Test Series (2023)

Mock Test–04

NEET

DURATION : 200 Minutes	05-04-2023	**M. MARKS : 720**

Topics Covered

Physics :	Complete Syllabus (Class 11th and 12th)
Chemistry :	Complete Syllabus (Class 11th and 12th)
Biology :	**(Botany) :** Complete Syllabus (Class 11th and 12th)
	(Zoology) : Complete Syllabus (Class 11th and 12th)

General Instructions:

1. Immediately fill in the particulars on this page of the test booklet.
2. The test is of **3 hour 20 minute** duration.
3. The test booklet consists of **200** questions. The maximum marks are **720**.
4. There are four Section in the Question Paper, Section I, II, III & IV consisting of Section-I **(Physics)**, Section-II **(Chemistry)**, Section-III **(Botany)** & Section IV **(Zoology)** and having **50 Questions** in each part.
5. There is only one correct response for each questions.
6. Each correct answer will give 4 marks while 1 Mark will be deducted for a wrong MCQ response.
7. No student is allowed to carry any textual material, printed or written, bits of papers, pager, mobile phone, any electronic device, etc. inside the examination room/hall.
8. On completion of the test, the candidate must hand over the Answer Sheet to the Invigilator on duty in the Room/Hall. However, the candidates are allowed to take away this Test Booklet with them.

OMR Instructions:

1. Use blue/black dark ballpoint pens.
2. Darken the bubbles completely. Don't put a tick mark or a cross mark where it is specified that you fill the bubbles completely. Half-filled or over-filled bubbles will not be read by the software.
3. Never use pencils to mark your answers.
4. Never use whiteners to rectify filling errors as they may disrupt the scanning and evaluation process.
5. Writing on the OMR Sheet is permitted on the specified area only and even small marks other than the specified area may create problems during the evaluation.
6. Multiple markings will be treated as invalid responses.
7. **Do not fold or make any stray mark on the Answer Sheet (OMR).**

SECTION – A

1. In case of polarisation, if i is angle of incidence and θ_P is polarising angle then
 (1) For $i = \theta_P$, refracted light is fully polarised
 (2) For $i = \theta_P$, refracted and reflected light rays are perpendicular to each other
 (3) For $i = \theta_P$, reflected light is fully polarised
 (4) Both (2) and (3) are correct

2. The ratio of resolving power of an optical microscope for two wavelengths 600 nm and 450 nm is
 (1) 3 : 4
 (2) 1 : 1
 (3) 9 :16
 (4) 16:9

3. If bichromatic light used in YDSE have wavelengths $\lambda_1 = 700$ nm and $\lambda_2 = 500$ nm, then minimum order of maxima for λ_1 which overlaps with maxima of λ_2 is
 (1) 4
 (2) 5
 (3) 6
 (4) 7

4. A point object is moving with speed of 10 cm/s in front of a converging lens along the principal axis as shown in figure. At this instant, the speed of the image is

$f = 20$ cm
$u = 10$ cm/s
├── 30 cm──→
$f = 20$ cm
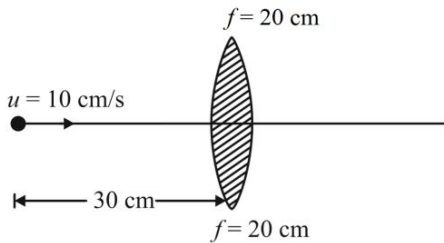
 (1) 30 cm/s
 (2) 32 cm/s
 (3) 40 cm/s
 (4) 44 cm/s

**5.** One face of a prism with refracting angle 37° is coated with silver. A light ray incident on other face at an angle of 60° is refracted and reflected back from silver face such that it retraces its path. The refractive index of prism is
 (1) $\dfrac{5}{2\sqrt{3}}$
 (2) $\dfrac{5}{\sqrt{3}}$
 (3) $\dfrac{4}{3}$
 (4) $\dfrac{3}{\sqrt{5}}$

6. A point object (inside a glass slab) when viewed from two opposite faces of a plane glass slab appears at distance of 9 cm and 5 cm respectively from the surfaces. Thickness of glass slab is ($^a\mu_g = 1.5$)
 (1) 21 cm
 (2) 22.5 cm
 (3) 10 cm
 (4) 26.2 cm

7. Six 1.1 V cells each with internal resistance 3 Ω are connected as shown in circuit. The current through external resistance $R = 2$ Ω is

$R = 2\ \Omega$
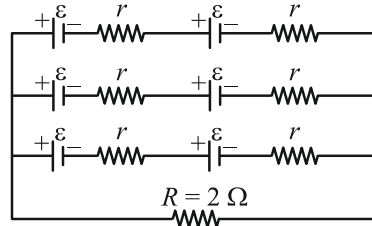
 (1) 0.44 A
 (2) 0.55 A
 (3) 0.33 A
 (4) 0.66 A

8. A tap supplies water at 22°C. A person takes 1 kg of water per minute at 42°C from geyser. The power of the geyser is (assuming 100% efficiency)
 (1) 1600 W
 (2) 1800 W
 (3) 2200 W
 (4) 1400 W

9. Which of the following statement is correct?
 (1) A negative charged particle in electric field experiences force in the direction of electric field
 (2) Electric field lines may form closed loop
 (3) Electrostatic force of interaction between two charged particles may be affected by the presence of other charges
 (4) Both (1) and (3) are correct

10. The reading of the voltmeter shown in figure is

600 Ω
300 Ω
200 Ω
100 V
100 Ω
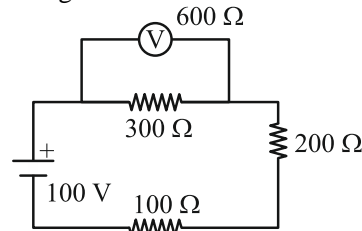
 (1) 50 V
 (2) 60 V
 (3) 40 V
 (4) 80 V

11. A particle having a charge $-q$ and mass m is released from rest on axis of fixed ring of total charge Q and radius R, at a distance $\sqrt{3}\,R$ from the centre of the ring. Its kinetic energy when it reaches the centre of the ring is


$-q, m$
$\sqrt{3}R$
R
Q
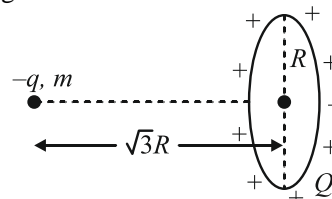
 (1) $\dfrac{Qq}{2\pi\varepsilon_0 R}$
 (2) $\dfrac{Qq}{16\pi\varepsilon_0 R}$
 (3) $\dfrac{Qq}{8\pi\varepsilon_0 R}$
 (4) $\dfrac{Qq}{\sqrt{3}\pi\varepsilon_0 R}$

12. Equipotential surfaces corresponding to electric field due to an infinitely large uniformly charged sheet are
   (1) Spherical
   (2) Cylindrical
   (3) Planer
   (4) Circular

13. A nucleus of $_{84}X^{210}$ originally at rest emit α-particle with speed v. The recoil speed of the daughter nucleus is
   (1) $\dfrac{4v}{206}$
   (2) $\dfrac{4v}{210}$
   (3) $\dfrac{v}{84}$
   (4) $\dfrac{v}{214}$

14. A block is placed in a ship which undergoes vertical harmonic oscillations of angular frequency ω. The amplitude of oscillations gradually increases. The block will leave contact with ship surface for the first time
   (1) At mean position of ship going upwards
   (2) At bottommost position of ship moving upwards
   (3) For an amplitude of g/ω^2 at topmost position
   (4) Block will remain in contact with ship for all amplitude

15. The frequency of tuning forks A and B are respectively 5% more and 4% less than frequency of tuning fork C. When A and B are simultaneously excited, 9 beats per second are produced, then frequency of tuning fork B is
   (1) 105 Hz
   (2) 100 Hz
   (3) 96 Hz
   (4) 104 Hz

16. A proton moves on a circular path of radius 6.6×10^{-3} m in perpendicular magnetic field of 0.625 tesla. The Broglie wavelength associated with the Proton will be:
   (1) 1 Å
   (2) 0.1 Å
   (3) 0.01 Å
   (4) 0.001 Å

17. A ball is thrown vertically upwards with a speed of 68 m/s. The distance travelled by the ball in its seventh second of motion will be ($g = 10$ ms^{-2})
   (1) 3.4 m
   (3) 5.2 m
   (2) 2.4 m
   (4) 4.8 m

18. In the formula $F = A.e^{\frac{hc}{x}}$, where h is Planck's constant, and c is speed of light. The dimensional formula for x is
   (1) $[M^0L^0T^0]$
   (2) $[M^1L^3T^{-2}]$
   (3) $[M^0L^1T^0]$
   (4) $[M^1L^2T^{-2}]$

19. A force of 10 N is applied horizontally on a block of mass 5 kg placed on horizontal frictionless surface for 4 second. What will be velocity of block after 5 second?
   (1) 5 m/s
   (2) 4 m/s
   (3) 8 m/s
   (4) 10 m/s

20. The efficiency of Carnot engine is 50% and temperature of sink is 500 K. If temperature of source is kept constant and is efficiency raised to 60%, then required sink temperature will be
   (1) 100 K
   (2) 600 K
   (3) 400 K
   (4) 500 K

21. A uniform disc is rotating about its geometrical axis in free space. If its temperature is increased by ΔT on heating, then fractional change in its angular velocity is (α = coefficient of linear expansion)
   (1) $-3\alpha\Delta T$
   (2) $-2\alpha\Delta T$
   (3) $-\alpha\Delta T$
   (4) No change in angular speed

22. An unpolarised beam of light is incident over a polariser and then this beam of light passed through another polariser. If transmission axis of both polariser are at $45°$ with each other then final intensity of emergent light beam becomes
   (1) 4 times
   (2) 2 times
   (3) $\dfrac{1}{2}$ times
   (4) $\dfrac{1}{4}$ times

23. An iron rod and a copper rod lie side by side. As the temperature is changed, the difference in lengths of the rods remains constant at a value of 40 cm. The ratio of original lengths of copper to iron is ($\alpha_{Cu} = 4.8 \times 10^{-5}/°C$, $\alpha_{Fe} = 1.2 \times 10^{-5}/°C$)
   (1) $\dfrac{1}{2}$
   (2) $\dfrac{1}{3}$
   (3) 2
   (4) $\dfrac{1}{4}$

24. Water rises to a height of 40 cm in a capillary tube of cross-sectional area A. If the cross-sectional area of tube is made 4A, then height to which water will rise in the capillary tube will be
   (1) 80 cm
   (2) 20 cm
   (3) 10 cm
   (4) 40 cm

25. A transistor used in common emitter mode, its current amplification factor is 60 and base current is 50 μA. The emitter current is
(1) 2.95 mA
(2) 3.00 mA
(3) 3.05 mA
(4) 3.10 mA

26. A container filled with a liquid of density 2ρ is as shown in figure. The velocity of efflux through orifice is nearly (ρ = density of water, g = 10 ms^{-2})
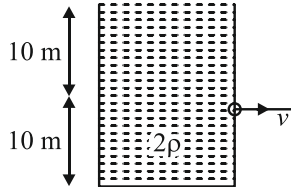
(1) 14.1 m/s   (2) 28 m/s
(3) 10 m/s   (4) 20 m/s

27. A human heart pumps 60 cc of blood per heart beat at a pressure of 1.5 m of water. If the heart beats are 72 per minute, then average pumping power of heart is nearly (g = 10 ms^{-2})
(1) 3.5 W   (2) 1.1 W
(3) 2.3 W   (4) 5.3 W

28. Which of the following statement is always correct about a planet revolving around sun?
(1) Potential energy of planet is constant
(2) Linear momentum of planet is constant
(3) Orbit of a planet must be circular
(4) Areal velocity of planet is constant

29. The kinetic energy of a body of mass m at a height $h = \dfrac{R}{2}$ from earth surface, when body is thrown from surface with speed of $v_0 = \sqrt{gR}$ (R = Radius of Earth)
(1) $\dfrac{mgR}{3}$

(2) $\dfrac{mgR}{6}$

(3) $\dfrac{mgR}{2}$

(4) $\dfrac{mgR}{4}$

30. If $\vec{A} = 4\hat{i} - 2\hat{j} + 6\hat{k}$ and $\vec{B} = -2\hat{j} - 6\hat{k}$, then angle made by vector $\vec{A} + \vec{B}$ with positive y-axis is
(1) 30°   (2) 135°
(3) 45°   (4) 120°

31. The centripetal acceleration of a particle, moving in a circle of radius 12 m, varies with time t as shown in diagram. If the particle starts from rest then speed of particle after 1 s is
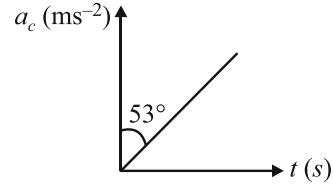
(1) 3 m/s
(2) 4 m/s
(3) 5 m/s
(4) 6 m/s

32. A swimmer wishes to cross a 600 m wide river flowing at 3 km/h. Speed of swimmer with respect to still water is 5 km/h. Time taken by swimmer to cross river through shortest path is
(1) 10 minute   (2) 12 minute
(3) 9 minute   (4) 16 minute

33. The graphs given below depict the dependence of two reactive impedances X_1 and X_2 on frequency of alternating emf applied individually to them. We can conclude that
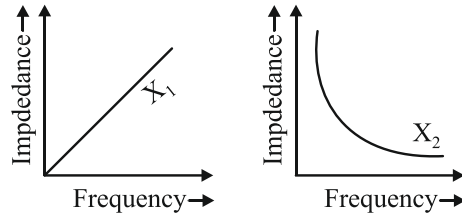

(1) X_1 is resistance and X_2 is inductive reactance
(2) X_1 is capacitive reactance and X_2 is inductive reactance
(3) X_1 is resistance and X_2 is capacitive reactance
(4) X_1 is inductive reactance and X_2 is capacitive reactance

