Ans: For conservation of biodiversity and sustainable utilization of its benefits.

Sol: The Earth Summit is known as historic Convention on Biological Diversity.

61. Which of the following glucose transporters------

Ans: GLUT IV

Sol: GLUT IV is insulin dependant glucose transport seen in cells.

62. Which of the statements given below is not ------

Ans: Annual rings are not prominent in trees of temperate region.

Sol: Annual rings are prominent in trees grown in temperate regions.

63. Match the following hormones with the ------

Ans: (a) – v (b) – iv (c) – i (d) - iii

Sol: Both the columns are correctly matched in the option (3)

64. In some plants, the female gamete develops------

Ans: Parthenogenesis

Sol: Development of embryo without fertilization is known as parthenogenesis.

65. Which of the following ecological pyramids------

Ans: Pyramid of biomass in a sea

Sol: Pyramid of biomass in sea is inverted.

66. Extrusion of second polar body from----

Ans: After entry of sperm but before fertilization.

Sol: Second polar body results in secondary cocyte by second meiosis after the entry of sperm in ovum.

67. *Pinus* seed cannot germinate and----

Ans: It has obligate association with mycorrhizae.

Sol: *Pinus* seeds exhibit obligate association with mycorrhizae and it helps in seed germination.

68. Which of the following factors -------

Ans: Maintaining hyperosmolarity towards inner medullary interstitium in the kidneys.

Sol: Hyper osmolarity of inner medullary interstitium draws more water resulting hyperosmotic urine.

69. In *Antirrhinum* (Snapdragon), a red----

Ans: Law of Segregation does not apply in this experiment.

Sol: Law of segregation is applicable to all crossing and mating processes.

70. Which part of the brain is ------

Ans: Hypothalamus

Sol: Hypothalamus controls body temperature, eating and drinking.

71. Which of the following sexually -------

Ans: Genital herpes

Sol: Genital herpes and hepatitis - B are not completely curable STDs.

72. Respiratory Quotient (RQ)----

Ans: 0.7

Sol: RQ of tripalmitin is 0.7 as it is the component of fat molecule.

73. Select the correct group of biocontrol ----

Ans: *Trichoderma, Baculovirus, Bacillus thuringiensis.*

Sol: *Trichoderma* is used for the control of root - borne disease. Baculovirus is used for the control of insects. *Bacillus thuringiensis* is used for controlling tobacco budworm and armyworm.

74. Which one of the following statements ----

Ans: Ovules develop into embryo sac

Sol: Ovules develop into seed in post-fertilisation events.

75. Concanavalin A is: ----

Ans: a lectin

Sol: Concanavalin A is secondary metabolite of plants belongs to lectins.

76. Match the following organism with the -------

Ans: (a) – ii (b) – iv (c) – iii (d) - v

Sol: Both the columns are correctly matched in option (2).

77. Consider the following statements: ------

Ans: Both A and B are false.

Sol: Coenzyme or metal ion are transiently bound to enzyme protein.

78. The correct sequence of phases of cell cycle------

Ans: $G_1 \rightarrow S \rightarrow G_2 \rightarrow M$

Sol: The correct sequence of phases of cell cycle given in the option (4) is $G_1 \rightarrow S \rightarrow G_2 \rightarrow M$.

79. *Thiobacillus* is a group of bacteria------

Ans: Denitrification

Sol: *Thiobacillus* is a chemosynthetic autotrophic bacterium acts as dentrification.

80. Select the incorrect statement. ------

Ans: Inbreeding selects harmful recessive genes that reduce fertility and productivity.

Sol: Inbreeding results homozygosity and causes expression of harmful recessive genes.

81. What map unit (Centimorgan) is adopted------

Ans: A unit of distance between genes on chromosomes, representing 1% cross over.

Sol: One centi Morgan (cM) indicates one percent chance that two genes will be separated by crossing over.

82. Which one of the following is not ------

Ans: Botanical Garden

Sol: Botanical gardens are examples of *ex situ* conservation of biodiversity.

83. Placentation, in which ovules develop ------

Ans: Parietal

Sol: Parieta of ovary hanging from the inner wall or periphery part.

