VMC MEDICAL

Paper Code
G6

Aggarwal Corporate Heights, 3rd Floor, Plot No. A-7, Netaji Subhash Place,
Pitampura, New Delhi-110034 Ph.: 011-45221189 - 93 Fax : 011-25222953

DETAILED SOLUTION
NEET-2023

Section- I (PHYSICS)	

1. **(2)**

As $\phi_0 = 2.20\text{eV}$ and incident energy of cesium is greater then ϕ_0 so electrons will get emitted from Cs.

2. (2)

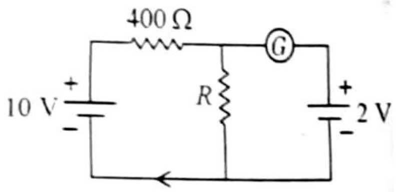
As magnetic field lines forms loop, number of field lines entering is same as number of field lines coming out of surface.

3. (4)

$$i = \frac{8}{400} = \frac{1}{50}$$

Also, $i = \frac{2}{R}$

$$\frac{1}{50} = \frac{2}{R}$$



4. (2)

For an ideal transformer

$$\frac{e_s i_s}{e_p i_p} = 1$$

$$\Rightarrow \frac{\text{output power}(e_s i_s)}{e_p i_p} = 1$$

$$\Rightarrow \frac{60}{220 \times i_p} = 1$$

$$i_p = \frac{60}{220} = 0.27\text{A}$$

5. (4)

The ripples can be removed by smoothing capacitor which converts the ripple voltage into smoother DC voltage.

6. (4)

$$\frac{E_0}{B_0} = C$$

$$\Rightarrow \frac{48}{B_0} = 3\times10^8$$

$$\Rightarrow B_0 = \frac{48}{3}\times10^{-8} = 1.6\times10^{-7}\,T$$

7. (4)

Density $f = \frac{M}{\pi r^2 \times l}$

$$\frac{\Delta f}{f} = \left(\frac{\Delta M}{M} + \frac{2\Delta r}{r} + \frac{\Delta l}{l}\right)\times100\%$$

$$= \left(\frac{0.002}{0.4} + 2\times\frac{0.001}{0.3} + \frac{0.02}{5}\right)\times100\%$$

$$= 0.0157\times100\% \simeq 1.6\%$$

8. (1)

$$\sin\theta_i = \frac{1}{\mu}$$

$$\mu = \frac{C}{v} = \frac{x/t_1}{10x/t_2}$$

$$\Rightarrow \theta_i = \sin^{-1}\left(\frac{10t_1}{t_2}\right)$$

9. (1)

$$\tau = PE\sin 30^o$$

$$\Rightarrow 4 = q(l)\times2\times10^5\times\frac{1}{2}$$

$$\Rightarrow q = 2\times10^{-3}C = 2mC$$

10. (3)

$$Stress = \frac{force}{Area} = \frac{W}{A}$$

11. (3)

$\frac{1}{\lambda} = R\left(\frac{1}{2^2} - \frac{1}{\infty^2}\right)$ for Balmer series (i)

& $\frac{1}{\lambda'} = P\left(\frac{1}{4^2} - \frac{1}{\infty^2}\right)$ for bracket (ii)

$(i)\div(ii)$

$$\frac{\lambda'}{x} = \frac{1/4}{1/16} = 4$$

$$\Rightarrow \lambda' = 4\lambda$$

12. (3)

$$\frac{V_1}{V_2} = \sqrt{\frac{T_1}{T_2}}$$

$$\frac{1}{4}=\sqrt{\frac{223}{T_2}}$$

$$\frac{1}{16}=\frac{223}{T_2}\Rightarrow T_2=3568k=3295^oC$$

13. (4)

$$\vec{F}=\frac{m(\vec{v}-\vec{u})}{t}$$

14. (3)

For open pipe

$$\nu_1=\frac{V}{2l}$$

For closed pipe

$$\nu_2=\frac{V}{4l}$$

$$\therefore\ \frac{\nu_1}{\nu_2}=\frac{v/2l}{v/4l}=2:1$$

15. (1)

Along the axis of rotation by right hand screw rule.