34. The natural frequency of an L-C circuit is 125 kHz, then the capacitor C is replaced by another identical capacitor with a dielectric medium of dielectric constant K. In this case, the frequency decreases to 25 kHz. The value of K is
(1) 5   (2) 25
(3) 50   (4) 100

**35.** The velocity acquired by a body, moving with uniform acceleration, is 30 ms^{-1} in 2 s and 60 ms^{-1} in 4 s. The initial velocity of the body is
(1) Zero
(2) 3 m/s
(3) 6 m/s
(4) 9 m/s

36. If a rod PQ of length 1.25 m is moving with velocity 10 ms^{-1} on parallel tracks placed in uniform magnetic field $B_0 = 0.2$ T. If resistance of $ABCDA$ is 100 Ω, then current through loop at this instant is
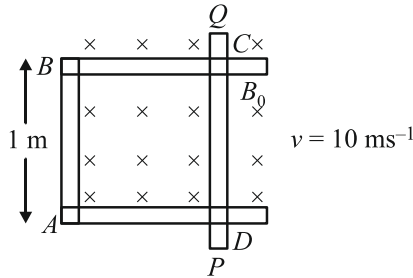
(1) 10 mA (2) 1.25 mA
(3) 20 mA (4) 40 mA

37. If $A = 0$ and $B = 1$ for a given logic gate, then value of X and Y respectively are
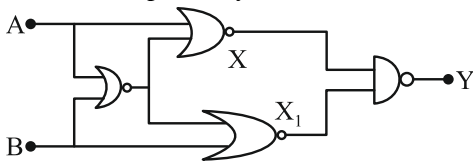
(1) 1, 0 (2) 0, 1
(3) 1, 1 (4) 0, 0

38. In the spectrum of hydrogen atom, the ratio of shortest wavelength in the Lyman series to the longest wavelength of Paschen series is

(1) $\dfrac{1}{9}$ (2) $\dfrac{27}{4}$

(3) $\dfrac{7}{144}$ (4) $\dfrac{36}{5}$

39. The depletion layer of silicon diode is $1\mu m$ wide and knee potential is 0.6 V. The electric field inside depletion layer is

(1) 0.6 V/m (2) 6×10^{11} V/m
(3) 6×10^5 V/m (4) 6×10^{-6} V/m

40. If two SHMs are represented by equations $y_1 = 4\sin\left(3\pi t + \dfrac{\pi}{3}\right)$ and $y_2 = 4\left(\sin 3\pi t + \sqrt{3}\cos 3\pi t\right)$, then ratio of their amplitudes is

(1) $\sqrt{3} : 1$ (2) $1 : 1$
(3) $1 : 2$ (4) $3 : 1$

41. The length of sonometer wire is 0.75 m and it's material density is 9×10^3 kg/m^3. It can bear maximum stress of 8.1×10^8 N m^{-2} without exceeding elastic limit. Fundamental frequency that can be produced in the wire is

(1) 200 Hz (2) 230 Hz
(3) 400 Hz (4) 900 Hz

42. Four identical rods of metal are connected as shown in figure. Assuming no heat loss due to radiation from side walls, the junction temperature in steady state will be
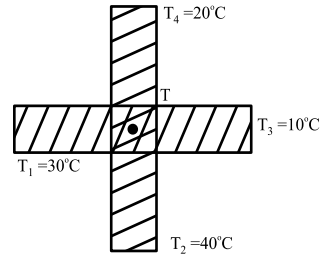
(1) $25°$ C (2) $18°$ C
(3) $20°$ C (4) $16°$ C

43. The amount of liquid flowing per second in tubes (1), (2) and (3) are 10 m^3/s, 5 m^3/s and 8 m^3/s respectively. Velocity of liquid in tube (4) having cross-sectional area 0.7 m^2 is (All tubes are in same horizontal plane).
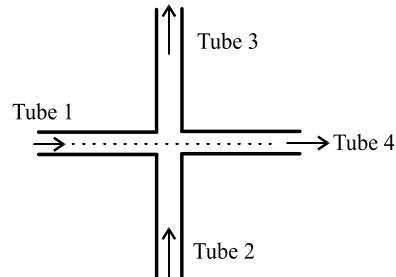
(1) 7 m/s (2) 14 m/s
(3) 10 m/s (4) 5 m/s

44. In ground to ground projectile, the horizontal range is 12 m and maximum height reached is 4 m. What is velocity of projection?

(1) $\dfrac{1}{3}\sqrt{5}$ m/s (2) $\dfrac{1}{5}\sqrt{5}$ m/s

(3) $3\sqrt{5}$ m/s (4) $5\sqrt{5}$ m/s

45. Rain is falling vertically downwards with speed 4 km/h. A boy moves on a straight horizontal road with velocity of 4 km/h. What is apparent velocity of rain w.r.t. boy?

(1) Zero (2) 8 km/h
(3) 5 km/h (4) $4\sqrt{2}$ km/h

46. **Statement I:** Electromagnetic wave are transverse in nature.
Statement II: The electric and magnetic fields in electromagnetic waves are perpendicular to each other and the direction of propagation.
(1) Both Statement-I and Statement-II are correct.
(2) Both Statement-I and Statement-II are incorrect.
(3) Statement-I is correct and Statement-II is incorrect.
(4) Statement-I is incorrect and Statement-II is correct.

47. **Statement I:** Cyclotron is a device which is used to accelerate the positive ion.
Statement II: Cyclotron frequency depends upon the velocity.
(1) Both Statement-I and Statement-II are correct.
(2) Both Statement-I and Statement-II are incorrect.
(3) Statement-I is correct and Statement-II is incorrect.
(4) Statement-I is incorrect and Statement-II is correct.

48. **Assertion:** Every metal has a definite work function, still all photoelectrons do not come out with the same energy if incident radiation is monochromatic.
Reason: Work function is the minimum energy required for the electron in the highest level of the conduction band to get out of the metal. Not all electrons in the metal belong to this level rather they occupy a continuous band of levels.
(1) If both Assertion and Reason are correct and the Reason is a correct explanation of the Assertion.
(2) If both Assertion and Reason are correct but Reason is not a correct explanation of the Assertion.
(3) If the Assertion is correct but Reason is incorrect.
(4) If both the Assertion and Reason are incorrect.

49. **Assertion:** When a tiny circular obstacle is placed in the path of light from a distant source, a bright spot is seen at the centre of the shadow of the obstacle.
Reason: Waves diffracted from the edge of the circular obstacle interfere constructively at the centre of the shadow producing a bright spot.
(1) If both Assertion and Reason are correct and the Reason is a correct explanation of the Assertion.
(2) If both Assertion and Reason are correct but Reason is not a correct explanation of the Assertion.
(3) If the Assertion is correct but Reason is incorrect.
(4) If both the Assertion and Reason are incorrect.

50. **Assertion:** A reflecting type of telescope is preferred over refracting type in astronomy.
Reason: A reflecting type of telescope is free from chromatic aberration and spherical aberration.
(1) If both Assertion and Reason are correct and the Reason is a correct explanation of the Assertion.
(2) If both Assertion and Reason are correct but Reason is not a correct explanation of the Assertion.
(3) If the Assertion is correct but Reason is incorrect.
(4) If both the Assertion and Reason are incorrect.

SECTION-II (CHEMISTRY)

SECTION-A

51. A mixture of gases contains 0.51 mol N_2, 0.28 mol H_2, and 0.52 mol NH_3. If the total pressure of the mixture is 2.35 atm, what is the partial pressure of H_2?
(1) 0.34
(2) 0.21
(3) 0.67
(4) 0.5

52. Consider the following synthetic compounds
A. Saccharin
B, Dulcin
C. Sodium cyclamate
D. Aspartame
Which of the following compounds are not used as sweetening agent?
(1) ABCD   (2) ABC
(3) BCD   (4) None of these

53. Which of the following has maximum weight?
(1) 40 g iron
(2) 1.2 g atom of N
(3) 1×10^{23} atoms of C
(4) 1.12 liter of O_2 at STP
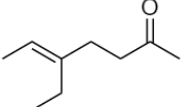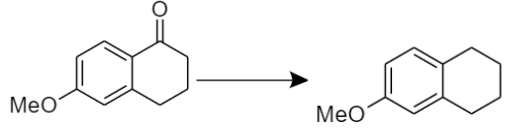
54. Consider the following statement about haemoglobin
A. It has 4 separate peptide subunits: 2 identical alpha-chains and 2 identical beta-chains each bonded to heme
B. In CO poisoning, since much of the Hb is tied up with CO, O_2 transport to the tissues is inhibited.
C. Normal Hb found in RBC has a glutamic acid residue.
Select the correct statement
(1) AB   (2) BC
(3) AC   (4) ABC

55. Which gas can be easily liquified?
Given, a for $NH_3 = 4.17$, $CO_2 = 3.59$, $SO_2 = 6.71$, $Cl_2 = 6.49$;
(1) NH_3 (2) Cl_2
(3) SO_2 (4) CO_2

56. Assertion: Reduction of fructose with sodium borohydride forms two products differing in configuration.
Reason: A chiral carbon is formed due to reduction of keto group at C_2.
(1) Assertion is correct, reason is correct; reason is a correct explanation for assertion.
(2) Assertion is correct, reason is correct; reason is not a correct explanation for assertion
(3) Assertion is correct, reason is incorrect
(4) Assertion is incorrect, reason is correct

57. You are given 6 identical balls. What is the maximum number of square voids and triangular voids (in separate arrangements) that can be created?
(1) 2, 4   (2) 4, 2
(3) 4, 3   (4) 3, 4

58. Which of the following is not an antiseptic drug?
(1) Iodoform   (2) Dettol
(3) Gentian violet   (4) Gammaxene

59. Units of parts per million (ppm) or parts per billion (ppb) are often used to describe the concentrations of solutes in very dilute solutions. The units are defined as the number of grams of solute per million or per billion grams of solvent. Bay of Bengal has 1.89 ppm of lithium ions. The molality of Li^+ in this water is
(atomic mass of Li = 7):
(1) 1.5×10^{-4} m   (2) 1.7×10^{-4} m
(3) 2.5×10^{-4} m   (4) 2.7×10^{-4} m

60. The oxidation number of S in dithionite and dithionate are respectively
(1) +3 & +4   (2) +3 & +5
(3) +4 & +5   (4) +4 & +6

61. Choose the correct statement.
(1) Diamond has lower thermal and electrical conductivities compared to graphite.
(2) Diamond has similar thermal and electrical conductivities compared to graphite.
(3) Diamond has higher thermal conductivities but lower electrical conductivities compared to graphite.
(4) Diamond has the same thermal but lower electrical conductivity compared to graphite.

62. Among the three types of orbitals p, d and f
(1) Both p and f orbitals have center of symmetry.
(2) Both p and d orbitals have center of symmetry
(3) Only d orbitals have center of symmetry.
(4) F orbitals alone have center of symmetry

63. Which one of the following is a free radical?
(1) CO   (2) CN^-
(3) NO   (4) CS

64. The only molecule having bridging oxygen is
(1) Phosphorous trioxide
(2) Phosphorous pentoxide
(3) Cyclic tetraphosphate
(4) Pyrophosphate

65. Using phenolphthalein as an indicator, which of the following titration is possible?
(1) Acetic acid with pyridine
(2) Oxalic acid and sodium hydroxide
(3) Hydrochloric acid with aniline
(4) Sulphuric acid with aqueous ammonia

66. The concentration of a reactant decreases linearly with time. what is the order of the reaction?
(1) 0   (2) 1
(3) 2   (4) 3

67. By a reversible process, that always
(1) Takes infinite time for completion
(2) Satisfies $\Delta S = 0$ for universe
(3) Satisfies $\Delta G = 0$
(4) Gives minimum work

68. The IUPAC name for the compound given below

(1) E-5-ethylhept-5-en-2-one
(2) Z-5-ethylhept-5en-2-one
(3) E-3-ethylhept-2-en-6-one
(4) Z-3-ethylhept-2-en-6-one

69. The most suitable reagent for the following transformation is

(1) $NaBH_4$
(2) B_2H_6
(3) Zn-Hg/HCl
(4) NH_2NH_2/HCl

70. Acetophenone can be converted to phenol by reaction with
(1) m-CPBA followed by base catalysed hydrolysis
(2) Conc. Nitric acid
(3) Iodine and NaOH
(4) Singlet oxygen followed by base catalysed hydrolysis

71. Reaction of phenyl benzoate with an excess of methyl magnesium bromide gives a mixture of
(1) Trimethyl methanol and phenol
(2) 2-phenylpropan-2-ol and phenol
(3) Acetophenone and toluene
(4) 2-phenylbenzoic acid and toluene

72. The major product formed in the reaction of 2-methylbut-3-en-2-ol with HBr is

(1)   (2)

(3)   (4)
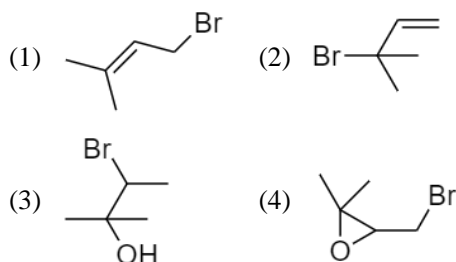
73. Among dimethylcyclobutanes, which one exhibit optical activity?
(1) Cis-1,2-dimethylcyclobutane
(2) Trans-1,2-dimethylcyclobutane
(3) Cis-1,3-dimethylcyclobutane
(4) Trans-1,3-dimethylcyclobutane