84. Due to increasing air-borne allergens -------

Ans: inflammation of bronchi and bronchioles.

Sol: Allergens cause inflammation of bronchi and bronchioles resulting wheezing and asthama.

85. Which of the following statements is------

Ans: Cornea is an external transparent and protective proteinacious covering of the eye-ball.

Sol: The cornea is the transparent front part of sclera.

86. Purines found both in DNA------

Ans: Adenine and guanine

Sol: DNA and RNA contains purines as adenine and guanine.

87. Expressed Sequence Tags------

Ans: Genes expressed as RNA

Sol: Expressed sequence Tags refers to all genes that are expressed as RNA.

88. Phloem in gymnosperms lacks--------

Ans: Both sieve tubes and companion cells.

Sol: Gymnosperms lack sieve tubes and companion cells in phloem.

89. What is the genetic disorder in which------

Ans: Klinefelter's syndrome

Sol: Chromosomal formula of Klinefelter's syndrome is 44 + XXY, a sterile male.

90. Grass leaves curl inwards during--------

Ans: Flaccidity in bulliform cells

Sol: Flaccidity in bulliform cells causes inrolling of grass leaves.

91. Consider following features------

Ans: Annelida, Arthropoda and Chordata

Sol: Organ system level, bilateral symmetry and true coelomate with metameric segmentation are found in Annelida Arthopoda and Chordata.

92. Under which of the following conditions will ------

Ans: Deletion of GGU from 7^{th}, 8^{th} and 9^{th} positions.

Sol: Deletion of GGU from 7^{th}, 8^{th} and 9^{th} position leads to deletion of a triplet codon change in reading frame.

93. Under which of the following conditions ------

Ans: There ae seven pairs of vertebrosternal, three pairs of vertebrochondral and two pairs of vertebral ribs.

Sol: Two pairs of vertebral ribs are ribs 11 and 12^{th} pairs commonly called as floating ribs.

94. The shorter and longer arms of a -------

Ans: p-arm and q-arm respectively

Sol: Shorter arm of a chromosome is 'P' arm and longer arm is 'q' arm.

95. Xylem translocates --------

Ans: Water, mineral salts, some organic nitrogen and hormones.

Sol: Xylem translocates H_2O, minerals, organic nitrogen and hormones.

96. persistent nucellus in the seed -------

Ans: Perisperm

Sol: persistent nucellus seen in the seed is known as perisperm.

97. Match column I with column II ------

Ans: (a) – ii (b) – iii (c) – iv (d) - i

Sol: Both columns are correctly matched in the option (4)

98. Which of the following can be used as ------

Ans: *Trichoderma*

Sol: *Trichoderma* is a biocontrol agent to manage soil borne pathogens in plants.

99. What would be the heart rate of a person ----

Ans: 100 beats per minute

Sol: Cardiac out put is stroke volume $\times$ heart rate 50 mL $\times$ 100 = 5 L

100. Which of the following protocols did aim ------

Ans: Montreal Protocol

Sol: Montreal protocol signed in 1987 and effective in 1989.

101. Polyblend, a fine powder of recycled ------

Ans: Construction of roads

Sol: Polyblend used for construction of roads.

102. Which of the following contraceptive ------

Ans: Lactational amenorrhea, Pills, Emergency contraceptives.

Sol: Lactational amenorrhea method is based on that absence of ovulation so chances of pregnancy is almost nil.

103. Drug called 'Heroin' is synthesized by ------

Ans: Acetylation of morphine

Sol: Heroin is synthesized by diacetylation of morphine

104. Which of the following pairs of gases is ------

Ans: Carbon dioxide and Methane

Sol: Carbon dioxide and methane are main green house gases.

105. Which of the following muscular disorders------

Ans: Muscular dystrophy

Sol: Muscular dystrophy is a genetical disorder.

106. Which one of the following equipments------

Ans: Bioreactor

Sol: Bioreactor is used for growing microbes on large scale for industrial production of enzymes.