16. (2)

17. (2)

Net flux is zero, so number of field lines getting inside and coming outside must be equal

18. (4)

$$R=22\times10^3\pm5\%$$

$10^3\rightarrow$ is for orange

19. (1)

$$U=\frac{1}{2}Li^2=\frac{1}{2}\times4\times10^{-6}\times2\times2=8\mu J$$

20. (1)

$$f=\frac{1}{2\pi\sqrt{LC}}=\frac{1}{2\times3.14\sqrt{10^{-2}\times16^{-6}}}=1.59\times10^3Hz=1.59kHz$$

21. (3)

$$E_{net}=10-5=5V, R_{eq}=10\Omega$$

$$\therefore\ i=\frac{E_{net}}{R_{net}}=\frac{5}{10}=0.5A$$

And direction from A to B via E

22. (3)

$$\frac{hc}{\lambda_{\min}}=eV$$

$$\therefore\ \lambda_{\min}\propto\frac{1}{V}$$

23. (1)

24. (4)

Angular width $=\frac{\lambda}{d}$

Statement 1: correct as it is independent of D

Statement 2: Incorrect angular separation with is directly proportional to wavelength.

25. (4)

$$H=\frac{u^2\sin^2\theta}{2g}=\frac{140\times280\times\frac{1}{4}}{2\times9.8}=1000\,m$$

26. (2)

$$n=1-\frac{T_2}{T_1}$$

$$\Rightarrow\frac{T_2}{600}=1-\frac{1}{2}$$

$$\Rightarrow\frac{50}{100}=1-\frac{T_2}{(32.7+2.73)k}$$

$$\Rightarrow\frac{T_2}{600}=\frac{1}{2}$$

$$T_2=300k=27^{o}C$$

27. (4)

$$Energy=T\times2(\Delta A)$$

$$=0.03\times2(4\pi(2\times10^{-2})^2-0)$$

$$=3.01\times10^{-4}\,J$$

28. (1)

$$\frac{A_0/16}{A_0}=2^{-\tau/T}$$

$$\frac{1}{2^4}=2^{-\tau/20}$$

$$2^{-4}=2^{-\tau/20}$$

$$\therefore\frac{t}{20}=4$$

$$\therefore\ t=80\,\text{min}$$

29. (1)

$$U=\frac{1}{2}k(2)^2 \qquad \ldots\text{(i)}$$

Now,

$$U'=\frac{1}{2}k(8)^2 \qquad \ldots\text{(ii)}$$

$$(ii)\div(i)$$

$$\frac{V'}{V}=\frac{8^2}{2^2}=\frac{64}{4}=16$$

$\Rightarrow V' = 16V$

30. (2)

$$= \frac{6 \times 3}{6+3} = \frac{18}{9} = 2\mu f$$

31. (4)

$$V_{avg} = \frac{2V_1V_2}{V_1+V_2} = \frac{2V \times 2V}{V+2V} = \frac{4V^2}{3V} = \frac{4V}{3}$$

32. (2) **(Bonus)**

$$\frac{K_{solid\ sphere}}{K_{hollow\,sphere}} = \frac{\sqrt{I_1/M}}{\sqrt{I_2/M}} = \sqrt{\frac{\frac{2}{5}MR^2}{\frac{2}{3}MR^2}} = \sqrt{\frac{3}{5}}$$

33. (4)

$$E_1 = E_2$$

$$\frac{Gm}{x^2} = \frac{G9m}{(R-x)^2}$$

$$\Rightarrow \left(\frac{R-x}{x}\right)^2 = 9$$

$$\Rightarrow \frac{R-x}{x} = \sqrt{9}$$

$$\Rightarrow 4x = R \Rightarrow x = \frac{R}{4}$$

$\therefore$ *At P*,

$$V_P = -\frac{GM}{R/4} - \frac{G(9m)}{3R/4} = -16\frac{GM}{R}$$

34. (3)

35. (4)

$$i = \frac{V}{X_c} = \frac{V}{1/\omega c} = \omega CV$$

$$\therefore i \times \omega$$

36. (1)

$$r \propto \frac{n^2}{z}$$

$$\frac{r_1}{r_3} = \left(\frac{n_1}{n_2}\right)^2 = \left(\frac{1}{3}\right)^2$$

$$\Rightarrow r_3 = 9 \times r_1 = 4.77 Å$$

37. (4)

$$R_T = T_0(1+\alpha\Delta\theta)$$

$$\frac{R_T - R_0}{R_0} = \alpha\Delta\theta$$

$\Rightarrow \frac{6.8-2}{2} = \alpha \times 80$

$\Rightarrow \frac{4.8}{160} = 3\times10^{-2}\,{}^{o}C^{-1}$

38. (4)

$Z = \sqrt{R^2 + \left(\omega L = \frac{1}{\omega c}\right)^2} = \sqrt{10^2 + (2\pi\times50\times\frac{50}{\pi}\times10^{-3} - \frac{1}{2\pi\times50\times\frac{10^3}{\pi}\times10^{-6}}}$

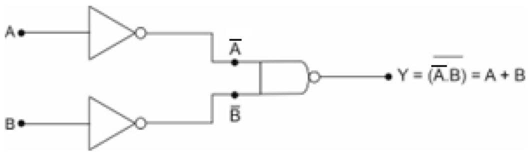
$= \sqrt{100 + \left(5000\times10^{-3} - \frac{1}{10^{-1}}\right)^2}$

$= \sqrt{100+(5-10)^2}$

$= \sqrt{125} = 5\sqrt{5}$

39. (3)

It will be or gate.



