Test Series (2023)

Full Syllabus Test - 1

NEET

DURATION : 200 Minutes | **23-04-2023** | **M. MARKS : 720**

Topics Covered

Physics :	Complete Syllabus (Class 11th and 12th)
Chemistry :	Complete Syllabus (Class 11th and 12th)
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-I (PHYSICS)

SECTION - A

1. A car of 1000 kg moving with a velocity of 18 km/hr is stopped by the brake force of 1000 N. The distance covered by it before coming to rest is

(1) 1 m (2) 162 m
(3) 12.5 m (4) 144 m

2. A body is suspended by a string from the celling of an elevator. It is observed that the tension in the string is doubled when the elevator is accelerated upward, the acceleration will be

(1) 4.9 m/s^2
(2) 9.8 m/s^2
(3) 19.6 m/s^2
(4) 2.45 m/s^2

3. The quantity $\frac{PV}{KT}$ represents:

(1) Mass of the gas
(2) Kinetic energy of the gas
(3) Number of the moles of the gas
(4) Number of molecules in the gas

4. Which one of the following is a conservative force?

(1) Friction
(2) Coulomb's force only
(3) Gravitational force only
(4) Both (2) and (3)

5. A block is kept on a horizontal table. The table is undergoing simple harmonic motion of frequency 3 Hz in a horizontal plane. The coefficient of static friction between the block and the table surface is 0.72. Find the maximum amplitude of the table at which the block does not slip on the surface (g = 10ms^{-2})

(1) 0.01 m (2) 0.02 m
(3) 0.03 m (4) 0.04 m

6. Transmission of heat by molecular collisions is

(1) Conduction
(2) Convection
(3) Radiation
(4) Scattering

7. The coefficient of linear expansion of a crystal in one direction is α_1 and that in every direction perpendicular to it is α_2. The coefficient of cubical expansion is

(1) $\alpha_1 + \alpha_2$ (2) $2\alpha_1 + \alpha_2$
(3) $\alpha_1 + 2\alpha_2$ (4) None of above

8. n_1 and n_2 are the moles of two ideal gases, whose thermodynamics constants, [ratio of $\left(\frac{C_p}{C_v}\right)$] are γ_1 and γ_2 respectively, are mixed. $\left(\frac{C_p}{C_v}\right)$ for the mixture is-

(1) $\frac{\gamma_1+\gamma_2}{2}$

(2) $\frac{n_1\gamma_1+n_2\gamma_2}{n_1+n_2}$

(3) $\frac{n_1\gamma_2+n_2\gamma_1}{n_1+n_2}$

(4) $\frac{n_1\gamma_1(\gamma_2-1)+n_2\gamma_2(\gamma_1-1)}{n_1(\gamma_2-1)+n_2(\gamma_1-1)}$

9. A ball rolls off top of a stair-way with a horizontal velocity u m/s. If the steps are h meters high and b meters wide, the ball will just hit the edge of n^{th} step if n equals to

(1) $\frac{hu^2}{gb^2}$ (2) $\frac{u^2g}{gb^2}$

(3) $\frac{2hu^2}{gb^2}$ (4) $\frac{2u^2g}{hb^2}$

10. In a uniform circular motion, which of the following is not correct?

(1) $\vec{v}=\vec{r}\times\vec{\omega}$
(2) $\vec{a}=\vec{\omega}\times(\vec{\omega}\times\vec{r})$
(3) $\vec{v}=\vec{\omega}\times\vec{r}$
(4) $\vec{a}=\vec{\omega}\times\vec{v}$

11. A source and a detector move away from each other, each with a speed of 10m/s with respect to the ground with no wind. If the detector detects a frequency 1950Hz of the sound coming from the source, what is the original frequency of the source? Speed of sound in air = 340m/s

(1) 2700 Hz (2) 2007 Hz
(3) 2070 Hz (4) 2170 Hz

12. The potential energy of a body as a function of distance is given as $U(x) = (-6x^2 + 2x)$ J. The conservative force acting on body at x = 1 m will be