107. The concept of "*Omnis cellula-e cellula*" ------

Ans: Rudolf Virchow

Sol: New cells are formed from pre-existing cells.

108. What is the fate of the male gametes ------

Ans: One fuses with the egg and other fuses with central cell nuclei.

Sol: Two male gametes discharged in the synergid, one fuses with egg and the other fuses with central cell nuclei is called double fertilization.

109. How does steroid hormone influence ------

Ans: Binding to DNA and forming a gene-hormone complex.

Sol: Steroid hormones bind to the intracellular receptor and influence DNA and genetic expression.

110. Which of the following pair of organelles ------

Ans: Lysosomes and Vacuoles

Sol: Lysosomes and vacuoles do not contain DNA.

111. A gene locus has two alleles A, a. ------

Ans: 0.16(AA); 0.48 (Aa); 0.36 (aa)

Sol: $P^2 + 2Pq + q^2 = 1$ According to Hardy-Weinberg Principle sum total of all the allele frequencies in a population is constant from generation to generation.

112. Match the following organisms with their ------

Ans: (a) – iii (b) – iv (c) – ii (d) - i

Sol: *Pila* is coming under phylum Mollusca bears radulla, a rasping organ.

113. Which of the following is a commercial ------

Ans: Statin

Sol: Statin produced by yeast *Monascus purpureus* is used as blood cholesterol lowering agent.

114. Variations caused by mutation, as ------

Ans: random and directionless

Sol: According to Hugo - de Vries mutation causes evolution are random and directionless.

115. Select the incorrect statement------

Ans: In domesticated fowls, sex of progeny depends on the type of sperm rather than egg.

Sol: In domesticated fowls sex of the progeny depends on the type of the egg rather than sperm.

116. Which of the following immune responses------

Ans: Cell-mediated immune response.

Sol: Cell-mediated immune response is responsible for rejection of kidney graft.

117. From evolutionary point of view, retention------

Ans: Pteriodophytes

Sol: In heterosporous pteridophyte female gametophyte retained on the parent sporophyte even after fertilization is a precursor of seed habit in evolution.

118. Select the correct sequence of organs in------

Ans: Pharynx $\rightarrow$ Oesophagus $\rightarrow$ Crop $\rightarrow$ Gizzard $\rightarrow$ Ileum $\rightarrow$ Collon $\rightarrow$ Rectum.

Sol: Oesophagus opens to a sac like structure called crop used for storing of food.

119. Which of the following statements ------

Ans: Enzymes of electron transport are embedded in outer membrane.

Sol: Enzymes of electron transport of mitochondria are located on inner membrane.

120. Which of the following statements is------

Ans: Lysosomes are formed by the process of packaging in the endoplasmic reticulum.

Sol: Lysosomes are formed from the fusion of vesicles from the golgi complex with endosomes.

121. Which of the following features of genetic------

Ans: Genetic code is nearly universal

Sol: Genetic code is universal, same in both prokaryotes and eukaryotes.

122. Tidal Volume and Expiratory Reserve -------

Ans: 1500 mL

Sol: The expiratory capacity is 1500 mL.

123. Match the following genes of the Lac-------

Ans: (a) – iii (b) – i (c) – iv (d) - ii

Sol: Both the columns are correctly matched in the option (3).

124. Use of an artificial kidney during --------

Ans: (c) and (d) are correct

Sol: Haemodialysis results reduced absorption of Ca^{2+} from gastro-intestinal tract and also reduce RBC production.

125. Match the hominids with their --------

Ans: (a) – iii (b) – iv (c) – i (d) - ii

Sol: Both the columns are correct

126. Select the hormone-releasing Intra--------

Ans: Progestasert, LNG-20

Sol: Progestasert and LNG-20 are hormone releasing IUDs.

127. Select the correct sequence for ------

Ans: Seminiferous tubules $\rightarrow$ Rete testis $\rightarrow$ Vasa efferentia $\rightarrow$ Epididymis $\rightarrow$ Vas deferens $\rightarrow$ Ejaculatory duct $\rightarrow$ Urethra $\rightarrow$ Urethral meatus.