40. (3)

$i = \frac{E}{10R}$ …(i)

$ni = \frac{E}{R/10} = 10\frac{E}{R}$

$\Rightarrow n\times\frac{E}{10R} = 10\frac{E}{R}$

$\Rightarrow n = 100$

41. (4)

$ma = \mu mg$

$\Rightarrow a = \mu g = 0.15\times10 = 1.5 m/s^2$

42. (1)

At t = 2 sec

x = 1 m

T = 8 sec

$\therefore a_{t=2s} = -\omega^2 x = -\left(\frac{2\pi}{T}\right)^2 \times 1$

$= -\left(\frac{2\pi}{8}\right)^2$

$= -\frac{\pi^2}{16}$

43. (3)

$$m\omega^2 R = \frac{GMm}{R^2}$$

$$\Rightarrow \left(\frac{2\pi}{T}\right)^2 = \frac{GM}{R^3}$$

$$\Rightarrow \frac{4\pi^2}{T^2} = \frac{G\times\frac{4}{3}\pi R^3 \times d}{R^3}$$

$$\Rightarrow \frac{3\pi}{Gd} = T^2$$

$$\Rightarrow \frac{3\pi}{GP} = T^3$$

44. (4)

$$B_{mt} = \frac{\mu_0 i}{2\pi R} - \frac{\mu_0 i}{4R} = \frac{\mu_0 i}{4R}\left[\frac{2}{\pi} - 1\right] = \frac{\mu_0 i}{4R}\left[1 - \frac{2}{\pi}\right] \text{ (out of page)}$$

45. (4)

$$\frac{1}{f} = \frac{1}{f_1} + \frac{1}{f_2} + \frac{1}{f_3}$$

$$\Rightarrow \frac{1}{f} = -\frac{100}{3} + \frac{1}{20} - \frac{100}{3}$$

$$\Rightarrow f = -100cm$$

$$f_1 = f_3 = -\frac{R}{\mu - 1}$$

$$\Rightarrow -\frac{20}{1.6-1}$$

$$\Rightarrow \frac{-200}{6}$$

$$\Rightarrow \frac{-100}{3}cm$$

And $f_2 = \frac{2R}{\mu - 1}$

$$= \frac{2\times 20}{1.5-1} = 20cm$$

46. (1)

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

$$\Rightarrow f = \infty$$

47. (4)

$$\vec{F}_{mt} = \vec{F}_y + \vec{F}_z$$

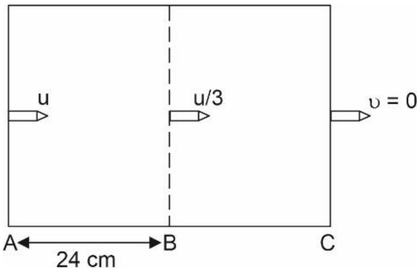
$$= 3IL\hat{k} + 4IL\hat{i}$$

$$|\vec{F}_r| = \sqrt{3^2 + 4^2} \times IL = 5IL$$

48. (2)

A → B

$$2a = \frac{\left(\frac{u}{3}\right)^2 - u^2}{24} = -\frac{\frac{8u^2}{9}}{24}$$



B → C

$$x = \frac{0 - \frac{u^2}{a}}{2a}$$

$$x = 3cm$$

Length = 24 + 3 = 27 cm

49. (2)

$$V = \frac{kP\cos\theta}{r^2 - a^2\cos^2\theta} = \frac{k.q(6)\times 1}{5^2 - 3^2} = \frac{6kq}{4^2} = \frac{3kq}{8}$$

50. (4)

$$s = ut + \frac{1}{2}gt^2$$

$$-h = 4\times 4 - \frac{1}{2}\times 10\times 4^2$$

$$-h = 16 - 80$$

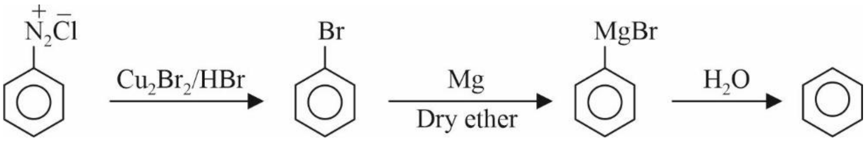
$$h = 64m$$

Section- II (CHEMISTRY)

51. (1)

Tl^{+} is more stable due to inert pair effect

52. (3)



53. (4)

This is an allylic halide.