(1) 6 N (2) 8 N
(3) 10 N (4) 12 N

13. The acceleration of a particle is given as $a = 3x^2$. At $t = 0$, $v = 0$, $x = 0$. The velocity at $t = 2$ sec will be:

(1) 0.05 m/s (2) 0.5 m/s
(3) 5 m/s (4) 50 m/s

14. When a current of (2.5 ± 0.5) ampere flows through a wire, it develops a potential difference of (20 ± 1) volt. Find the resistance of the wire

(1) $(6 \pm 3)\ \Omega$ (2) $(7 \pm 2)\ \Omega$
(3) $(8 \pm 2)\ \Omega$ (4) $(18 \pm 3)\ \Omega$

15. The distance between two particles on a string is 10 cm. If the frequency of wave propagating in it is 400 Hz and its speed is 100 m/s then the phase difference between the particles will be

(1) 0.8 π Radian (2) 0.4 π Radian
(3) 0.2 π Radian (4) π Radian

16. If $A = 3\hat{i} + 4\hat{j}$ and $B = 7\hat{i} + 24\hat{j}$, Then the vector having the same magnitude as $\vec{B}$ and parallel to $\vec{A}$ is -

(1) $15i + 20\hat{j}$ (2) $-15i + 20\hat{j}$
(3) $15i - 20\hat{j}$ (4) $15i + 30\hat{j}$

17. A body floats with one third of its volume outside water and ¾ of its volume outside in another liquid. The density of the other liquid is

(1) 9/4 gm/c.c (2) 4/3 gm/c.c
(3) 8/3 gm/c.c (4) 3/8 gm/c.c

18. The viscous force acting on a solid ball moving in air with terminal velocity v is directly proportional to

(1) $\sqrt{v}$ (2) v
(3) $1/\sqrt{v}$ (4) v^2

19. The ratio of excess pressure inside drops of water of diameters 2.0 mm and 20 μm is-

(1) $\frac{1}{10}$ (2) $\frac{1}{100}$
(3) $\frac{1}{1000}$ (4) $\frac{1}{10000}$

20. In a nuclear reaction which of the following remains conserved?

(1) Mass
(2) energy
(3) relativistic energy
(4) None of these

21. If the series limit of wavelength of the Lyman series for H-atom is λ, then series limit of wavelength for Paschen series of H-atom is

(1) λ (2) λ/3
(3) 3λ (4) 9λ

22. Correct match of Coolum I with column II is:

C-I (waves)		**C-II (Production)**	
A.	Infra-red	P.	Rapid vibration of electrons in aerials
B.	Radio	Q.	Electrons in atoms when they move from higher to lower energy level.
C.	Light	R.	Klystron tube
D.	Microwave	S.	Vibration of atoms and molecules

(1) A-P, B-R, C-S, D-Q
(2) A-S, B-P, C-Q, D-R
(3) A-Q, B-P, C-S, D-R
(4) A-S, B-R, C-P, D-Q

23. **Assertion:** In uniform circular motion speed of the particle is constant.
Reason: In uniform circular motion linear momentum of the particle is constant.

(1) If both assertion and reason are true and the reason is the correct explanation of the assertion
(2) If both assertion and reason are true but reason is not the correct explanation of the assertion
(3) If assertion is true but reason is false
(4) It the assertion and reason both are false

24. In Which of the following situation, doppler effect will appear:

(1) Listener and source of sound are rest
(2) Both are moving with same velocity along the same straight line, in same directions
(3) In both case
(4) In None of the above case

25. A rectangular coil of size 10 cm × 20 cm has 60 turns. It is rotating in magnetic field of 0.5 Wb/m^2 with a rate of 1800 revolutions per minutes. The maximum induced e.m.f. across the ends of the coil is

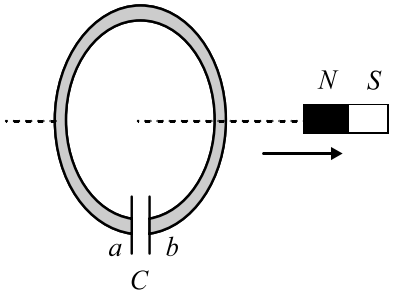
(1) 90 πV
(2) 80 πV
(3) 70 πV
(4) 36 πV

26. An uniform elastic rope of length L (area A), mass m is sliding on a horizontal smooth table by force F as shown in figure. If Young's modulus of material is Y then extension in rope is