74. The monomer of biopolymer DNA is
(1) Nucleotide
(2) Amino acid
(3) Disaccharide
(4) Fatty acid

75. Natural sugar and amino acids are respectively
(1) D & L   (2) D & D
(3) L & D   (4) L & L

76. The decreasing order of stability of the free radicals A, B and C is

A   B   C
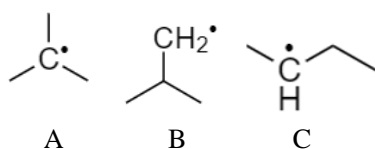
(1) ABC
(2) CAB
(3) BAC
(4) ACB

77. Bond dissociation enthalpies of $H_2(g)$ and $N_2(g)$ are 436.0 kJ mol^{-1} and 941.8 kJ mol^{-1} respectively and enthalpy of formation of $NH_3(g)$ is –46 kJ mol^{-1}. What is enthalpy of atomization of $NH_3(g)$?
(1) 390.3 kJ mol^{-1}
(2) 1170.9 kJ mol^{-1}
(3) 590 kJ mol^{-1}
(4) 720 kJ mol^{-1}

78. Addition of BH_3 to a carbon-carbon double bond is
(1) Anti-Markovnikov syn addition
(2) Anti-Markovnikov anti addition
(3) Markovnikov syn addition
(4) Markovnikov anti addition

79. The configuration at the two stereocenters in the compound given below are
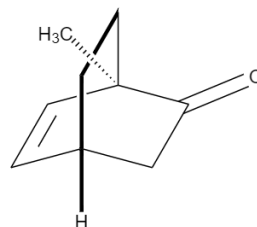
(1) 1R, 4R   (2) 1R, 4S
(3) 1S, 4R   (4) 1S, 4S

80. The molecule with highest number of lone pair and has a linear shape based on the VSEPR theory is
(1) Carbon dioxide
(2) Triiodide anion
(3) Nitrogen dioxide
(4) Nitrogen dioxide cation

81. Find out the value of K_c for the following equilibria from the value of Kp:
$2NOCl(g) \rightleftharpoons 2NO(g) + Cl_2(g)$; $K_p = 1.8 \times 10^{-2}$
atm at 500 K
(1) 4.38×10^{-6}
(2) 2.19×10^{-4}
(3) 4.38×10^{-4}
(4) 2.19×10^{-6}
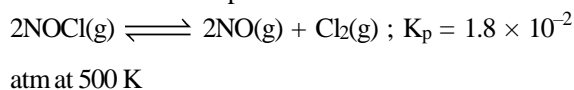
82. Assertion: The pH of rain water is 5.6 .
Reason: H^+ ions are formed by the reaction of rain water with carbon dioxide present in the atmosphere.
(1) Assertion is correct, reason is correct; reason is a correct explanation for assertion.
(2) Assertion is correct, reason is correct; reason is not a correct explanation for assertion
(3) Assertion is correct, reason is incorrect
(4) Assertion is incorrect, reason is correct

83. Alkali metal superoxides are obtained by the reaction of
(1) Oxygen with alkali metal in liquid ammonia
(2) Water with alkali metal in liquid ammonia
(3) Hydrogen peroxide with alkali metals
(4) Hydrogen peroxide with alkali metals in liquid ammonia

84. The correct order of acidity of the following compounds is

A   B   C
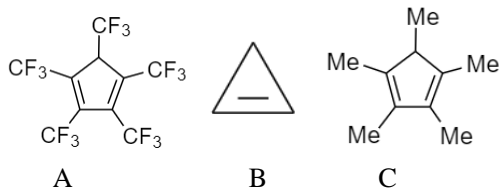
(1) B>C>A
(2) C>B>A
(3) A>C>B
(4) A>B>C

85. Flocculation value of potassium sulphate is much more than that of potassium bromide for sol A. The flocculation value of calcium chloride is much more than that of sodium chloride for sol B. which of the following statement is correct?
(1) Sol A is negatively charged and sol B is positively charged
(2) Both the sols are negatively charged
(3) Sol A is positively charged and sol B is negatively charged
(4) Both the sols are positively charged

SECTION – B

86. For an electron, with n = 3 has only one radial node. The orbital angular momentum of the electron will be
(1) 0
(2) $\sqrt{6}\dfrac{h}{2\pi}$
(3) $\sqrt{2}\dfrac{h}{2\pi}$
(4) 3

87. Amongst the following, the form of water with the lowest ionic conductance at 298 K is:
(1) Sea water
(2) Distilled water
(3) Saline water used for intravenous injection
(4) Water from a well

88. There is $p\pi - d\pi$ multiple bonding in
(1) NO
(2) CO_2
(3) NO_2
(4) CS_2

89. Consider the following cell reaction,
$$Cd(s) + Hg_2SO_4(s) + H_2O(l) \rightleftharpoons CdSO_4 + H_2O(s) + 2Hg(l)$$
The value of E^0_{cell} is 4.315 V at 25°C. If $\Delta H° = -825.2$ kJ mol^{-1} the standard entropy change $\Delta S°$ in J K^{-1} is:
[Given: Faraday constant = 96487 C mol^{-1}]
(1) 25
(2) 30
(3) 35
(4) 15

90. Which has a maximum pK_a value?
(1) H_2O
(2) H_2S
(3) H_2Se
(4) H_2Te

91. Solid crystalline PCl_5 has structure which of the following?
(1) Bipyramidal moieties
(2) Octahedral and tetrahedral ions
(3) Square pyramidal moieties
(4) Pentagonal moieties

92. At 363 K, the vapor pressure of A is 21 kPa and that of B is 18 kPa. 1 mol of A and 2 mol of B are mixed. Assuming that this solution is ideal, the vapor pressure of the mixture is _____kPa.
(1) 22
(2) 19
(3) 17
(4) None of these

93. Which compound of silicon acts as a lubricant?
(1) Asbestos
(2) Silicones
(3) Zeolite
(4) Mica

94. The geometries of the ammonia complexes of Ni^{2+}, Pt^{2+} and Zn^{2+} respectively are
(1) Octahedral, square planar and tetrahedral
(2) Square planar, octahedral and tetrahedral
(3) Tetrahedral, square planar and octahedral
(4) Octahedral, tetrahedral and square planar

95. $EDTA^{4-}$ is ethylenediaminetetraacetate ion. The total number of N–Co–O bond angles in $[Co(EDTA)]^{1-}$ complex ion is:
(1) 4
(2) 10
(3) 12
(4) 8

96. Assertion: Nitrogen and Oxygen are the main components of the atmosphere but these do not react to form oxides of nitrogen.
Reason: The reaction between nitrogen and oxygen requires high temperature.
(1) Assertion is correct, reason is correct; reason is a correct explanation for assertion.
(2) Assertion is correct, reason is correct; reason is not a correct explanation for assertion
(3) Assertion is correct, reason is incorrect
(4) Assertion is incorrect, reason is correct

97. Red and white P will differ but not in
(1) Smell
(2) Reduction with nitric acid
(3) Solubility in methane
(4) Exhibiting phosphorescence

98. A solution of urea is isotonic with 12 g/L glucose solution. The concentration of urea solution is:
(1) 4 g/L
(2) 12 g/L
(3) 16 g/L
(4) 1 g/L

99. Molten sodium chloride conducts electricity due to the presence of
(1) Na atom
(2) Cl atom
(3) Ions
(4) Free electron

100. At 100°C the vapour pressure of a solution of 6.5 g of a solute in 100 g water is 732 mm. If $k_b = 0.52$, the boiling point of this solution will be:
(1) 102°C
(2) 103°C
(3) 101°C
(4) 100°C

SECTION-III (BOTANY)

SECTION-A

101. The branch of science which studies the interactions among organisms and between organisms and physical environmental is called as
(1) Ecology
(2) Etiology
(3) Ethology
(4) Epidemiology

102. What is meant by niche overlap.
(1) Two different parasites on the same host
(2) Active cooperation between two species
(3) Sharing of one or more resources between the two species
(4) Mutualism between two species

103. Identify one among the following biomes where life do not exists
(1) Tropical rain forest
(2) Deciduous forest
(3) Permafrost polar regions
(4) None

104. A: Mango trees do not and cannot grow in temperature countries.
R: Temperature play, a significant role in enzymatic activity and metabolic activity of organisms.
(1) Both (A) and (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) and (R) are true and (R) is not the correct explanation of (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

105. What is the salt concentration of in land water in (parts per thousand?)
(1) 5
(2) 30-35
(3) >100
(4) None

106. Given graph represents the response of organisms to various abiotic factors.
Identify (I), (II), (III) in graph.
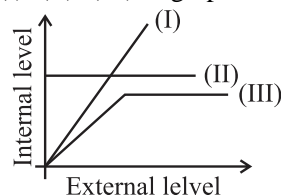
	(I)	(II)	(III)
(1)	Regulator	Partial regulator	Conformers
(2)	Conformers	Regulators	Partial regulators
(3)	Partial regulators	Regulators	Conformers
(4)	Regulators	Conformers	Partial regulators

107. Match column I with column II

	Column I		Column II
(a)	Biochemical adaptation	(i)	Desert lizard
(b)	Allen's rule	(ii)	Marine Fish at depth
(c)	Behavioural Adaptation		Kangaroo rat
(d)	Physiological adaptation	(iv)	Polar seals

	A	B	C	D
(1)	ii	iv	iii	i
(2)	iv	ii	iii	i
(3)	ii	iv	i	iii
(4)	iv	i	iii	ii

108. A population with larger proportion of older individuals than younger ones will likely to
(1) Decline eventually
(2) Continue to grow vigorously
(3) Grow larger and then decline
(4) None

109. Biosphere is

(1) Composed of all living organisms present on earth which interact with abiotic factors

(2) A component in the ecosystem

(3) Life on land alone

(4) Aquatic life only

110. Identify test cross

(1) $YY \times YY$ (2) $Yy \times Yy$

(3) $Yy \times yy$ (4) $yy \times yy$

111. Match column I with column II and select the correct option:

	Column I		Column II
(a)	Mendel	(i)	Discovered x body
(b)	Morgan	(ii)	Laws of Inheritance
(c)	Henking	(iii)	Chromosomal theory of inheritance
(d)	Sutton & Boveri	(iv)	*Drosophila melanogaster*

	A	B	C	D
(1)	ii	iv	i	iii
(2)	ii	i	iv	iii
(3)	iii	i	iv	ii
(4)	iii	ii	iv	i

112. Which of the following abiotic factor that affects the rate of mutation

(1) γ rays

(2) Temperature

(3) x-rays

(4) All of above

113. Find the odd pair among the following

(1) Turner's syndrome – Sterile female

(2) Klinefelter's syndrome – 47, XXY

(3) Downs syndrome– Discovered in 1866

(4) Sickle cell anaemia – Sex linked recessive disorder

114. In the given cross which of the following traits are inherited.

$$XX^C \qquad\qquad XY$$
(Carrier women) × (Normal man)

$X^C Y$ XY   XX XX^C
(Diseased son) (Normal son) (Normal daughter) (Carrier daughter)

(1) Autosomal dominant traits

(2) Autosomal recessive traits

(3) X-linked dominant traits

(4) X-linked recessive traits

115. **A:** ABO blood group system provides good example of multiple alleles.

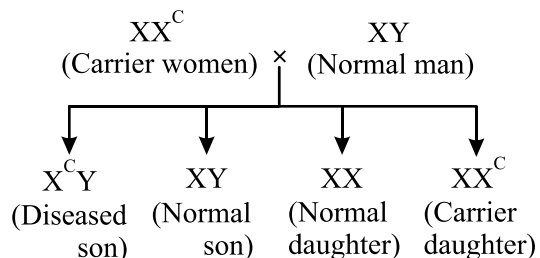**R:** In ABO blood group system when I^A and I^B alleles are present together, they both express their own types.

(1) Both (A) and (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) and (R) are true and (R) is not the correct explanation of (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

116. **A:** Thalassemia is a qualitative defect of haemoglobin synthesis.

R: Beta thalassemia refers to an inherited addition of beta globin gene.

(1) Both (A) and (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) and (R) are true and (R) is not the correct explanation of (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

117. The genetic material of bacteriophage lamda consist of how many base pair?

(1) 5386

(2) 48502

(3) 4.6×10^6

(4) 3.3×10^9

118. **A:** Almost all (99.9%) nucleotides bases are exactly the same in all people.

R: The average gene consist of 3000 bases but size very greatly.