54. (3)

$$Na + C + N + S \xrightarrow{\text{Fuse}} NaSCN$$

$$3NaSCN + Fe^{3+} \longrightarrow \underset{\substack{\text{Blood Red} \\ \text{ppt}}}{Fe(SCN)_3}$$

55. (1)

Assertion is false as no reaction can have $E_a = 0$.

Reason is true.

56. (3)

Amount of $CaCO_3$ $= 0.2 \times 20 = 4$ gm

100 gm $CaCO_3$ gives $= 44$ g CO_2

So, 4 g $CaCO_3$ give $= \frac{44}{100} \times 4 = 1.76$ gm.

57. (1)

58. (2)

Both statement (I) and (II) are true.

59. (2)

Effective B atoms = 4

Effective A atoms = $8 \times \frac{1}{3}$

Formula = $A_{8/3}B_4 \Rightarrow A_{2/3}B_1 = A_2B_3$

Hence, 2 + 3 = 5

60. (4)

Cu^{2+} is more stable due to higher hydration energy.

61. (4)

Coke is used as a reducing agent, all C in diamond are sp^3, fullerene are cage like molecule, graphite is a dry lubricant.

62. (4)

Deep sea divers respire O_2 and He this is to keep them light

63. (1)

Veronal is a barbiturate.

64. (4)

Statement D and E are incorrect, H-H bond energy is highest among single bond.

65. (4)

Rate = $K[A]^2[B]$

Rate new = $K[3A]^2[B]$

$= 9k[A]^2[B]$

66. (1)

$N_2 + 3H_2 \xrightarrow{Fe} 2NH_3$

Reactant are gases catalyst is solid

67. (2)

68. (3)

$CH_3COONa \xrightarrow[CaO]{NaOH} CH_4 + Na_2CO_3$

2 times $M_{CH_4} = 32$ g

69. (4)

N^{3-} will be the largest due to least effective nuclear charge.

70. (2)

For molecules lighter then O_2 configuration is given in choice two.

71. (2)

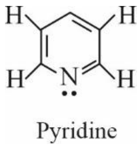
$K_3\left[Al(C_2O_4)_3\right]$

Has same type of ligand and is homoleptic.

72. (4)

Intermolecular forces do not include covalent bonding.

73. (4)

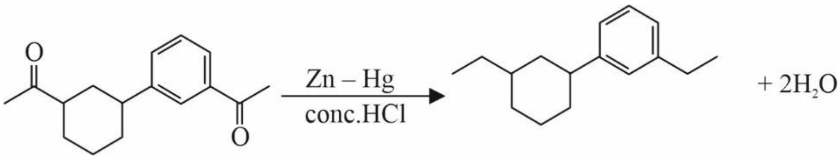


Pyridine has 11σ bonds, 3π bonds and one lone pair.

74. (1)

Mass of e^- is 9.10939×10^{-31} Kg, all isotopes of an element can show same chemical properties.

75. (2)



This is Clemmensen Reduction.

76. (2)

77. (3)

$P = K \times \frac{1}{V}$ is a straight line as shown in option (3)

78. (2)

$n_m = 2\ell + 1$

So, option (2) is correct

79. (4)

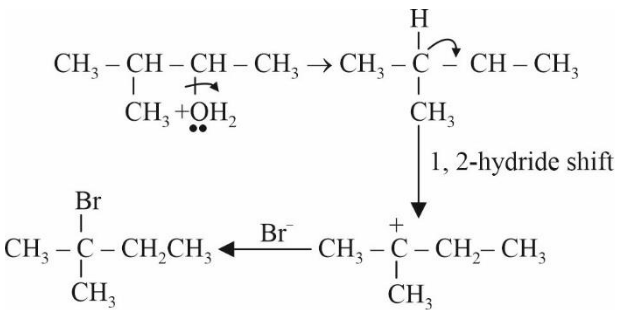
$K = G \times \frac{\ell}{a}$

$0.0210 = \frac{1}{60} \times \frac{\ell}{a}$

So, $\frac{\ell}{a} = 0.0210 \times 60$

$= 1.26\ cm^{-1}$

80. (2)



81. (3)

Polymer of chloroprene $\left(H_2C=\underset{}{\overset{\overset{\displaystyle Cl}{|}}{C}}-CH=CH_2 \right)$ is neoprene (synthetic rubber.)