Sol: The correct sequence of transport of sperms in male is given in option (2).

128. What is the direction of movement------

Ans: Bi-directional

Sol: Sugars move in bi-directional way in phloem.

129. Which of the following statements ----

Ans: Infective constituent in viruses is the protein coat.

Sol: Genetic material is the infective constituents in viruses.

130. The ciliated epithelial cells are ----

Ans: Bronchioles and Fallopian tubes

Sol: Bronchioles and fallopian tubes have ciliated epithelial cells.

131. Which of the following statements--------

Ans: Yeasts have filamentous bodies with long thread-like hyphae.

Sol: Yeast is unicellular fungus.

132. Which of these following methods is -------

Ans: Bury the waste within rocks deep below the Earth's surface.

Sol: Nuclear wastes are tightly shield and buried under rock in land.

133. Following statements describe the---------

Ans: The enzyme binds DNA at specific sites and cuts only one of the two strands.

Sol: Restriction Endonuclease, binds the DNA molecule and cuts both the strands.

134. In a species, the weight of newborn---------

Ans: ~~Dir~~ectional Selection

Sol: Newborn babies with average (mean) weight are selected, hence known as stabilizing selection.

135. Select the correctly written scientific---------

Ans: *Mangifera indica Linn.*

Sol: Scientific name of mango is *Mangifera indica Linn.*

PHYSICS

136. The correct Boolean operation ----

Ans: NAND

Sol:

A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

NAND.

137. A hollow metal sphere of ---

Ans: zero as r increases for r < R, decreases as r increases for r > R.

Sol: Electric field inside a hollow metallic charged shell is zero. Electric field outside the shell deceases with the square of distance from the centre of the shell.

138. At a point A on the earth's ----

Ans: A is located in the northern hemisphere and B is located in the southern hemisphere.

Sol: $\delta > 0$ in northern hemisphere and $\delta < 0$ in the southern hemisphere.

139. In a double slit experiment, ----

Ans: 0.15°

Sol: Angular width of the fringe = $\frac{\lambda}{d}$

$\theta_1 = \frac{\lambda_1}{d}$

$\theta_2 = \frac{\lambda_2}{d}$

$$\lambda_2 = \frac{\lambda_1}{\mu} = \frac{\lambda_1}{\left(\frac{4}{3}\right)}$$

$$= \frac{3\lambda_1}{4}$$

$$\frac{\theta_2}{\theta_1} = \frac{\lambda_2}{\lambda_1} = \frac{3}{4}$$

$$\theta_2 = \frac{3}{4}\theta_1$$

$$= \frac{3}{4} \times 0.2^\circ$$

$$= 0.15^\circ.$$

140. Six similar bulbs are connected ----

Ans: 9 : 4

Sol: When all are glowing, 3 bulbs are parallel (in A) 3 bulbs are parallel (in B) and they are in series.

$$P_{eff_1} = \frac{3p \times 3p}{3p + 3p}$$

$$= \frac{3}{2}p.$$

when two in A and one in B are glowing.

$$P_{eff_2} = \frac{2p \times p}{2p + p}$$

$$= \frac{2p}{3}$$

$$\frac{P_{eff_1}}{P_{eff_2}} = \frac{\frac{3}{2}p}{\frac{2}{3}p} = \frac{9}{4}.$$

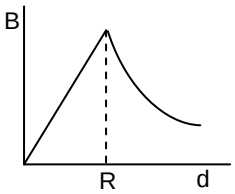
141. In which of the following processes, ----

Ans: adiabatic

Sol: In adiabatic process $\Delta Q = 0$

142. A cylindrical conductor of radius ----

Ans:



Sol: When $r \le R$

$$B = \frac{\mu_0 I r}{2\pi R^2}$$

when r > R

$$B = \frac{\mu_0 I}{2\pi r}.$$

143. In the circuits shown below ----

Ans: $V_1 = V_2$ and $i_1 = i_2$

Sol: $V_1 = 10$ V

$$i_1 = \frac{V}{R} = \frac{10}{10} = 1A$$

(ideal voltmeter – hence no current goes through it)

$V_2 = 10$ V

$$i_2 = \frac{10}{10} = 1 \text{ A.}$$

144. Which colour of the light ----

Ans: red

Sol: red has the longest wavelength.