(1) Both (A) and (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) and (R) are true and (R) is not the correct explanation of (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

119. Which experiment was performed by Mathew Meselson and Franklin Stahl in year 1958.

(1) Central dogma

(2) Transduction

(3) Semi-conservative DNA replication

(4) Transformation

120. Which among the following codon is not a stop terminator codon?

(1) UAA

(2) AUG

(3) UAG

(4) UAA

121. Match the column I with column II and select the correct option.

	Column I		Column II
(a)	Avery, Macleod Mc Carty	(i)	Annotated DNA sequence
(b)	Jacob and Monod	(ii)	Lac operon
(c)	F. Sanger	(iii)	DNA fingerprinting
(d)	Alec Jeffreys	(iv)	Transformation principle

	A	B	C	D
(1)	iv	i	ii	iii
(2)	iv	ii	i	iii
(3)	i	ii	iv	iii
(4)	i	iv	ii	iii

122. Industrial melanism demonstrates which of the following phenomenon?
(1) Induced mutation
(2) Reproductive isolation
(3) Natural selection
(4) Geographical isolation

123. Match the column I with column II and identify correct option:

	Column I Creatures		Column II Brain capacity
(a)	Homo habilis	(i)	1400 CC
(b)	Homo erectus	(ii)	900 CC
(c)	Neanderthal man	(iii)	700 CC

	A	B	C
(1)	ii	iii	i
(2)	iii	ii	i
(3)	iii	i	ii
(4)	i	iii	ii

124. What does the statement **survival of fittest** means?
(1) Strong animal can survive
(2) Intelligent animal can survive
(3) Clever animals can survive
(4) Animals which can adapt to changes can survive

125. Analogous organs arises due to
(1) Convergent evolution
(2) Artificial selection
(3) Genetic drift
(4) Population genetics

126. Identify set of hermaphrodite organisms in below option:
(1) Earthworm, tapeworm, leech, sponge
(2) Earthworm, leech, sponge, sound worm
(3) House fly, sea horse, tapeworm, earthworm
(4) Earthworm, tapeworm, housefly, frog

127. Read the following statements and select the correct option:
Statement I: Viviparous animals give better protection to their offspring.
Statement II: In viviparous animals, young ones, after attaining a certain stage of growth, are delivered out of the body of female organism.
(1) Both statement I and II are correct
(2) Statement I is correct but statement II is incorrect
(3) Statement I is incorrect but statement II is correct
(4) Both statement I and II are incorrect

128. **A:** Some female animals undergo copulation only during oestrous cycle.
R: Oestrus cycle is observed in non-primate mammals.
(1) Both (A) and (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) and (R) are true and (R) is not the correct explanation of (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

129. Which of the following is a post fertilisation event in flowering plants?
(1) Formation of pollen grains
(2) Formation of flower
(3) Embryo development
(4) Pollen tube formation

130. Identify the parts labelled as A, B, C, D in the given figure and select correct.
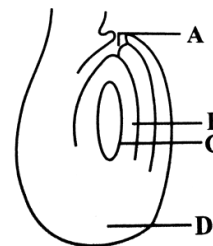
	A	B	C	D
(1)	Chalaza	Nuclear	Embryo sac	Micropyle
(2)	Chalaza	Female gametophyte	Embryo sac	Micropyle
(3)	Micropyle	Nucellus	Embryo sac	Chalaza
(4)	Micropyle	Chalaza	Embryo sac	Nucellus

131. Match column I with column II.

Column I		Column II	
(a)	Isotonic	(i)	Water move into cell
(b)	Hypertonic	(ii)	No net flow of water
(c)	Hypotonic	(iii)	Water moves out of the cell

	A	B	C
(1)	ii	i	iii
(2)	ii	iii	i
(3)	iii	i	ii
(4)	iii	ii	i

132. Identify the following biological membrane which is not made up of lipids and proteins.
(1) Bacterial plasma membrane
(2) Egg membrane
(3) Human erythrocyte cell
(4) None

133. Plants synthesis sugar in the form of ___A__ and transport through phloem in the form of ___B___ and store sugar in the form of ___C___

	A	B	C
(1)	Glucose	Sucrose	Starch
(2)	Fructose	Glucose	Starch
(3)	Starch	Fructose	Glucose
(4)	Starch	Glucose	Fructose

134. Identify wrong pair among the following:
(1) Chromoplast – Coloured plastids
(2) Chloroplast – Green pigment
(3) Amyloplast – Store starch
(4) Elaioplast – Store proteins

135. Which of the following function is not performed by soil?
(1) Providing nitrogen to plants
(2) Providing water to plant
(3) Providing oxygen to plants
(4) Providing carbon to plant

SECTION – B

136. In C_4 plants Calvin cycle enzymes are located in
(1) Chloroplast of mesophyll cells
(2) Chloroplast of bundle sheath cells
(3) Cytoplasm of guard cells
(4) Cytoplasm of epidermal cells

137. Identify the incorrect pair:
(1) End products in aerobic respiration → Water, CO_2, heat
(2) End product anaerobic respiration in animals → Ethanol
(3) Glycolysis → Cytoplasm
(4) Product of glycolysis → Pyruvic acid

138. Which of the following is best example of amphibolic pathway in steps of respiration?
(1) Oxidative phosphorylation
(2) TCA cycle
(3) Glycolysis
(4) Oxidative decarboxylation of pyruvate

139. Which among the following is not an alkaloid?
(1) Cellulose
(2) Codeine
(3) Morphine
(4) Both (2) and (3)

140. Select the correct option
(1) Each of the metabolic reactions are physical reactions
(2) Flow of metabolites through metabolic pathway has definite rate and direction
(3) Metabolic pathways are linear only
(4) CO_2 dissolved in water is uncatalysed reaction in living systems

141. Identify the correct statement regarding genetic material of prokaryotic cell.
(1) Composed of single circular DNA molecule.
(2) Does not have nuclear membrane for protection.
(3) They lack Histone proteins.
(4) All the above

142. Which phenomenon is seen in plant cell placed in water without cell wall?
(1) Endosmosis will occur and cell burst
(2) Exosmosis will occur and cell shrink
(3) Due to photolysis oxygen is released
(4) Cell division initiates

143. Identify the correct arrangement of lipids in biological membrane
(1) Both polar heads and tails towards inside
(2) Polar Heads towards outside and tails towards inside
(3) Both polar heads and tails towards outside
(4) Polar heads towards inner side and hydrophobic tails towards outer side

144. DNA replication takes place in which stage in cell cycle.
(1) Metaphase
(2) G_1-phase
(3) G_2-phase
(4) S-phase

145. Match the following

(a)	Zygote	(i)	Synapsis
(b)	Diakinesis	(ii)	Crossing over
(c)	Pachytene	(iii)	Terminalisation
(d)	Diplotene	(iv)	Chiasmata

	A	B	C	D
(1)	iv	ii	iii	i
(2)	iv	iii	ii	i
(3)	i	ii	iii	iv
(4)	i	iii	ii	iv

146. **A:** Cell growth result in disturbing the ratio between nucleus and cytoplasm.

R: Mitosis helps the cell to restore the nucleo-cytoplasmic ratio

(1) Both (A) and (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) and (R) are true and (R) is not the correct explanation of (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

147. Dikaryophase is characteristic feature of

(1) Ascomycetes and Basidiomycetes

(2) Basidiomycetes and Deuteromycetes

(3) Phycomycetes & Ascomycetes

(4) All fungi

148. Which among the following are heterosporous?

(1) *Dryopteris* and *Adiantum*

(2) *Selaginella* and *Salvinia*

(3) *Selaginella* and *Psilotum*

(4) *Lycopodium* and *Pteris*

149. Match column I with column II and select the correct option:

	Column I		Column II
(a)	Subsidiary cells	(i)	Accessory cells
(b)	Lenticels	(ii)	Rolling in and out of leaves
(c)	Guard cells	(iii)	Aerating pores in the back of plant
(d)	Bulliform cells	(iv)	Regulate opening and closing of stomata

	A	B	C	D
(1)	iv	iii	ii	i
(2)	ii	iii	i	iv
(3)	i	iv	iii	ii
(4)	i	iii	iv	ii

150. **A:** Xylem vessel is a long cylindrical tube like structure made up of many cells each with lignified walls.

R: Presence of vessels is a characteristic feature of gymnosperms

(1) Both (A) and (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) and (R) are true and (R) is not the correct explanation of (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

SECTION-IV (ZOOLOGY)

SECTION – A

151. Pseudocoelomate phylum is

(1) Aschelminthes (2) Platyhelminthes

(3) Annelida (4) Arthropoda

152. Match column I with column II

	Column I		Column II
A.	Saltation	i.	Darwin
B.	Formation of life was preceded by Chemical evolution	ii.	Louis pasteur
C.	Reproductive fitness	iii.	de vries
D.	Life comes from pre-existing life	iv.	Oparin and Haldane

	A	B	C	D
(1)	iii	iv	i	ii
(2)	ii	iii	iv	i
(3)	iii	i	ii	iv
(4)	iii	iv	ii	i

153. Respiratory organ as tracheal system is present in

(1) Prawns

(2) Scorpions

(3) Crabs

(4) Cockroach

154. Which of the following is not a characterstic of chordates?

(1) Notochord present

(2) A post-anal tail

(3) Pharynx perforated by gills slits

(4) Heart is dorsal in position

155. Which of the following is limbless Amphibia?

(1) *Hyla*

(2) *Salamandra*

(3) *Ichthyophis*

(4) *Bufo*

156. How many spiracles are present in *Periplanata americana*?
(1) 10
(2) 12 pairs
(3) 20
(4) 20 pairs

157. Ligaments connects
(1) Bone to Muscle
(2) Bone to Bone
(3) Skin to Muscle
(4) Fat to Muscle

158. Cartilage is surrounded by a firm sheath, called
(1) Periosteum
(2) Perichondrium
(3) Pericardium
(4) Perimetrium

159. Choose the odd pair from the following
(1) Muscle fibre – Myosin
(2) Areolar – Mast cells
(3) Epithelium – Keratin
(4) Neuron – Melanin

160. **Statement I:** Monosaccharide contains 3-7 carbon atoms.
Statement II: Glucose and fructose are hexose.
Choose the appropriate option.
(1) Statement I is correct but statement II is incorrect
(2) Statement I is incorrect but statement II is correct
(3) Both statement I and II are correct
(4) Both statement I and II are incorrect

161. Structural polysaccharide among following is
(1) Glycogen
(2) Starch
(3) Insulin
(4) Cellulose

162. How many helical polypeptide is present in haemoglobin?
(1) 3
(2) 4
(3) 5
(4) 6

163. Which of the following were discovered in Ethopia and Tanzania?
(1) Fossils of dinosaurs
(2) Few fossils of man like bones
(3) Alive coelancanth
(4) Fossils of *Archaeopteryx*

164. Most abundant RNA are
(1) mRNA
(2) tRNA
(3) snRNA
(4) rRNA

165. Phosphodiester bond is characteristically found in
(1) Deoxyribonucleic acid
(2) Chitin
(3) Phospholipid
(4) Cellulose

166. Choose the incorrect match
(1) Sub-linguals – Below tongue
(2) Parotids – Near cheek
(3) Sub-mandibular – Near lower jaw
(4) Sub-maxillary – Near cheek

167. Select the correct match.

	Column I		Column II
(a)	Sphincter of oddi	(i)	Glisson's capsule
(b)	Cystic duct	(ii)	Hepato-pancreatic duct
(c)	Hepatic lobule	(iii)	Gall bladder
(d)	Brunner's gland	(iv)	Submucosal gland

	a	b	c	d
(1)	ii	iii	i	iv
(2)	i	ii	iii	iv
(3)	ii	i	iii	iv
(4)	iv	ii	iii	i

168. Anxiety and eating spicy food together can lead to
(1) Indigestion
(2) Jaundice
(3) Vomiting
(4) Diarrhoea

169. Thoracic cage of man is formed of
(1) Ribs and sternum
(2) Ribs, sternum and thoracic vertebrae
(3) Ribs, sternum and lumbar vertebrae
(4) Ribs, thoracic vertebrae

170. **Assertion (A):** Solubility of gases affect the rate of diffusion.
Reason (R): A gas having high solubility, diffuses at a faster rate than the gas having lower solubility.
Choose the appropriate option:
(1) (A) is correct but (R) is not correct
(2) (A) is not correct but (R) is correct
(3) Both (A) and (R) are correct and (R) is the correct explanation of (A)
(4) Both (A) and (R) are correct but (R) is not the correct explanation of (A)

171. Percentage of oxygen carried in dissolved state through plasma is
(1) 3%
(2) 97%
(3) 67%
(4) All of these

172. Basic respiratory rhythm centre is located in
(1) Pons
(2) Medulla oblongata
(3) Forebrains
(4) Mid brain

173. What will be the pO_2 and pCO_2 in the atmospheric air as compared to those in alveolar air?
(1) pO_2 higher, pCO_2 lesser
(2) pO_2 lesser, pCO_2 higher
(3) pO_2 higher, pCO_2 higher
(4) pO_2 lesser, pCO_2 lesser

174. The average cardiac output in healthy individual is
(1) 1 litre   (2) 3 litre
(3) 5 litre   (4) 10 litre

175. Individuals with which blood group have both A and B antigens on the surface of their RBCs?
(1) O –ve   (2) AB +ve
(3) A –ve   (4) B +ve

176. Protonephridia or flame cells are the excretory structure present in
(1) Prawns, Cockroaches
(2) Earthworm, *Ascaris*
(3) Rotifers, Earthworm
(4) *Planaria*, *Amphioxus*

177. Presence of which of the following substances does not favour formation of large quantities of diluted urine?
(1) Renin
(2) Coffee
(3) Beer, Alcohol
(4) ANF

178. Which of the following animals can be included under seasonal breeders?
(1) Frog   (2) Lizard
(3) Birds   (4) All of these

179. **Assertion (A):** Animals are either unisexual or bisexual
Reason (R): Most of the bisexual animals reproduce by cross-fertilisation.
(1) Both (A) and (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) and (R) are true and (R) is not the correct explanation of (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

180. **Statement I:** Menstrual flow lasts for 3-4 days.
Statement II: Menstruation usually occurs about 20 days after ovulation.
Choose the correct option.
(1) Statement I is correct but statement II is incorrect
(2) Statement I is incorrect but statement II is correct
(3) Both statement I and II are correct
(4) Both statement I and II are incorrect

181. Identify the stage A and B and what are the correct labellings of C and D?

Choose the correct option.