82. (2)

$AlCl_3, BeCl_2, PCl_5$ do not have eight electron around centeral atom.

83. (4)

BF_3 will act as Lewis acid as octet of central atom is incomplete.

84. (4)

Assertion is true but reason is false.

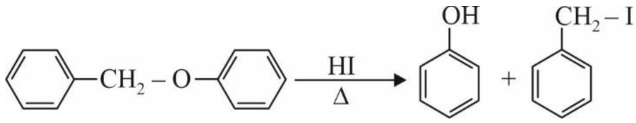
85. (4)

Isocyanides on reduction give 2° amines.

86. (4)

C and D are wrong statements

87. (4)



88. (3)

$\Delta H = \Delta U + \Delta n_g RT$

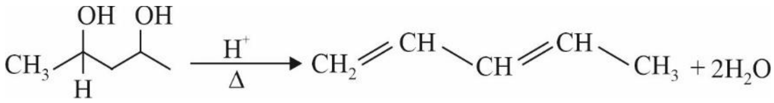
89. (4)

Octahedral void at edge center contribute 1/4 to a unit cell.

90. (1)

Statement I is wrong statement II is correct.

91. (3)



92. (3)

A. $HO-\underset{\underset{\displaystyle O}{||}}{\overset{\overset{\displaystyle O}{||}}{S}}-O-O-\underset{\underset{\displaystyle O}{||}}{\overset{\overset{\displaystyle O}{||}}{S}}-OH$ (Peroxodisulphuric Acid)

A — (III)

B. $HO-\underset{\underset{\displaystyle O}{||}}{\overset{\overset{\displaystyle O}{||}}{S}}-OH$

B — (IV)

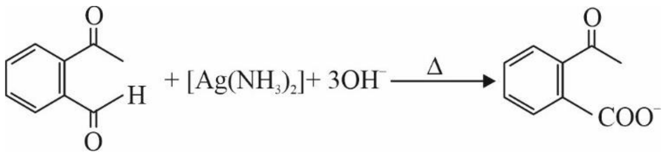
C. $\mathrm{HO-\overset{\overset{\large O}{||}}{\underset{\underset{\large O}{||}}{S}}-O-\overset{\overset{\large O}{||}}{\underset{\underset{\large O}{||}}{S}}-OH}$

C— (I)

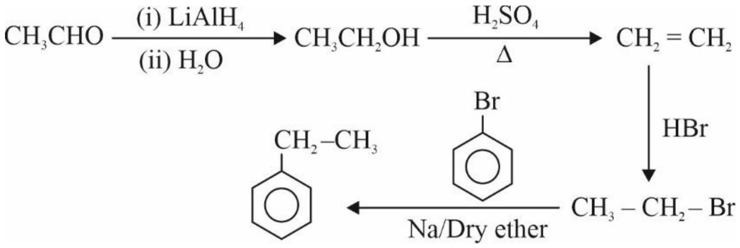
D. $\mathrm{HO-\overset{\overset{\large O}{||}}{\underset{\bullet\bullet}{S}}-OH}$

D— (II)

93. (4)



94. (2)



95. (2)

$Fe_2O_3 + CO \longrightarrow 2FeO + CO_2$. Does not occur in the 900 K – 1500 K Jone.

96. (4). Colloid of gas in solid is solid sol.

97. (4)

$\left[CoCl_2(en)_2\right]NO_3$ will be most stable due to chelate effect.

98. (2)

(i), (ii), (v), (vii) obey Huckel's Rule.

99. (4)

$A + B \rightleftharpoons C + D \quad K_c = \dfrac{[C][D]}{[A][B]} = \dfrac{10\times 6}{3\times 2} = 10$

$\Delta G^\circ = -2.303\times 2\times 300\times \log 10$

$= -1381.80$ cal

100. (2)

$Cr_2O_7^{2-} + 3SO_3^{2-} + 8H^+ \longrightarrow 2Cr^{3+} + 3SO_4^{2-} + 4H_2O$

Section- III (BOTANY)

101. **(2)**

The first stage of gametophyte in the life cycle of *funaria* is the protonema stage. Protonema stage is followed by development of secondary leafy gametophyte.

The protonema is the juvenile stage which develops directly from the spores that develops in the capsule after meiotic division. The spores germinate to produce protonema stage.