145. Increase in temperature of a gas ----

Ans: Increase in its kinetic energy.

Sol: Temperature is the measure of the mean kinetic energy possessed by the molecules.

146. The radius of circle ----

Ans: $y(t) = 3\cos\left(\frac{\pi t}{2}\right)$, where y in m.

Sol: $y = r\cos\theta$

$$= 3\cos(\omega t)$$

$$= 3\cos\left(\frac{2\pi}{T}t\right)$$

$$y(t) = 3\cos\left(\frac{\pi t}{2}\right).$$

147. Average velocity of a ----

Ans: zero

Sol: Total displacement = 0
Average velocity = 0.

148. A solid cylinder of mass 2 kg ----

Ans: 2×10^{-6} N m

Sol: $$I = \frac{mR^2}{2} = \frac{2 \times \left(4 \times 10^{-2}\right)^2}{2}$$

$$= 16 \times 10^{-4} \text{ kg m}^2$$

$$\theta = n \times 2\pi = 2\pi \times 2\pi = 4\pi^2$$

$$\omega = \frac{2\pi N}{60} = \frac{2\pi \times 3}{60}$$

$$= \frac{\pi}{10} \text{rad/s}$$

$$\omega^2 = \omega_0^2 + 2\alpha\theta$$

$$0 = \left(\frac{\pi}{10}\right)^2 + 2\alpha \times 4\pi^2$$

$$\alpha = \frac{-\pi^2}{800\pi^2} = \frac{-1}{800}$$

$$\tau = I\alpha$$

$$= 16 \times 10^{-4} \times \frac{1}{800}$$

$$= 2 \times 10^{-6} \text{ Nm.}$$

149. A block of mass 10 kg ----

Ans: 10 rad/s

Sol: $N = mr\omega^2$

For equilibrium

$\mu N = mg$

$\mu mr\omega^2 = mg$

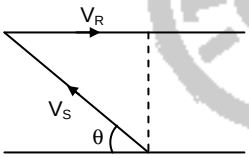
$$\omega = \sqrt{\frac{g}{\mu r}} = \sqrt{\frac{10}{1 \times 0.1}}$$

$= 10$ rad/s

150. The speed of a swimmer in ----

Ans: 30° west

Sol:



$v_s \cos\theta = V_R$

$20 \cos\theta = 10$

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

$\theta = 60°$.

$\theta' = 90 - 60 = 30°$.

151. A 800 turn coil of effective ----

Ans: 0.02 V

Sol: $$E = -\frac{d\phi}{dt} = -\frac{(\phi_2 - \phi_1)}{\Delta t}$$

$\theta_1 = 0°$ $\theta_2 = 90°$

$\phi_2 = N\ B\ A \cos\theta_2 = 0$

$\phi_1 = NBA \cos\theta_1$

$= 800 \times 5 \times 10^{-5} \times 0.05 \times 1$

$= 2 \times 10^{-3}$

$$\varepsilon = \frac{2 \times 10^{-3}}{0.1} = 0.02v\ .$$

152. In an experiment, the percentage ----

Ans: 16%

Sol: Given $X = \dfrac{A^2 B^{\frac{1}{2}}}{C^{\frac{1}{3}} D^3}$

$$\frac{\Delta X}{X} = \frac{2\Delta A}{A} + \frac{1}{2}\frac{\Delta B}{B} + \frac{1}{3}\frac{\Delta C}{C} + \frac{3\Delta D}{D}$$

$$= 2 \times 1\% + \frac{1}{2} \times 2\% + \frac{1}{3} \times 3\% + 3 \times 4\%$$