	A	B	C	D
(1)	Morula	Blastocyst	Follicular cells	Inner cell mass
(2)	Morula	Blastocyst	Embryo	Tropho blast
(3)	Morula	Blastocyst	Trophoblast	Inner cell mass
(4)	Blastocyst	Morula	Trophoblast	Inner cell mass

182. Sertoli cells are found in
(1) Pancreas and secrete cholecystokinin
(2) Ovaries and secrete progesterone
(3) Adrenal cortex and secrete adrenaline
(4) Seminiferous tubules and provide nutrition to germ cells

183. What is the function of copper-T?
(1) To inhibit ovulation
(2) To inhibit insemination
(3) To inhibit implantation
(4) To inhibit gametogenesis

184. Which of the following is the most effective method of birth control which prevents ovulation?
(1) CuT   (2) Oral contraceptives
(3) MTP   (4) Use of condoms

185. Which of the following is not true for an ideal contraceptive?
(1) User friendly
(2) Negligible failure rate
(3) Irreversible
(4) None or least side effects

SECTION – B

186. Temperature taken by S.L. miller for his experiment was
(1) 700°C   (2) 800°C
(3) 900°C   (4) 600°C

187. Which of the following arthropods are harmful?
(a) *Culex*   (b) *Bombyx*
(c) *Apis*   (d) *Locusta*
(1) a and b   (2) b and c
(3) b and d   (4) a and d

188. Tasmanian wolf and placement wolf appear similar due to
(1) Chemical evolution
(2) Divergent evolution
(3) Biochemical evolution
(4) Convergent evolution

189. If gene migration happens multiple times, it would lead to
- (1) Mutation
- (2) Gene flow
- (3) Chemical evolution
- (4) Genetic drift

190. **Assertion (A):** Artificial selection is highly beneficial for human beings
Reason (R): Artificial selection is carried out by man.
Choose the appropriate option.
- (1) Both (A) and (R) are true and (R) is the correct explanation of (A)
- (2) Both (A) and (R) are true and (R) is not the correct explanation of (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false

191. Which of the following immunoglobin is present in colostrum?
- (1) IgA
- (2) IgG
- (3) IgM
- (4) IgE

192. Mark the correct statement
- (1) The anamnestic response against a pathogen is highly intensified.
- (2) The T-lymphocyte produce antibodies
- (3) The B-lymphocyte produce cell mediated immune response
- (4) An antibody is represented by H_2L_4

193. The antibodies are
- (1) Proteins
- (2) Carbohydrate
- (3) Lipids
- (4) Germs

194. Which of the following is the most important factor that would lead to increased milk yield in cattle?
- (1) Selection of good breeds
- (2) Resistant to diseases
- (3) Stringent cleanliness and hygiene
- (4) Provision of ideal environmental conditions to cattle

195. Restriction endonuclease cuts
- (1) dsDNA
- (2) ssDNA
- (3) Single strands of dsDNA
- (4) Both (1) and (2)

196. Tumor inducing plasmid (Ti plasmid) transforms
- (1) Nematodes
- (2) Bacteria
- (3) Fungi
- (4) Several dicot plants

197. Cells in continuous culture system are maintained in
- (1) Stationary phase
- (2) Lag phase
- (3) Log phase
- (4) Either (1) and (3)

198. Plasmid developed by Bolivar and Rodriguez is :
- (1) pUC19
- (2) pBR322
- (3) pSC101
- (4) All of these

199. The technique used to detect the antibodies synthesized by host against the pathogen is
- (1) PCR
- (2) ELISA
- (3) Southern blot
- (4) RFLP

200. Which of the following is used as a bioweapon?
- (1) *Bacillus substilis*
- (2) *Bacillus licheniformis*
- (3) *Bacillus thuringiensis*
- (4) *Bacillus anthracis*

Test Series (2023)

Mock Test - 04

NEET

ANSWER KEY

PHYSICS	CHEMISTRY	BOTANY	ZOOLOGY
1. (4)	51. (4)	101. (1)	151. (1)
2. (1)	52. (4)	102. (3)	152. (1)
3. (2)	53. (1)	103. (4)	153. (4)
4. (3)	54. (4)	104. (1)	154. (4)
5. (1)	55. (3)	105. (1)	155. (3)
6. (1)	56. (1)	106. (2)	156. (3)
7. (2)	57. (1)	107. (3)	157. (2)
8. (4)	58. (4)	108. (1)	158. (2)
9. (2)	59. (4)	109. (1)	159. (4)
10. (3)	60. (2)	110. (3)	160. (3)
11. (3)	61. (3)	111. (1)	161. (4)
12. (3)	62. (3)	112. (4)	162. (2)
13. (1)	63. (3)	113. (4)	163. (2)
14. (3)	64. (3)	114. (4)	164. (4)
15. (3)	65. (2)	115. (2)	165. (1)
16. (3)	66. (1)	116. (4)	166. (4)
17. (1)	67. (1)	117. (2)	167. (1)
18. (2)	68. (1)	118. (2)	168. (1)
19. (3)	69. (3)	119. (3)	169. (2)
20. (3)	70. (1)	120. (2)	170. (3)
21. (2)	71. (2)	121. (2)	171. (1)
22. (4)	72. (1)	122. (3)	172. (2)
23. (4)	73. (2)	123. (2)	173. (1)
24. (2)	74. (1)	124. (4)	174. (3)
25. (3)	75. (1)	125. (1)	175. (2)
26. (1)	76. (4)	126. (1)	176. (4)
27. (2)	77. (2)	127. (1)	177. (1)
28. (4)	78. (3)	128. (2)	178. (4)
29. (2)	79. (1)	129. (3)	179. (2)
30. (2)	80. (2)	130. (3)	180. (1)
31. (1)	81. (3)	131. (2)	181. (3)
32. (3)	82. (3)	132. (4)	182. (4)
33. (4)	83. (1)	133. (1)	183. (3)
34. (2)	84. (3)	134. (4)	184. (2)
35. (1)	85. (3)	135. (4)	185. (3)
36. (3)	86. (3)	136. (2)	186. (2)
37. (3)	87. (2)	137. (2)	187. (4)
38. (3)	88. (4)	138. (2)	188. (4)
39. (3)	89. (1)	139. (1)	189. (2)
40. (3)	90. (1)	140. (2)	190. (2)
41. (1)	91. (2)	141. (4)	191. (1)
42. (1)	92. (2)	142. (1)	192. (1)
43. (3)	93. (2)	143. (2)	193. (1)
44. (4)	94. (1)	144. (4)	194. (1)
45. (4)	95. (4)	145. (4)	195. (1)
46. (1)	96. (1)	146. (2)	196. (4)
47. (3)	97. (2)	147. (1)	197. (3)
48. (1)	98. (1)	148. (2)	198. (2)
49. (1)	99. (3)	149. (4)	199. (2)
50. (1)	100. (3)	150. (3)	200. (4)

1. **(4)**

Hint : At Brewster's angle, refracted light is partially polarised and reflected is fully polarised.
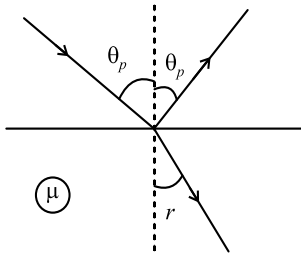
When $i = \theta_p$ (Reflected light is totally polarised)

By Brewster law : $\tan\theta_p = \mu$

By Snell's law $\dfrac{\sin\theta_p}{\sin r} = \mu$

$\Rightarrow \sin r = \cos\theta_p$

$\Rightarrow \sin r = \sin(90° - \theta_p)$

$\Rightarrow r = 90° - \theta_p$ or $r + \theta_p = 90°$

$\Rightarrow$ Reflected and refracted rays are perpendicular

2. **(1)**

Resolving power of microscope $= \dfrac{d}{1.22\lambda}$

$R.P \propto \dfrac{1}{\text{Wavelength}}$

$R_1 \propto \dfrac{1}{\lambda_1}$ and $R_2 \propto \dfrac{1}{\lambda_2}$

$\dfrac{R_1}{R_2} = \dfrac{\lambda_2}{\lambda_1} = \dfrac{450}{600} = \dfrac{3}{4}$

3. **(2)**

Hint: $y = n_1\beta_1 = n_2\beta_2$

$n_1\beta_1 = n_2\beta_2$ (for overlapping)

$\dfrac{\beta_1}{\beta_2} = \dfrac{n_2}{n_1}$

$\dfrac{\lambda_1 \dfrac{D}{d}}{\lambda_2 \dfrac{D}{d}} = \dfrac{n_2}{n_1}$ $\qquad \therefore \dfrac{\lambda_1}{\lambda_2} = \dfrac{n_2}{n_1}$

$\dfrac{n_2}{n_1} = \dfrac{\lambda_1}{\lambda_2} = \dfrac{700}{500} = \dfrac{7}{5}$

$\therefore n_1 = 5$

4. **(3)**

$\dfrac{1}{v} - \dfrac{1}{u} = \dfrac{1}{f}$

$\therefore v_i = \left(\dfrac{v}{u}\right)^2 \times v_0$

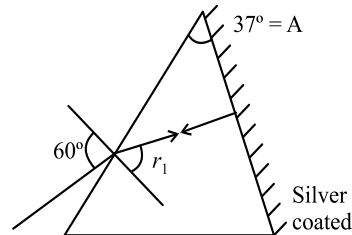$\dfrac{1}{v} - \dfrac{1}{u} = \dfrac{1}{f} \qquad\qquad \Rightarrow \dfrac{1}{v} - \dfrac{1}{(-30)} = \dfrac{1}{20}$

$\therefore \dfrac{1}{v} = \dfrac{1}{20} - \dfrac{1}{30} = \dfrac{3-2}{60} \Rightarrow v = 60$ cm

$\therefore v_i = \left(\dfrac{v}{u}\right)^2 \times (v_0)$

$\Rightarrow v_i = \left(\dfrac{60}{30}\right)^2 \times (10) = 40$ cm/s

5. **(1)**

Hint : When light ray retraces its path, it incident normally on the silvered face.

For refraction at first face

$\dfrac{\sin 60°}{\sin r_1} = \dfrac{\mu}{1} = \mu \qquad ....(1)$
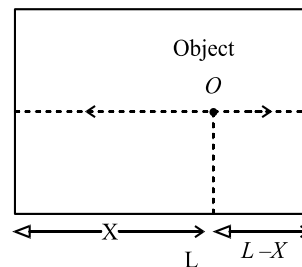
When ray hits normally on silvered face, $\angle r_2 = 0$

$\therefore \quad \angle r_1 + \angle r_2 = \angle A$

$r_1 + 0 = 37° \qquad\qquad ...(2)$

$\therefore \quad \mu = \dfrac{\sin 60°}{\sin 37°} = \dfrac{5\sqrt{3}}{6} = \dfrac{5}{2\sqrt{3}}$

6. **(1)**

Hint : Apparent depth $= \dfrac{\text{Real depth}}{\text{Refractive index}}$

Let L = thickness of glass slab

Let X = actual distance from first face

$9 = \dfrac{X}{\mu} \qquad\qquad \therefore x = 9\mu$

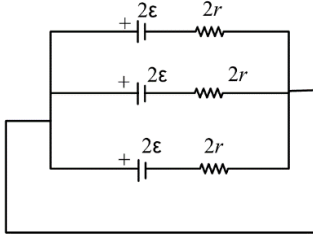$5 = \dfrac{L-x}{\mu}$

$\therefore 5\mu = L - 9\mu$

$L = 14\mu$

$L = 14 \times 1.5 = 21$ cm

7. **(2)**
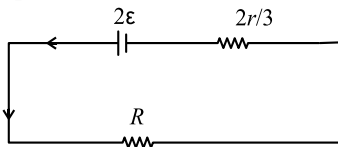
Equivalent EMF $= = \dfrac{\dfrac{\varepsilon_1}{r_1}+\dfrac{\varepsilon_2}{r_2}+\dfrac{\varepsilon_3}{r_3}}{\dfrac{1}{r_1}+\dfrac{1}{r_2}+\dfrac{1}{r_3}}$

and equivalent internal resistance

$= \dfrac{1}{r_0}=\dfrac{1}{r_1}+\dfrac{1}{r_2}+\dfrac{1}{r_3}$

The equivalent circuit becomes

Current in circuit $I=\dfrac{2\varepsilon}{R+\dfrac{2r}{3}}=\dfrac{2\times1.1}{\left(2+\dfrac{2}{3}\times3\right)}=\dfrac{2.2}{4}$

$$I=0.55\,\text{A}$$

8. **(4)**

Hint: Heat required Q = msΔθ

$P \times t = ms\Delta\theta$ (P = Power of geyser)

$P=\dfrac{ms\Delta\theta}{t}=\dfrac{1\times4200\times(42-22)}{60}=\dfrac{4200\times20}{60}=1400\,\text{W}$

9. **(2)**

A negative charge in electric field will experience force opposite to direction of electric field.
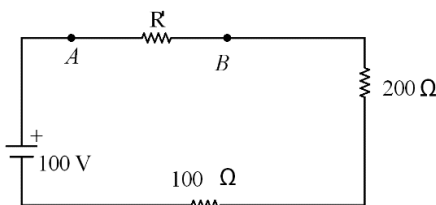
For induced electric field produced by changing magnetic field with time forms closed loop.

The electrostatic force between two charges does not depend on presence of any other charge. The force remains same.

10. **(3)**

Using Kirchhoff's voltage law for closed loop.

$$R' = \dfrac{300\times600}{900}=200\,\Omega$$

Current in circuit $I = \dfrac{100}{(200+200+100)}=\dfrac{1}{5}\text{A}$

Voltmeter reading $V_{AB}=I\times R'=\dfrac{1}{5}\times200=40\,\text{V}$

11. **(3)**

Total mechanical energy remains constant
$\Delta U+\Delta K=0$

$$\dfrac{-(qQ)}{4\pi\varepsilon_0\left[\left(\sqrt{3}R\right)^2+R^2\right]^{\frac{1}{2}}}+\dfrac{1}{2}m(0)^2=\dfrac{-(Qq)}{4\pi\varepsilon_0 R}+\dfrac{1}{2}mv^2$$

$$\dfrac{1}{2}mv^2=KE=\dfrac{-qQ}{4\pi\varepsilon_0(2R)}+\dfrac{Qq}{4\pi\varepsilon_0 R}$$

$$=\dfrac{(Qq)}{4\pi\varepsilon_0}\left[\dfrac{1}{R}-\dfrac{1}{2R}\right]=\dfrac{Qq}{4\pi\varepsilon_0 R}\times\dfrac{1}{2}$$

$$\Rightarrow KE = \dfrac{Qq}{8\pi\varepsilon_0 R}$$

12. **(3)**

Electri field lines due to large sheet are straight and parallel. Equipotential surfaces are perpendicular to electric field lines, which are planer.
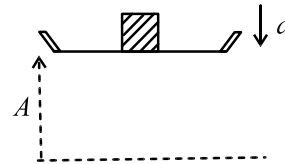
13. **(1)**

By momentum conservation
$0=m_d.\vec{v}_d+m_\alpha.\vec{v}_\alpha$

$$|\vec{v}_d|=\dfrac{m_\alpha.v_\alpha}{m_d}=\dfrac{4\times v}{(210-4)}=\dfrac{4v}{206}$$

14. **(3)**

Hint : When normal reaction becomes zero block gets separated from ship platform.