102. (4)

Cellulose is a polymer of glucose it is composed of linear chains of glucose molecules linked by $\beta(1 \rightarrow 4)$ glycosidic bonds. Cellulose doesn't have amylose, hence its is not complex so doesn't form blue colour with iodine.

103. (2)

Mn^{+2} is the main photolytic reagent it acts as catalyst for break down of H_2O molecules.

104. (2)

ESTs are genes that are expressed as RNA in the body.

105. (2)

Thickness of ozone is measured by Dobson unit.

106. (2)

A-ATP is used in conversion of glucose to glucose $6PO_4$ and in conversion of fructose $6PO_4$ to fructose 1, 6 diphosphate, hence first 5 steps of glycolysis is called energy consuming steps.

R-In the entire glycolysis where glucose breaks to form 3 molecules of pyruvic acid, 2 molecules of ATP are consumed.

107. (1)

In agarose gel electrophoresis the separated fragments of DNA are visualised using UV rays where DNA becomes bright orange coloured when treated with Ethidium bromide. Hence is visible.

108. (2)

Evil quartet is related to 4 major causes, but habitat loss and fragmentation is considered as most important.

109. (4)

Centromere divides in Anaphase stage of mitosis and Anaphase II of Meiosis II, it divides due to force developed by the spindle fibres, due to which daughter cell receives one copy of each chromosome.

110. (4)

Ethylene is a gaseous hormone which accumulate in water and triggers the growth of rice. It allows expansions of cell and helps to grow the plant so that leaves can grow above the water.

111. (4)

Henking discovered sex chromosome (X-chromosome) in insects. Alfred Sturtevent, a student of Morgan, in 1913 has given the frequency of recombination between gene pairs on the same chromosome as a measure of the distance between genes to map their position on chromosomes. T.H. Morgan worked on fruit fly Drosophila used to study the inheritance of traits and the mechanisms of recombination.

Walter Sutton (1877 – 1916) and Theodar Boveri (1862 – 1915) had proposed the chromosome theory of inheritance.

112. (3)

1 cycle of C_3 cycle produces = 2NADPH and 3ATP.

So 6 cycle produces 1 molecule of glucose and 6 cycle needs 12NADPH and 18ATP.

113. (3)

RNA polymerase III plays role in synthesis of tRNA, 5 sr RNA and Sn RNA
RNA Pol-I, rRNAs like 28s, 18s and 5.8s RNA Pol-II synthesises precursor of mRNA and hn RNA.

114. (2)
The flowers of Fabaceae the stamens are fused into two groups with 9 stamen in a group and 1 in other group. They also consists of two separate lobes or sacs. In Solanaceae epipetalous and separate saes are absent in anthers and in liliaceae six stamens an there either free or fused and anthers are Monothecous.

115. (3)
Recombination nodules are formed during the pachytene stage of prophase I of Meioxis-I homologous chromosomes are paired and crossing over occurs between them resulting in the exchange of genetic material.

116. (4)
NPP = GPP – R where R is the respiratory loss, GPP = Gross primary production and NPP = Net primary production.

117. (2)
The reaction centre of PS-II has a chlorophyll a molecule with wave length 680 nm hence absorption maxima is 680 nm. In PS-II primary photo chemical reaction occurs.

118. (3)
Hershey and Martha chase. Proposed unequivocal proof that DNA is genetic material.
Wilkins and Franklin- Discovery of DNA structure using x-rays crystallography.
Frederick Griffith – Experiment with *Streptococcus pneumoniae* bacteria that lead to transformation.
Avery Macleod and McCarthy made a significant contribution in understanding of DNA as the genetic material.

119. (3)
GA on juvenile conifer can help in hastening the maturity period leading to early seed production.

120. (3)
Tassels in the corn cob trap pollen grains.

121. (3)
Chilled ethanol is used for precipitation of DNA.

122. (4)
Synergid have (n) chromosome, zygote have 2n and primary endosperm have 3n nucleus.

123. (2)
Colour, fragrance, nectar and large petals are required to attract insect pollinator’s.

124. (3)
The phenomenon of leaf mesophyll cells forming callus in culture medium is called dedifferentiation. Dedifferentiation is the ability of differentiated cells to revert back to meristematic cells.
Differentiation in a process by which cells become specialised and acquire distinct morphological and functional characteristics development is the sum of growth and differentiation.
Senescence in plants refers to the natural process of ageing or deterioration of cells.

125. (2)
Transpiration forces lift of water column in xylem upto a height of 130 m it is explained by cohesion tension theory.
Transpiration creates a water potential gradient from soil to atmosphere through plant causing water to move from roots to leaves which cools the leaves. This is called evaporative cooling.