$= 2\% + 1\% + 1\% + 12\%$

$= 16\%$

153. The displacement of a particle ----

Ans: $\sqrt{A^2 + B^2}$

Sol: Given $y = A_0 + A \sin\omega t + B \cos\omega t$

$\Rightarrow a = \sqrt{A^2 + B^2}$

154. An electron is accelerated ----

Ans: 12.2×10^{-13} m

Sol: $$\lambda = \frac{h}{\sqrt{2meV}}$$

$$= \frac{6.6 \times 10^{-34}}{\sqrt{2 \times 9 \times 10^{-31} \times 1.6 \times 10^{-19} \times 10000}}$$

$$= \frac{6.6 \times 10^{-34}}{5.3 \times 10^{-23}}$$

$= 1.22 \times 10^{-11}$

$= 12.2 \times 10^{-12}$ m

155. A mass m is attached ----

Ans: the mass is at the lowest point

Sol: at the lowest point tension is maximum

$$T = mg + \frac{mv^2}{r}$$

156. Two particles A and B ----

Ans: 1 : 1

Sol: Given time period is same, ω will be a constant.

$r_A = r_B = 1 : 1$.

157. A copper rod of 88 cm----

Ans: 68 cm

Sol: $\ell_1\alpha_1 = \ell_2\alpha_2$

$88 \times 1.7 \times 10^{-5} = \ell_2 \times 2.2 \times 10^{-5}$

$$l_2 = \frac{88 \times 1.7 \times 10^{-5}}{2.2 \times 10^{-5}}$$

$$= \frac{149.6}{2.2}$$

$= 68$ cm.

158. Ionized hydrogen ----

Ans: 2 : 1

Sol: Radius of the circular path, $r = \frac{mv}{qB}$

since momenta and B are same, $r \propto \frac{1}{q}$

$r_H \propto \frac{1}{e}$

$r_\alpha \propto \frac{1}{2e}$

$\frac{r_H}{r_\alpha} = \frac{1\times 2e}{e\times 1} = 2 : 1.$

159. When block of mass M ----

Ans: $Mg\ell$

Sol: Elastic potential energy

$= \frac{1}{2}\text{force}\times\text{displacement}$

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

160. For a p-type semiconductor, ----

Ans: Holes are the majority carriers and trivalent atoms are the dopants.

Sol: Conceptual.

161. The work done to raise a mass m from the surface ----

Ans: $\frac{1}{2}mgR$

Sol: Work done = $\frac{mgh}{1+\frac{h}{R}}$

Given h = R

Work done = $\frac{mgh}{1+\frac{R}{R}} = \frac{mgR}{2}$.

162. In total internal reflection ----

Ans: 90°

Sol: conceptual.

163. Two point charges A and B ----

Ans: $\frac{9F}{16}$

Sol: $F = \frac{KQ^2}{r^2}$

$F' = \frac{K\left[Q-\frac{1}{4}Q\right]\left[-Q+\frac{1}{4}Q\right]}{r^2}$

$= \frac{K\frac{3}{4}Q\times\frac{3}{4}Q}{r^2}$

$F' = \frac{9}{16}\frac{KQ^2}{r^2}$

$F' = \frac{9}{16}F.$

164. α-particle consists of ----

Ans: 2 protons and 2 neutrons only

Sol: α particle contains 2 protons and 2 neutrons $\left({}_2He^4\right)$.

165. Body A of mass 4 m moving ----

Ans: $\frac{8}{9}$

Sol: $u_1 = u$, $m_1 = 4m$, $u_2 = 0$, $m_2 = 2m$

Velocity of the colliding body

$A_1V_1 = \frac{(m_1-m_2)u_1}{m_1+m_2} + \frac{2m_2u_2}{m_1+m_2}$

$= \frac{[4m-2m]u}{6m}$

$= \frac{2}{6}u = \frac{1}{3}u$

final kinetic energy = $\frac{1}{2}4m\left(\frac{1}{3}u\right)^2$

$= \frac{1}{2}4m\frac{u^2}{9}$

Loss of kinetic energy = $\frac{\frac{1}{2}4m\left[u^2-\frac{u^2}{9}\right]}{\frac{1}{2}4mu^2}$

$= \frac{8}{9}$.

166. A body weight 200 N on ----

Ans: 100 N

Sol: $g' = g\left[1-\frac{d}{R}\right]$

$= g\left[1-\frac{R}{2R}\right]$

$g' = \frac{g}{2}$

weight = 100 N.