At the highest point of ship when motion is downward, acceleration is also along mean position.

$|a|=\omega^2 A$ (A = amplitude)

When $ma \geq mg$ (N = 0)

$\omega^2 A \geq g$

$A \geq \dfrac{g}{\omega^2}$

So block will leave its contact at minimum amplitude A= $\dfrac{g}{\omega^2}$, at highest position of ship.

15. **(3)**

Let frequency of C is n. Beat frequency

$\Delta n = n_A - n_B$

$n_A = n + \dfrac{5}{100} n = \dfrac{21}{20} n = \dfrac{21}{20} n$ (n = Frequency of C)

$n_B = n - \dfrac{4}{100} n = \dfrac{24}{25} n$

Also given $n_A - n_B = 9$

$\Rightarrow \quad \dfrac{21}{20} n - \dfrac{24}{25} n = 9$

$\Rightarrow \quad n\left[\dfrac{21}{20} - \dfrac{24}{25}\right] = 9$

$\Rightarrow n\left[\dfrac{105 - 96}{100}\right] = 9 \quad \Rightarrow \quad n = 100\,\text{Hz}$

$\Rightarrow \quad n_B = \dfrac{24}{25} \times 100 = 96\,\text{Hz}$

16. **(3)**

Given,

$r = 6.6 \times 10^{-3}$ m

$B = 0.625$ T

$\dfrac{mv^2}{r} = qvB$

$\boxed{r = \dfrac{mv}{qB}}$

$\Rightarrow \quad mv = qBr$

$= 1.6 \times 10^{-19} \times 0.625 \times 6.6 \times 10^{-3}$

$\boxed{mv = 6.6 \times 10^{-22}}$

Therefore,

$\lambda = \dfrac{h}{mv}$

$\lambda = \dfrac{6.625 \times 10^{-34}}{6.6 \times 10^{-22}}$

$\Rightarrow \quad \lambda = 1.0037 \times 10^{-34+22}$
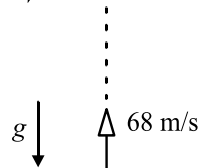
$\lambda = 1.0037 \times 10^{-12}$

$\Rightarrow \quad \boxed{\lambda = 0.01\,\text{Å}}$

17. **(1)**

$t_a = \dfrac{u}{g},$

For total distance both upward and downward distances travelled during 1 second are added.

$V = 0 \bullet t = 6.8$ S.

$g \downarrow$ $\triangle$ 68 m/s

$t_a = \dfrac{u}{g} = \dfrac{68}{10} = 6.8\,\text{s}$

$\therefore$ From $t = 6.0$ s to $t = 6.8$ s distance covered

$= 3.2$ m

In next 0.2 second, it falls under gravity

$d_2 = 0 + \dfrac{1}{2} \times g \times (0.2)^2 = \dfrac{1}{2} \times 10 \times (0.2)^2 = 5 \times (0.04)$

Total distance during $t = 6$ s to $t = 7$s (7th Second)

$d = 3.2 + 0.2 = 3.4$ m

18. **(2)**

Power of e should be dimensionless

$\therefore \left[\dfrac{hc}{x}\right] = \left[M^0 L^0 T^0\right]$

$[x] = [hc]$

$\Rightarrow [x] = [\text{M.L}^2\text{T}^{-1}]\,[\text{LT}^{-1}]\,[\text{LT}^{-1}] = \text{ML}^3\text{T}^{-2}]$

19. **(3)**

By second law of motion a $a = \dfrac{F}{M}$

$v = u + at$

Force acts for 4s, velocity at end of 4 s

$v = u + at = 0 + 2 \times 4 = 8$ m/s

Now object moves with same velocity due to inertia of motion.

20. **(3)**

Given,

T_2 (sink) = 500 K

$n_1 = 50\% = 1/2$

$n_1 = 1 - \dfrac{T_2}{T_1}$

$\dfrac{1}{2} = 1 - \dfrac{T_2}{T_1}$

$\Rightarrow \quad \boxed{T_2 = \dfrac{T_1}{2}}$

Now, Temperature of source = T_1 (same),

$n_2 = 60\%$

Temperature of sink required, $\left(T_2'\right) = ?$

$0.6 = 1 - \dfrac{T_2'}{T_1}$

$0.4 = \dfrac{T_2'}{T_1}$

$\Rightarrow T_2' = 0.4 \times T_1 = 0.4 \times 2T_2 = 0.4 \times 1000 = 400$ K

$\Rightarrow \quad \boxed{T_2' = 400\,\text{K}}$

21. **(2)**

When no torque acts, angular momentum will remain conserved.

l_ω = Constant

$$\frac{mR^2}{2} \times \omega_0 = \frac{mR'^2}{2} \times \omega$$

$R' = R(1 + \alpha\Delta T)$

$R^2\omega_0 = R^2(1 + \alpha\Delta T)^2 \times \omega$

$$\omega = \frac{\omega_0}{(1 + \alpha\Delta T)^2} \quad \therefore \frac{\omega}{\omega_0} = (1 + \alpha\Delta T)^{-2}$$

$$\frac{\omega}{\omega_0} = 1 + (-2\alpha\Delta T) \text{ (Using binomial expansion)}$$

$$\frac{\omega}{\omega_0} - 1 = -2\alpha\Delta T$$

$$\frac{\Delta\omega}{\omega_0} = -2\alpha\Delta T$$

22. **(4)**

According to Malus law,

$I = I_0\cos^2\theta$

$$I_1 = \frac{I_0}{2}$$

$$I_1 = I_1 \cos^2 45° = \frac{I_0}{2} \times \left(\frac{1}{\sqrt{2}}\right)^2 = \frac{I_0}{4}$$

i.e. intensity becomes $\frac{1}{4}$ times

23. **(4)**

$\Delta l = l_0\alpha\Delta T)$

When temperature changes by ΔT

$l = l_0(1 + \alpha\Delta T)$

$l_2 - l_1 = l_{2,0}(1 + \alpha_2\Delta T) - l_{1,0}(1 + \alpha\Delta T)$

$l_2 - l_1 = (l_{2,0} - l_{1,0})(l_{2,0}\alpha_2 - l_{1,0}\alpha_1)\Delta T$

Given $l_2 - l_1 = l_{2,0} - l_{1,0}$

$\Delta T \neq 0$

$\therefore \alpha_1 l_{1,0} = \alpha_1 l_{2,0}$

$$\therefore \frac{l_{Cu}}{l_{Fe}} = \frac{\alpha_{Fe}}{\alpha_{Cu}} = \frac{1.2 \times 10^{-5}}{4.8 \times 10^{-5}} = \frac{1}{4}$$

24. **(2)**

$$h = \frac{2T\cos\theta}{r\rho g}, \text{ h} \propto \frac{1}{r}$$

r = radius of tube

$A = \pi r^2$

$$r = \sqrt{\frac{A}{\pi}}$$

$$\therefore h \propto \frac{1}{\sqrt{A}}$$

$$\therefore \frac{h'}{h} = \frac{\sqrt{A}}{\sqrt{4A}} = \frac{1}{2}$$

$$h' = \frac{1}{2} \times 40 = 20 \text{ cm}$$

25. **(3)**

$$\beta = \frac{\Delta I_C}{\Delta I_B}, \ I_B + I_C = I_E$$

$$\therefore \frac{I_C}{50\mu A} = 60$$

$\therefore I_C = 50 \times 60 \times 10^{-6}$

$= 3000 \times 10^{-6} \text{ A} = 3mA$

And $I_E = I_C + I_B = (3 + 50 \times 10^{-3})$ mA $= 3.05A$

26. **(1)**

Velocity of efflux $= \sqrt{2gh}$

$v = \sqrt{2gh}$, here $h = 10$ m

(In formula, velocity does not depend on density of the liquid)

$v = \sqrt{2 \times 10 \times 10} = \sqrt{200} = 14.1$ m/s

27. **(2)**

$W = P\Delta V$ and $P = \dfrac{W}{t}$

$P = 1.5$ m of water $= 1.5 \times 10^3 \times 10$

$= 15 \times 10^2$ N m^{-2}

$\Delta V = 60 \times 10^{-6}$ m^3

$$P_{av} = \frac{P\Delta V}{\Delta t} = \frac{15 \times 10^2 \times 60 \times 10^{-6} \times 72}{60} = 1.08W$$

$$\approx 1.1W$$

28. **(4)**

Each planet with respect to sun traces equal area in equal intervals of times. So areal velocity is constant.

By IInd law of Kepler: areal velocity of each planet around sun is constant

29. **(2)**

Mechanical energy is conserved in conservative gravitational field.

$U + K$ = Constant

$U_1 + K_1 = U_2 + K_2$

$$\Rightarrow \frac{-GmM}{R} + \frac{mgR}{2} = -\frac{GmM}{R+h} + K_2$$

$$h = \frac{R}{2}$$

$$\Rightarrow \frac{-GmM}{R} + \frac{mgR}{2} = \frac{-2}{3}\frac{GmM}{R} + K_2$$

$$\Rightarrow \frac{GmM}{R}\left(-1 + \frac{2}{3}\right) + \frac{mgR}{2} = K_2$$

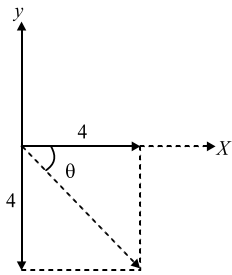$$\Rightarrow \frac{-GmM}{3R} + \frac{mgR}{2} = K_2$$

$$g = \frac{GM}{R^2}$$

$$\Rightarrow -\frac{gR^2 \times m}{3R} + \frac{mgR}{2} = K_2$$

$$\therefore K_2 = \frac{mgR}{2} - \frac{mgR}{3} = \frac{mgR}{6}$$

30. **(2)**

$\vec{R} = \vec{A} + \vec{B}$ and $\tan\theta = \dfrac{R_y}{R_x}$

$\vec{R} = \vec{A} + \vec{B} = 4\hat{i} - 2\hat{J} + 6\hat{K} + (-2\hat{J} - 6\hat{K})$

$\vec{R} = 4\hat{i} - 4\hat{\vec{j}}$

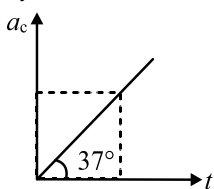$\tan\theta = \dfrac{4}{4} = 1$

$\theta = 45°$ with positive x-axis

With positive y-axis, angle $= 90° + 45° = 135°$

31. **(1)**

$a_t = \dfrac{d\,|v|}{dt}$, Tangential acceleration

$a_c = \dfrac{V^2}{R}$ Centripetal acceleration

$\dfrac{a_c}{t} = \tan 37°$

$a_c = \dfrac{3}{4}t$
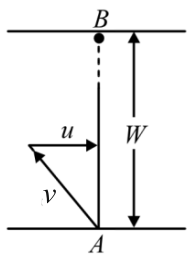
$V^2 = \dfrac{3}{4}t \times 12 = 9t$

at $t = 1s$, $v^2 = 9 \times 1 = 9$ $v = 3$ m/s

32. **(3)**

$t = \dfrac{w}{\sqrt{v^2 - u^2}}$

Time taken to cross river through shortest path is

$t = \dfrac{w}{\sqrt{v^2 - u^2}} = \dfrac{\dfrac{600}{1000}}{\sqrt{5^2 - 3^2}} = \dfrac{600}{1000 \times 4}$

$t = \dfrac{3}{20}h = 9\,\text{min}$

33. **(4)**

$X_L = \omega L$ and $X_C = \dfrac{1}{\omega C}$

$X_C = \dfrac{1}{\omega C} = \dfrac{1}{2\pi f C}$

$\therefore X_C \propto \dfrac{1}{f}$

When frequency increase X_C decreases, graph is rectangular hyperbola. So X_2 corresponds to a capacitor

34. **(2)**

$f = \dfrac{1}{2\pi}\sqrt{\dfrac{1}{LC}}$

$f_1 = \dfrac{1}{2\pi}\sqrt{\dfrac{1}{LC_1}}$

$f_2 = \dfrac{1}{2\pi}\sqrt{\dfrac{1}{LC_2}}$

$\dfrac{f_2}{f_1} = \sqrt{\dfrac{C_1}{C_2}} = \sqrt{\dfrac{C}{KC}}$

$\dfrac{25}{125} = \sqrt{\dfrac{1}{K}}$

$\dfrac{1}{5} = \sqrt{\dfrac{1}{K}}$

$\therefore \dfrac{1}{25} = \dfrac{1}{K} \Rightarrow K = 25$

35. **(1)**

For uniform acceleration $v = u = at$

$v = u + at$

$30 = u + a \times 2 = u + 2a$ ……. (1)

$60 = u + a \times 4 = u + 4a$ …… (2)

Subtracting (1) and (2)

$30 = 2a$ $\therefore a = 15$ m s^{-2}

Using in (1), $30 = u + 2 \times 15$ $\therefore u = 0$ ms^{-1}

36. **(3)**

Induced emf, $\varepsilon = Blv$,

And Induced current $i = \dfrac{\varepsilon}{R}$

$v = 10$ms^{-1}, $l = 1$m, $B = 0.2$ T
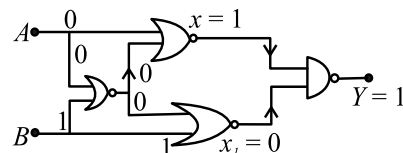
$\varepsilon = $ induced emf $= Blv = 0.2 \times 10 \times 1 = 2$ volt

Induced current in loop

$i = \dfrac{\varepsilon}{R} = \dfrac{2}{100} = \dfrac{20}{1000} = 20mA$

37. **(3)**

Sol:

38. **(3)**

Hint: Longest wavelength appears when electron jumps from next energy state and shortest wavelength appears when electron jumps from $n = \infty$ to the lowest energy shell.