126. (3)

The convention on biological diversity "the earth summit" held in Rio de Janeiro in 1992 is called upon all nations to table appropriate measures for conservation of Biodiversity and sustainable utilisation of its benefits.

127. (4)
In gene gun or biolistics the alien DNA is introduced using microparticle of gold or tungsten.

128. (1)
Movement and accumulation of ions across a membrane against concentration gradient is done by Active transport osmosis is movement of water molecules from higher to lower concentrations through semi permeable membrane.
Facilitated diffusion is a type of passive transport where movement of molecules takes place from higher to lower concentration through selectively permeable membrane without using ATP but uses membrane proteins called transporters or channels. Passive diffusion is movement of molecules from higher to lower concentration through selectively permeable membrane without using ATP.

129. (1)
Axile placentation is observed in china rose, Petunia and Lemon where ovules or seeds are attached on the septum.

130. (2)
The detritus food chain begins with dead organic matter.
Detrivores like earthworms break detritus into smaller particles called fragmentation.

131. (3)
S-Synthetic phase where DNA replication takes place.
G_1- Metabolically active phase where many events take place.
G_2 – Proteins is synthesised
M-Mitotic or Meiotic phase

132. (1)
In roots protoxylem lies towards periphery and metaxylem towards the center, such arrangement is called Exarch.
Exarch is formed in roots and endarch is found in stem.

133. (4)
Pleiotropism is a single gene affecting multiple phenotypic expansions. The gene control many biological processes.

134. (3)
The pteridophytes which are heterosporous are selaginella and salvinia.

135. (2)
Late wood i.e. in winter cambium is less active hence forms few xylary elements with narrow vessels called autumn or late wood.

136. (3)
Lenticels are lens shaped formed during secondary growth for exchange of gases.
Bank formed early in the season is called early or soft bank. Bark is non-technical term refers to all tissues exterior to phloem and periderm.
Phellogen is a couple of layers thick not single layered.

137. (4)
Mitotic phase is equational diversion as both daughter cell reverse same number of chromosomes
Tubulin protein is involved in spindle fibre formation and other proteins in G2 phase.
Interval between stage of mitosis and initiation of DNA replication is G1 phase.

Cells is quiscent stage are inactive for devision and metabolically active.

138. (4)

A is true. In gymnosperms pollen grains are synthesised in microsporangium and are dispersed by wind currents.

Reason is false -Pollen grains in gymnosperms and angiosperms form pollen tube, hence fertilization takes place by pollen tube known as siphonogamy.

139. (4)

Iron -Plants obtain iron in the form of ferric ions (Fe^{3++}) and it is activator of catalase.

Zinc- Is the precursors of IAA (Auxin) and tryptophan.

Boron – is formed cell elongation and differentiation and molybdenum is the activator of nitrate reductase that fixes nitrogen.

140. (2)

Chemiosmosis requires a membrane, a proton pump, a proton gradient and ATP synthetase.

141. (4)

Recombinant DNA technology involves

(a) Isolation of desired DNA

(b) Cutting of DNA at palindromic sequence.

(c) Amplification of DNA using PCR

(d) Insertion of recombinant DNA into the host.

142. (3)

Algal blooms (*Anabaena flos-aquae*) causes deterioration of water quality and makes water toxic.

143. (4)

Klinefelter's Syndrome is caused due to non-disjunction and addition of extra X chromosomes (XXY) such individual have overall masculine development, but feminine characters like development of breast called gynaecomastia is expressed.

144. (3)

Mutualsim (+, +)

Commensalism (+, 0)

Amensalism (–, 0)

Parasitism (+, –)

145. (2)

The thalamus of a flower is the enlarged and condensed axis. The whorls are arranged in the nodes. A flower is a modified shoot. Internodes do not elongate and axis gets condensed and apex produces different kinds of floral appendages laterally at successive nodes, so both are correct.

146. (2)

Ribosomes contain 79-80 proteins and four ribosomal rRNA molecules

147. (2)

Cohesion -Mutual attraction among water molecules.

Adhesion-Attraction towards polar surfaces.

Surface tension – More attraction in liquid phase.

Guttation – water loss in liquid phase.

148. (1)

Oxidative decarboxylation -Pyruvate dehydrogenase

Glycolysis- EMP pathway

Oxidative phosphorylation – Electron transport system.
Tricarboxylic acid cycle- Citrate synthetase

149. (2)
Melonate inhibits growth of pathogenic bacteria by inhibiting succinic dehydrogenase.