167. Pick the wrong answer in the ----

Ans: An observer can see a rainbow when his front is towards the sun.

Sol: An observer can see a rainbow when his back is towards the sun.

168. A force F = 20 + 10y are ----

Ans: 25 J

Sol: Given F = 20 + 10y

$$W = \int_0^1 F.dy$$

$$= \int_0^1 (20+10y)\,dy$$

$$= \left| 20y + \frac{10y^2}{2} \right|_0^1$$

$$= 20 \times 1 + 5 \times 1^2$$

$$= 20 + 5$$

$$= 25 \text{ J.}$$

169. A disc of radius 2 m and mass 100 kg ----

Ans: 3 J

Sol: Work done $= \frac{1}{2}mv^2\left[1+\frac{K^2}{R^2}\right]$

$$= \frac{1}{2}\times 100\left(20\times 10^{-2}\right)^2\left[1+\frac{1}{2}\right]4$$

$$= 50\times 400\times 10^{-4}\times\frac{3}{2}$$

$$= 3\text{J.}$$

170. A small hole of area of ----

Ans: 12.6×10^{-6} m^3/s

Sol: rate of flow = A × v

$$= 2 \times 10^{-6} \times \sqrt{2\times 10\times 2}$$

$$= 12.6 \times 10^{-6} \text{ m}^3/\text{s.}$$

171. When an object is shot from the bottom ----

Ans: $1 : \sqrt{3}$

Sol: Here $S = \frac{u^2}{2g\sin\theta}$

$$\Rightarrow \frac{x_1}{x_2} = \frac{\sin\theta_2}{\sin\theta_1} = \frac{\sin 30^\circ}{\sin 60^\circ} = \frac{1}{2}\cdot\frac{2}{\sqrt{3}}$$

$$= \frac{1}{\sqrt{3}}.$$

172. A parallel plate capacitor ----

Ans: 60 μA, 60μA

Sol: $I = \frac{dq}{dt} = \frac{CdV}{dt}$

$$= 20 \times 10^{-6} \times 3$$

$$= 60 \ \mu\text{A}.$$

Conduction current and displacement current have same magnitudes.

173. The unit of thermal ----

Ans: $W\ m^{-1}\ K^{-1}$.

Sol: Theory

174. Which of the following acts as ----

Ans: fuse

Sol: Conceptual

175. A soap bubble, having ----

Ans: 1 cm.

Sol: $Z_0\rho g = \frac{4T}{R}$

$$Z_0 = \frac{4T}{R\rho g}$$

$$= \frac{4\times 2.5\times 10^{-2}}{10^{-3}\times 10^3\times 10}$$

$$= 10^{-2} \text{ m.}$$

$$= 1 \text{ cm.}$$

176. The total energy of an ----

Ans: 3.4 eV, –6.8 eV

Sol: TE = –3.4 eV
KE = +3.4 eV
PE = 2TE = –6.8 eV.

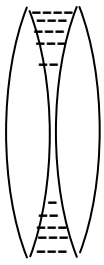
177. Two similar thin equi-convex ----

Ans: 1 : 2

Sol:

$$\frac{1}{F_1} = \frac{1}{f} + \frac{1}{f} = \frac{2}{f}$$

$$\Rightarrow F_1 = \frac{f}{2}$$



$$\frac{1}{F_2} = \frac{1}{f} + \frac{1}{f} - \frac{1}{f} = \frac{1}{f}$$

$$\Rightarrow F_2 = f.$$

$$\frac{F_1}{F_2} = \frac{1}{2}.$$

178. Two parallel infinite ----

Ans: $\frac{\lambda}{\pi \in_0 R} N/C$

Sol: Two fields add up at the point

$\Rightarrow E = \frac{2\lambda}{2\pi \in_0 R} = \frac{\lambda}{\pi \in_0 R} N/C$.

179. In which of the following devices ----

Ans: electric heater

Sol: Conceptual

180. A particle moving ----

Ans: remain constant

Sol: conceptual