Sol: $\dfrac{1}{\lambda_{L,\,\min}} = R\left[\dfrac{1}{1^2} - \dfrac{1}{\infty^2}\right]$

$\dfrac{1}{\lambda_{L,\,\min}} = R$

$\dfrac{1}{\lambda_{P,\,\max}} = R\left[\dfrac{1}{3^2} - \dfrac{1}{4^2}\right]$

$\dfrac{1}{\lambda_{P,\,\max}} = R\left[\dfrac{1}{9} - \dfrac{1}{16}\right]$

$\dfrac{1}{\lambda_{P,\,\max}} = R\left[\dfrac{16-9}{144}\right]$

$\dfrac{\lambda_{L,\,\min}}{\lambda_{P,\,\max}} = \dfrac{(16-9)}{144} = \dfrac{7}{144}$

39. **(3)**

Hint: $|E| = \dfrac{\Delta V}{\Delta x}$

Sol: $\Delta V = 0.6$ V, $\Delta x = 10^{-6}$ m

$\therefore E = \dfrac{\Delta V}{\Delta x} = \dfrac{0.6}{10^{-6}} = 6\times10^5\, V/m$

40. **(3)**

Hint: Change equation for y_2 to sinusoidal form

Sol: $y_1 = 4\sin\left(3\pi t + \dfrac{\pi}{3}\right)$

$y_2 = 4\left[\sqrt{\left(1^2 + \sqrt{3}\right)^2}\right]$

$\left((\sin 3\pi t)\times \dfrac{1}{\sqrt{1^2 + \left(\sqrt{3}\right)^2}} + \dfrac{\sqrt{3}}{\sqrt{1^2 + \left(\sqrt{3}\right)^2}}.\cos 3\pi t\right)$

$y_2 = 4\times 2\left[\sin 3\pi t \times \dfrac{1}{2} + \dfrac{\sqrt{3}}{2}\cos 3\pi t\right]$

$= 8[\sin 3\pi t.\cos 60° + \cos 3\pi t.\sin 60°]$

$y_2 = 8[\sin(3\pi t + 60°)$

$\therefore \dfrac{y_1}{y_2} = \dfrac{4}{8} = \dfrac{1}{2}$

41. **(1)**

Hint: Fundamental frequency $n = \dfrac{1}{2}\sqrt{\dfrac{T}{\mu}}$

Sol:

$\mu = \dfrac{M}{L} = \dfrac{\pi r^2 \times \rho \times L}{L}$, T = max^m stress × area
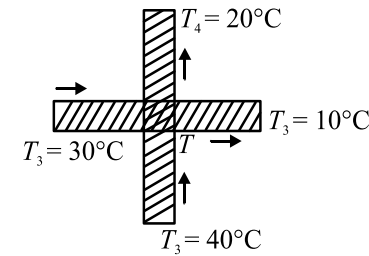
So,

$\mu = \sqrt{\dfrac{T}{\mu}} = \sqrt{\dfrac{\text{max}^m \text{ stress} \times \pi r^2}{\pi r^2 \times \rho}} = \sqrt{\dfrac{\text{max}^m \text{ stress}}{\rho}}$

$\therefore n = \dfrac{1}{2L} \times \sqrt{\dfrac{\text{max}.stress}{\rho}} = \dfrac{1}{2\times 0.75}\sqrt{\dfrac{8.1\times10^8}{9\times10^3}}$

$= \dfrac{2}{3}\times 3\times10^2 = 200$ Hz

42. **(1)**

Hint: $\dfrac{\Delta H}{\Delta t} = KA\left(\dfrac{\Delta T}{I}\right)$ (For conductor)

Thermal resistance

$R = \dfrac{I}{KA}$, K = Thermal Conductivity

Let T = junction Temperature

From diagram

$\Rightarrow \dfrac{dH_1}{dt} + \dfrac{dH_2}{dt} = \dfrac{dH_3}{dt} + \dfrac{dH_4}{dt}$

$\Rightarrow \dfrac{T_1 - T}{R} + \dfrac{T_2 - T}{R} = \dfrac{T - T_4}{R} + \dfrac{T - T_3}{R}$

$\Rightarrow \dfrac{30 - T}{R} + \dfrac{40 - T}{R} = \dfrac{T - 20}{R} + \dfrac{T - 10}{R}$

$\Rightarrow 30 - T + 40 - T = T - 20 + T - 10$

$\Rightarrow 30 + 40 + 20 + 10 = 4T$

$\therefore T = \dfrac{100}{4} = 25°C$

43. **(3)**

Hint: Use equation of continuity.

Sol: By continuity equation

$A_1v_1 + A_2v_2 = A_3v_3 + A_4v_4$

$\therefore 10 + 5 = 8 + A_4v_4$

$15 - 8 = A_4v_4$

$7 = A_4v_4$

$7 = 0.7 \times v_4$

$v_4 = \dfrac{7}{0.7}$

$\therefore v = 10$ m/s

44. (4)

Hint: $R = \dfrac{u^2 \sin 2\theta}{g}, H_m = \dfrac{u^2 \sin^2 \theta}{2g}$

$\therefore \dfrac{R}{H_m} = \dfrac{4}{\tan\theta}$

Sol: $\dfrac{R}{H_m} = \dfrac{4}{\tan\theta} \therefore \dfrac{12}{4} = \dfrac{4}{\tan\theta}$

$\tan\theta = \dfrac{16}{12} = \dfrac{4}{3} \therefore \sin\theta = \dfrac{4}{5}$

$\therefore 4 = \dfrac{u^2 \sin^2 \theta}{2g} \Rightarrow 4 = \dfrac{u^2}{2g} \times \left(\dfrac{4}{5}\right)^2$

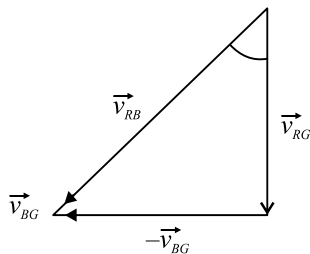$\therefore u^2 = 8g \times \dfrac{25}{16} = \dfrac{25g}{2}$

$\therefore u = \sqrt{\dfrac{25g}{2}} = 5 \times \sqrt{\dfrac{g}{2}}$

$= 5\sqrt{5}m/s$

45. (4)

Hint: $\vec{v}_{RB} = \vec{v}_{RG} - \vec{v}_{BG}$

Sol:

$\vec{v}_{RB} = \vec{v}_{RG} + \left(-\vec{v}_{BG}\right)$

$\left|\vec{v}_{RB}\right| = \sqrt{v_{RG}^2 + v_{BG}^2} = 4\sqrt{2}km/h$

46. (1)
Fact based

47. (3)
Fact based

48. (1)
Fact based

49. (1)
Fact based

50. (1)
Fact based

SECTION – II (CHEMISTRY)

51. (4)

Dalton's law of partial pressure states that the total pressure exerted by a mixture of gases is equal to the sum of the partial pressures exerted by each individual gas in the mixture;

$P_{H_2} = X_{H_2} \times P_T$

Lets calculate the mole fraction of hydrogen

$X_{H_2} = \dfrac{n_{H_2}}{\sum n_{gases}}$

$X_{H_2} = 0.28/1.31$

Putting the calculated value of X_{H_2} in Dalton's law relation as:

$P_{H_2} = (0.28/1.31) \times 2.35$

$P_{H_2} = 0.5$

52. (4)
All are sweetening agents.

53. (1)
- Mass of Iron = 40 g
- Mass of 1.2 atoms of N = $14 \times 1.2 = 16.8$ g
- Mass of 1×10^{23} atoms of C = $(12 \times 1 \times 10^{23}) / (6.023 \times 10^{23}) = 1.99$ g
- Mass of 1.12 liter of O_2 at STP = $(32 \times 1.2) / 22.4 = 1.6$ g

54. (4)
It comprises four protein chains – two alpha and two beta chains, wherein each has a ring-like heme group which contains an iron atom. In CO poisoning, since much of the Hb is tied up with CO, O_2 transport to the tissues is inhibited and it is a correct statement. Hemoglobin, the oxygen carrier in red blood cells, contains the amino acid glutamate at position 6 in the primary sequence.

55. (3)

More the value of 'a' more will be intermolecular forces of attraction and so more easily gas can be liquified; As, value of 'a' for SO_2 is highest, it can be easily liquified.

56. (1)

Reason is the correct explanation for assertion.

57. (1)

Square void is the empty space enclosed by four particles. Triangular void is the empty space enclosed by three particles.
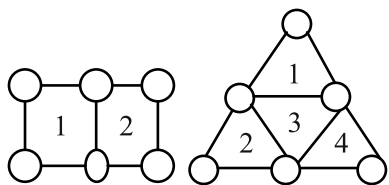
58. (4)

Gammaxene is an insecticide.

59. (4)

1.89 ppm of lithium ions corresponds to 1.89 g of lithium in 1000000 g of solvent

Thus, 1 kg or 1000 g of solvent will contain 1.89×10^{-3} g of lithium

This corresponds to $[1.89 \times 10^{-3}\text{g}]/7 = 2.7 \times 10^{-4}$ mol of lithium

Molality = Moles of Lithium/mass of solvent (in kg) $= 2.7 \times 10^{-4}$ mol / 1 $= 2.7 \times 10^{-4}$ m

60. (2)

Dithionite is $S_2O_4^{2-}$ and dithionate is $S_2O_6^{2-}$.

61. (3)

No free electron in diamond means lower electrical conductivity but atoms are fixed at a place are continuously vibrating at their mean position means higher thermal conductivity

62. (3)

Only s and d orbitals have center of symmetry.

63. (3)

Any species containing odd number of electrons.

64. (3)

Draw the structure of the given compounds and just check for the bridging oxygen.

65. (2)

The pH range of phenolphthalein is 8.2-10.

66. (1)

$A_0 - A_t = kt$

67. (1)

In an ideal reversible process, the system maintains equilibrium at every intermediate step and the process is extremely slow. Thus, from a theoretical point of view, an ideal reversible process should require an infinite time for its completion.

68. (1)

Priority of ketone group is more than alkene

69. (3)

Alkane level reduction is possible with clemmensen reagent

70. (1)

m-CPBA converts ketone into ester and base hydrolysis of an ester gives phenol and an acid

71. (2)

Reaction of phenyl benzoate with an excess of methyl magnesium bromide gives a mixture of 2-phenyl propan-2-ol and phenol.

72. (1)

Allylic cation undergoes rearrangement to give least substituted bromide.

73. (2)

Absence of plane, center and improper axis of symmetry.

74. (1)

The monomers of DNA are called nucleotides. Nucleotides have three components: a base, a sugar (deoxyribose) and a phosphate residue.

75. (1)

Most natural sugars are D- and most natural amino acids are L-. One method for determining whether a molecule is D- or L- by looking at the Fischer projection of a molecule.

76. (4)

The more the number of hyperconjugating structure, the more is the stability.

77. (2)

$$\left(\frac{1}{2}\right)N_2 + \left(\frac{3}{2}\right)H_2 \rightarrow NH_3$$

$\Delta_f H^\circ = -45 \text{ kJ mol}^{-1}$

$$\frac{1}{2}N_2 \rightarrow N$$
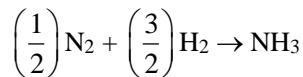
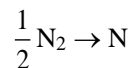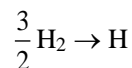Bond dissociation enthalpy of $N_2 = \dfrac{941.8}{2} = 470.9$ kJ mol^{-1}

$$\frac{3}{2}H_2 \rightarrow H$$

Bond dissociation enthalpy of H–H $= \dfrac{3}{2}(436) = 654$ kJ mol^{-1}

Total enthalpy of atomization $= 470.9 + 654 - (-46)$
$= 1170.9$ kJ mol^{-1}

78. (3)

Hydroboration-Oxidation is a two step pathway used to produce alcohols. The reaction proceeds in an Anti-Markovnikov manner, where the hydrogen (from BH_3 or BHR_2) attaches to the more substituted carbon and the boron attaches to the least substituted carbon in the alkene double bond.

79. (1)

Apply CIP Rule.

80. (2)

Calculate the total electron pair, bonding electron pair and lone pair around central atoms.

81. (3)

$$K_c = \frac{K_p}{(RT)^{\Delta n_g}}$$

$\Delta n_g = 3 - 2 = 1$ from the reaction

$$K_c = \frac{1.8 \times 10^{-2}}{0.0821 \times 500} = 4.38 \times 10^{-4} M$$

82. (3)

Carbon dioxide present in air, react with the rain water to form carbonic acid. Clean rain water has a pH value in range of 5 to 5.5.

83. (1)

Oxygen with alkali metal in liquid ammonia

84. (3)

A on loosing a proton becomes aromatic plus 5 electron withdrawing groups are attached makes its conjugate base the most stable.

85. (3)

Apply Hardy-Schulze rule.

86. (3)

Number of radial node = 1, n = 3

$n - l - 1 = 1$
$3 - l - 1 = 1$
$l = 2 - 1 = 1$

So, orbital angular momentum $\dfrac{h}{2\pi}\sqrt{l(l+1)}$

87. (2)

In distilled water, there are no ions present except H^+ and OH^- ions, both of which are immensely minute in concentration, which renders their collective conductivity negligible.