150. (4)
Herbivores are more adversely affected by competition than carnivores because herbivores do not have alternative resources.

Section- IV (ZOOLOGY)

151. (3)

Gene 'z' encodes	β galactosidase
Gene 'a' encodes	Transacetylase
Gene 'y' encodes	Permease
Gene 'i' encodes	Repressor protein

152. (3)
Ligaments are dense regular connective tissue.
Cartilage are specialized skeletal connective tissue.

153. (1)
Amniocentesis is banned for sex determination in India.

154. (3)

155. (2)

156. (3)
Serum and urine analysis can not be used for early diagnosis.

157. (3)
Except for Hepatitis, AIDS and Genital Herpes, all other STD's are curable if detected at early stage.

158. (1)
BAC, YAC, and pBR322 are used as cloning vector.

159. (2)

160. (3)
Only Endoplasmic Reticulum, Golgi body, Vacuole and Lysosomes form Endomembrane system.

161. (4)
Taenia solium (Phylum Platyhelminthes) – flame cells
Paramecium (Protozoa) – Contractile vacuole
Periplaneta (Phylum Arthropoda) – Malphigian Tubes, Uricose glands, Fat Bodies, Nephrocytes
Pheritema (Phylum Annelida) - Nephridia

162. (3)

Ileum last part of small intestine opens into large intestine through Ileo-caecal valve.

163. (2)

- Fovea centralis is the point of great resolution where only cones are present.
- Iris regulates the amount of light entering in the eye.
- Sclera is the outer most layer made of dense regular connective tissue.
- Blind spot – point of no vision where optic nerve leaves the eye.

164. (2)

Leopard and lion are in competition in forest.

Cuckoo laying egg in crow's nest is Brood parasitism.

Mutualism is the association of fungi and roots of higher plants.

165. (1)

First menstrual cycle is called as menarche.

166. (2)

167. (3)

Radial symmetry is present in adults of phylum. - (a) Coeloenterata

- (b) Ctenophora

- (c) Echinodermata.

168. (3)

169. (4)

170. (2)

Replication of virus occurs in Helper T Lymphocytes and Macrophages.

171. (1)

VC = TV + IRV + ERV

172. (1)

Primary structure depicts the linear structure of proteins.

1^{st} amino acid is present in N-terminal and last is on C-terminal.

173. (3)

174. (3)

Wolf, Bobcat and Mole are placental mammals.

175. (2)

176. (2)

177. (4)

Electrostatic precipitator removes air pollutants.

178. (4)

Juxtamedullary nephrons have long loop of Henle projecting in the medulla.

179. (4)

The cytoskeleton in a cell are involved in many functions such as mechanical support, motility, maintenance of the shape of the cell.

180. (2)

Broad palm with single palm crease is visible in a person suffering from Down syndrome.

181. (1)

DNA is negatively charged molecule and histones are positively charge molecules.

182. (2)

183. (3)

Algal bloom increases fish mortality.

Present of large amount of nutrients in water increases the chance of algal bloom.

Eutrophication refers to accelerated ageing of lakes due to human activity.

184. (2)

RNA mutates at very fast rate so have shorter lifespan.

185. (3)

186. (2)

Hypothallamus along with limbic system regulates sexual behavior, excitement, pleasure, rage, fear etc.

187. (2)

188. (3)

Excessive loss of water activates the osmoreceptors.

ADH is responsible for increase in GFR by absorbing the water from DCT.

189. (3)

Nerve cord is mid dorsal, hollow and single.

Heart is ventral in chordates.

190. (3)

Anal styles are only present in male cockroach.

191. (1)

In G_o stage, cell is metabolically active but is not in dividing state.

192. (4)

Normal rhythm of sleep awake cycle is done by Melatonin.

193. (4)

Uracil is not present in DNA and is only present in RNA.

194. (3)

External ear pinna, hairs and mammary glands are present only in mammals.

195. (2)

Inbreeding increases homozygosity.

196. (4)

Basophils are least abundant cells of WBC'S Basophils are granulocytes.

197. (3)

Tetrad formation occurs in Pachytene.

Terminalization begins in diplotene.

Crossing over occurs between non sister chromatids of homologous chromosomes.

198. (4)

Excretion in cockroach is done by - (a)Nephrocytes
- (b)Fat bodies
- (c)Malphigian Tubes.
- (d) Uricose glands

199. (4)

200. (3)

Sarcomere is the functional unit of contraction in muscle.

Muscle bundle are held together by collagenous connective tissue layer called facia.