88. (4)

Only sulphur of carbon disulphide is having d-orbital.

89. (1)

$$\Delta G^\circ = -nFE^\circ_{cell} = \Delta H^\circ - T\Delta S^\circ$$

$$-T\Delta S^\circ = -nFE^\circ_{cell} - \Delta H^\circ$$

$$-\Delta S^\circ = \frac{-(nFE^\circ_{cell} + \Delta H^\circ)}{T}$$

$$-\Delta S^\circ = \frac{-\left(2 \times 96487 \times 4.315 - 825.2 \times 10^3\right)}{298}$$

$$\Delta S^\circ = 25 \text{JK}^{-1}$$

90. (1)

Maximum pK_a means weakest acid as the its conjugate base is the unstable one.

91. (2)

In solid state, PCl_5 is an ionic solid with $[PCl_4]^+$ tetrahedral and $[PCl_6]^-$ octahedral.

92. (2)

We have to calculate the partial pressure of solution which is ideal So Ps = P(A) + P(B)
Now we have to use Raoult's law to calculate the partial pressure of A and B

$P_A = X_A . P_A^0$ and $P_B = X_B . P_B^0$

So $P_A = 21 \times 1/3 = 7$ kpa
and $P_B = 18 \times 2/3 = 12$ Kpa
So $P_{solution} = 7 + 12 = 19$ kPa.

93. (2)

Silicones are used as lubricants for both solids and liquids.

94. (1)

The ammonia complexes of Ni^{2+}, Pt^{2+} and Zn^{2+} respectively are

$[Ni(NH_3)_6]^{2+}$, $[Pt(NH_3)_4]^{2+}$, $[Zn(NH_3)_4]^{2+}$ are of octahedral, square planar, and tetrahedral geometries.

95. (4)

Total number of N-Co-O bonds = 8

96. (1)

Assertion is correct, reason is correct; reason is a correct explanation for assertion.

97. (2)

Both are allotropes so differ in physical properties not in chemical properties.

98. (1)

$\pi_1 = \pi_2$

$C_1\,RT = C_2\,RT$

C_1 = Concentration of glucose solution

C_2 = Concentration of urea solution

$C_1 = C_2$

As the weight of solution of 1 L of glucose solution is = 12 g/ L

C_1 = Weight / Molecular mass = 12 gL^{-1} / 180 g mol^{-1} = 2/ 30 mol L^{-1}

As $C_1 = C_2 = \dfrac{2}{30}$ mol L^{-1}

C_2 = Weight / Molecular mass x Volume in Litre = Weight / 60

$\dfrac{\text{Weight}}{60} = \dfrac{2}{30}$

Weight Per L = 4 g/L

99. (3)

Molten sodium chloride conducts electricity due to the presence of free ions. In order to conduct electricity a substance must have charge particles, such as electrons and ions, that are free to move freely through it. In the solid state, ionic compounds such as sodium chloride have their ions fixed in position and therefore these ions cannot move so solid ionic compounds cannot conduct electricity. However in the molten state, ions in ionic compounds are free to flow and therefore molten sodium chloride can conduct electricity.

100. (3)

W_B = 6.5 g. W_A = 100 g,

P_s = 100°C mm, K_b = 0.52,

$T_b^{\circ} = 100°C, P^{\circ}$ = 760 mm

$\dfrac{P^{\circ} - P_s}{P^{\circ}} = \dfrac{n_2}{n_1}$

$\Rightarrow \dfrac{760 - 732}{760} = \dfrac{n_2}{100/18}$

$\Rightarrow n_2 = \dfrac{28 \times 100}{760 \times 18} = 0.2046\,mol$

$\Delta T_b = K_b \times m$

$T_b - T_b^{\circ} = K_b \times \dfrac{n_2 \times 1000}{W_A(g)}$

$T_b - 100°C = \dfrac{0.52 \times 0.2046 \times 1000}{100}$

= 1.06

T_b = 100 + 1.06 = 101.06°C

SECTION – III (BOTANY)

101. (1)

The branch of science which studies the interactions among organisms and between organisms and physical environment is called as 'Ecology'

102. (3)

Niche overlap means sharing of one or more resources between the two species.

103. (4)

Life exists in all given biomes such as Tropical rain forest, deciduous forest, Permafrost polar regions.

104. (1)

105. (1)

In land water salinity concentration ranges from 5 parts per thousand in water.

106. (2)

(1) Conformers

(2) Regulators

(3) Partial regulators

107. (3)

(1) Biochemical adaptation→Marine fish in depth

(2) Allen's Rule→ polar seals

(3) Behavioural adaptation →Desert lizard.

(4) Physiological adaptation → Kangaroo rat.

108. (1)

A population with larger proportion of older individuals than younger ones will likely to declines.

109. (1)

Biosphere composed of all living organisms present on earth which interact with physical factors.

110. (3)

Breeding of the dominant phenotype with the homozygous recessive Phenotype (parent) is known as 'Test cross'

111. (1)

(a) Mendel →Laws of Inheritance
(b) Morgan →*Drosophila melanogaster*.
(c) Henking→Discovered x body
(d) Sutton &Boveri→Chromosomal theory of Inheritance

112. (4)

Gamma rays, temperature and x-rays all these abiotic factor affects the rate of mutations.

113. (4)

Sickle-cell anaemia is an autosomal linked recessive trait.

114. (2)

In X-linked recessive traits, Males have only one 'X' Chromosome and females have two.   The son of a woman who carries the gene has a 50% chance of being colour-blind.
A daughter will not normally be colour blind, unless, her mother is carrier and her father is colour-blind. They are normal carriers.

115. (2)

116. (4)

Thalassaemia is a quantitative problem of synthesising very few globin molecules.

117. (2)

Bacteriophage lambda consists of 48502 BP.

118. (2)

119. (3)

Matthew Meselson & Franklin Stahl in year 1958 performed experiment to prove semi-Conservative DNA Replication.

120. (2)

AUG codon has dual functions
(a) Codes for methionine
(b) Initiator codon.

121. (2)

(1) Avery, MacLeod→Transformation
   McCarty   principle
(2) Jacob & Monod →Lac operon
(3) F.Sanger→Annotated DNA sequences
(4) Alec Jeffreys→ DNA fingerprinting

122. (3)

Industrial melanism is an example of natural selection where the environment selects the black colour moth so their number increases and nature favours their survival.

123. (2)

(a) Homo habilis→ 700 CC
(b) Homo erectus→ 900CC.
(c) Neanderthal man →1400CC.

124. (4)

Survival of fittest is a phrase that originated from Darwinian evolutionary theory as a way of describing the phenomenon of Natural Selection

125. (1)

Analogous organs arises due to convergent evolution Ex: wings of an insect and bird
→ Pectoral fins of shark and flippers of dolphin

126. (1)

Each worm, tape worm, leech, sponges are hermaphrodite organisms.

127. (1)

128. (2)

129. (3)

Embryo development happens after fertilization and zygote formation.

130. (3)

1→ Micropyle
2→ Nucellus
3→ Embryo sac
4→Chalaza.

131. (2)

Isotonic → No net flow of water.
Hypertonic → water moves out of cell
Hypotonic → water moves into cell.

132. **(4)**

All biological membrane (plasma membrane /cell membrane/nuclear membrane) are mainly made up of lipids and proteins. It is universally same though composition may change.

133. **(1)**

Plants synthesis sugars during photosynthesis in the form of **Glucose**.

They transport sugar in the form of **fructose**

They store sugar is the form of **Starch**.

134. **(4)**

Elaioplast store oils and fats.

135. **(4)**

Plants majorly depend on atmospheric carbondioxide. Where plants have the power to decompose carbondioxide in presence of Sunlight evolving oxygen. NOTE: In photosynthesis photolysis of water releases oxygen.

136. **(2)**

In C_4 plants Calvin cycle occursin **bundle sheath cells** and not in the mesophyll cells.

137. **(2)**

End products of anaerobic respiration in animals results in **lactic acid** and **energy**.

138. **(2)**

Amphibolic pathway is a biochemical pathway that includes both anabolic and catabolic processes.

In TCA cycle energy is both Consumed and produced during the process.

139. **(1)**

Cellulose is not an alkaloid.

140. **(2)**

Flow of metabolite through metabolic pathways have definite rate and direction.

141. **(4)**

Genetic material of prokaryotic cell is nucleoid it is composed of single circular DNA molecule.

→ It does not have nuclear membrane.

→ Even they lack Histone proteins

142. **(1)**

When plant cell placed in water without cellwall, osmosis occurs and water move from Hypotonic solution to hypertonic solution. Hence water moves into the cell and cell will become turgid and may burst.

143. **(2)**

In bilipid layer hydrophilic heads are towards outside and hydrophobic tails are towards inside.

144. **(4)**

S (or) Synthesis phase marks the period during which DNA Synthesis (or) replication takes place. During this phase amount of DNA Doubles.

145. **(4)**

(1) Zygotene → Synapsis

(2) Diakinesis→ Terminalisation

(3) Pachytene → Crossing over

(4) Diplotene→Chiasmata

146. **(2)**

147. **(1)**

Dikaryophase is characteristic featureof Ascomycetes and Basidiomycetes

148. **(2)**

Selaginella and *Salvinia* are heterosporous which produce two kinds of spores {macro (large) micro (small)}.

149. **(4)**

(1) Subsidiary cells→ Accessory cells

(2) Lenticels→ Aerating pores in the back of plant

(3) Guard cells →Regulate opening and closure of stomata

(4) Bulliform cells→ Rolling in and out of leaves

150. **(3)**

Presence of vessels is a characterise feature of angiosperms.

SECTION – IV (ZOOLOGY)

151. (1)
Aschelminthes are pseudocoelomates.
Platyhelminthes are acoelomate and Annelida and Arthropoda are coelomates.

152. (1)
Saltation - de Vries
Formation of life was preceded by chemical evolution - Oparin and Haldane
Reproductive fitness - Darwin
Life comes from pre-existing life - Louis pasteur

153. (4)
Respiratory organ as tracheal system is present in cockroaches.

154. (4)
Heart is ventral in position in chordates.

155. (3)
Ichthyophis is a limbless amphibia.

156. (3)
20 (10 pairs) of spiracles are present in *Periplanata americana.*

157. (2)
Ligaments connect bone to bone.

158. (2)
Cartilage is surrounded by firm sheath called perichondrium.

159. (4)
Neuron has 3-parts axon, dendrite and cell body.

160. (3)
Monosaccharide contains 3-7 carbons. Glucose and fructose are hexose.

161. (4)
Cellulose is a structural polysaccharide.

162. (2)
4-helical polypeptides are present in haemoglobin.
2-α-chains
2-β-chains

163. (2)
Few fossils of man like bones were discovered in Ethopia and Tanzania.

164. (4)
Most abundant RNA are rRNA.

165. (1)
Phosphodiester bond is characteristically found in deoxyribonucleic acid.

166. (4)
Sub-maxillary glands are located on upper jaw.

167. (1)
Sphincter of oddi	–	Hepato pancreatic duct
Cystic duct	–	Gall bladder
Hepatic lobule	–	Glisson's capsule
Brunner's gland	–	Sub-mucosal gland

168. (1)
Anxiety and eating spicy food together can lead to indigestion.

169. (2)
Thoracic cage of man is formed of Ribs, sternum and thoracic vertebrae.

170. (3)
Solubility of gases affect the rate of diffusion.
Solubility of gas $\propto$ rate of diffusion.

171. (1)
3% of oxygen is carried through dissolved state in plasma.

172. (2)
Basic respiratory rhythm center is located in medulla oblongata.

173. (1)
pO_2 is higher in atmosphere than alveolar air.

174. (3)
The average cardiac output in healthy individual is 5 litre/min.

175. (2)
Individual with AB +ve blood group have both A and B antigens on the surface of their RBCs.

176. (4)
Protonephridia or flame cells or solenocytes are the excretory structures present in *planaria* and *Amphioxus*.

177. (1)
Renin favours the formation of concentrated urine.

178. (4)
Frog, Lizard and birds can be included under seasonal breeders.

179. (2)
Animals are either unisexual or bisexual, most of the bisexual animals reproduce by cross-fertilisation.

180. (1)
Menstruation flow last for 3-4 days and usually occur about 14-days after ovulation.

181. (3)
In the given diagram
Stage A = Morula
Stage B = Blastocyst
Labelling C = Trophoblast
Labelling D = Inner cell mass

182. (4)
Sertoli cells are found in seminiferous tubules and provide nutrition to germ cells.

183. (3)
Function of Cu-T is to inhibit implantation.

184. (2)
Oral contraceptive is the most effective method of birth control which prevent ovulation.

185. (3)
Ideal contraceptive should be reversible.

186. (2)
Temperature taken by S.L. miller for his experiment was 800°C.

187. (4)
Culex and *Locusta* are harmful insects.

188. (4)
Tasmanian wolf and placental wolf appear similar due to convergent evolution.

189. (2)
If gene migration happens multiple times it would leads to gene flow.

190. (2)
Artificial selection is highly beneficial for human and artificial selection is carried out by man.

191. (1)
IgA is the imunoglobin present in colostrum.
IgG are found in blood and extracellular fluid.
IgM are also found in blood and lymph fluid.

192. (1)
The anamnestic response against a pathogen is highly intensified.

193. (1)
The antibodies are protein.

194. (1)
The most important factor that would lead to increased milk yield in cattle is selection of good breeds.

195. (1)
Restriction endonuclease cut dsDNA.

196. (4)
Tumor inducing plasmid transform several dicot plants.

197. (3)
Cells in continuous culture is maintained in log phase.

198. (2)
Bolivar and Rodriguez developed pBR322.

199. (2)
The technique used to detect the antibodies synthesised by host against pathogens is PCR.

200. (4)
Bacillus anthracis is used as bioweapons.