(1) $\frac{FL}{AY}$ (2) $\frac{2FL}{AY}$

(3) $\frac{FL}{2AY}$ (4) $\frac{FL}{3AY}$

27. Consider the arrangement shown in figure in which the north pole of a magnet is moved away from a thick conducting loop containing capacitor. Then excess positive charge will arrive on



(1) Plate a
(2) Plate b
(3) On both plates a and b
(4) On neither a nor b plates.

28. Photograph formed by A pinhole camera is:
(1) Real image (2) Virtual image
(3) Shadow (4) None of these

29. At any place on earth, the horizontal component of earth's magnetic field is $\sqrt{3}$ times the vertical component. The angle of dip at that place will be
(1) 60° (2) 45°
(3) 90° (4) 30°

30. A magnet of moment M is lying in a magnetic field of induction B. W_1 is the work done in turning it from 0º to 60º and W_2 is the work done in turning it from 30º to 90º. Then

(1) $W_2 = W_1$ (2) $W_2 = \frac{W_1}{2}$

(3) $W_2 = 2W_1$ (4) $W_2 = \sqrt{3}W_1$

31. A convex lens when placed in the first position forms a real image of an object on a fixed screen. The distance between the object and the screen is 75 cm. On displacing the lens from first position by 25 cm to the second position, again a real image is formed on the screen. Then the focal length of the lens is :
(1) 25.0 cm (2) 16.7 cm
(3) 50.3 cm (4) 33.3 cm

32. A convex lens of power 4D is kept in contact with a concave lens of power 3D, the effective power of combination will be
(1) 7D (2) 4D/3
(3) 1D (4) 3D/4

33. A conducting wire of length l is turned in the form of a circular coil and a current i is passed through it. For torque due to magnetic field produced at its centre, to be maximum, the number of turns in the coil will be
(1) 1 (2) 2
(3) Any value (4) More then 1

34. An electron is revolving in a circular path of radius 2×10^{-10} m with a speed of 3×10^{6} m/s. The magnetic field at the centre of circular path will be-
(1) 1.2 Tesla
(2) 2.4 Tesla
(3) Zero
(4) 3.6 Tesla

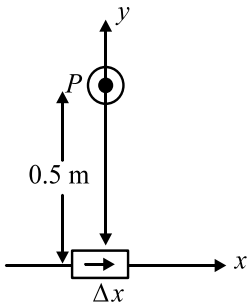
35. The refractive indices of material of a prism for blue and red colours are 1.532 and 1.514 respectively. Calculate angular dispersion produced by the prism if angle of prism is 18°.
(1) 0.144° (2) 0.104°
(3) 0.044° (4) 0.4°

SECTION - B

36. A long solenoid with 15 turns per cm has a small loop of area 2 cm^2 placed inside the solenoid normal to its axis. If the current carried by the solenoid changes steadily from 2A to 4A in 0.1 sec then find induced emf in loop.
(1) 6 μ_0
(2) 0.6 μ_0
(3) 0.06 μ_0
(4) 60 μ_0

37. A geyser heats water flowing at the rate of 3.0 litres per sec from 27°C to 77°C. If the geyser operates on a gas burner, what is the rate of consumption of the fuel if its heat of combustion is 4.0×10^4 J/g?
(1) 157 gm
(2) 0.157 gm
(3) 1.57 gm
(4) 15.7 gm

38. An element $\Delta\ell = \Delta x\hat{i}$ is place at the origin and carries a large current I = 10 A. What is the magnitude of magnetic field on the *y*-axis at a distance of 0.5 m. Δx = 1 cm:

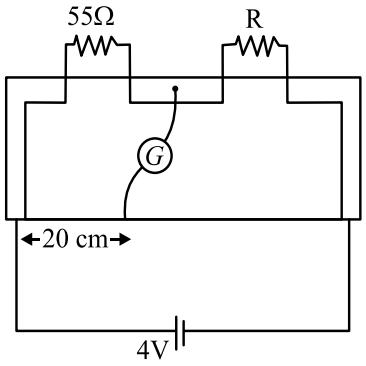


(1) 2×10^{-8} T (2) 4×10^{-8}T
(3) 6×10^{-8} T (4) 8×10^{-8}T

39. **Assertion:** Bohr's atomic model can be applied for every atom.
Reason: The energy state of election in atom is continuous.
(1) If both assertion and reason are true and the reason is the correct explanation of the assertion
(2) If both assertion and reason are true but reason is not the correct explanation of the assertion
(3) If assertion is true but reason is false
(4) If the assertion and reason both are false

40. Why the blood pressure in humans is greater at the feet than at the brain:
(1) Liquid pressure increases downward
(2) Density of blood is more in feet than brain
(3) Both (1) and (2)
(4) None of (1) and (2)

41. Shown in the figure given below is a meter- bridge set up with null deflection in the galvanometer. The value of the unknown resistor *R* is:

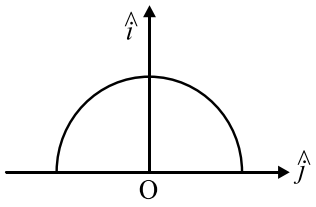


(1) 13.75 Ω (2) 220 Ω
(3) 110 Ω (4) 55 Ω

42. A conducting wire is stretched to increase its length by 2%. What is the percentage change in its resistance
(1) 2% (2) 4%
(3) 8% (4) 1%

43. If σ is the surface charge density of the conductor then, mechanical force per unit area of a charged conductor is proportional to:
(1) $(1/\sigma)^2$ (2) σ^2
(3) σ (4) $\sqrt{\sigma}$

44. A thin semi-circular ring of radius r has a positive charge *q* distributed uniformly over it. The net field $\vec{E}$ at the centre *O* is:



(1) $\frac{q}{4\pi^2\varepsilon_0 r^2}\hat{j}$
(2) $-\frac{q}{4\pi^2\varepsilon_0 r^2}\hat{j}$
(3) $-\frac{q}{2\pi^2\varepsilon_0 r^2}\hat{j}$
(4) $\frac{q}{2\pi^2\varepsilon_0 r^2}\hat{j}$

45. The work done in bringing a unit positive charge from infinite distance to a point at a distance *x* from positive charge *Q* is *W*. Then, the potential at the point is:
(1) $\frac{WQ}{X}$ (2) W
(3) W/X (4) WQ

46. **Assertion:** In a metre bridge experiment, null point for an unknown resistance is measured. Now, the unknown resistance is put inside an enclosure maintained at a temperature. The null point can be obtained at the same point as before by decreasing the value of the standard resistance.
Reason: Resistance of a metal remains constant with increase in temperature.
(1) If both assertion & Reason are Ture & the Reason is a correct explanation of the Assertion.
(2) If both Assertion & Reason are Ture but Reason
(3) If Assertion is Ture but the Reason is false
(4) If both Assertion & Reason are false.

47. **Assertion:** A material having greater Young's modulus also possesses greater bulk modulus.
Reason: The elastic moduli are due to intermolecular forces existing in the material.
(1) If both Assertion & Reason are Ture & the Reason is a correct explanation of the Assertion.
(2) If both Assertion & Reason are True but Reason is not a correct explanation of the Assertion
(3) If Assertion is Ture but the Reason is False.
(4) If both Assertion & Reason are False.

48. **Assertion:** Copper is a paramagnetic substance.
Reason: Paramagnetic substance when placed in a magnetic field are feebly magnetised in a direction opposite to that of the magnetising filed.
(1) If both Assertion & Reason are Ture & the Reason is a correct explanation of the Assertion.
(2) If both Assertion & Reason are Ture but Reason is not a correct explanation of the Assertion
(3) If Assertion is Ture but the Reason is False.
(4) If both Assertion & Reason are False.

49. **Assertion:** Coolant coils are fitted at the top of a refrigerator, for formation of convection current.
Reason: Air becomes denser on cooling.
(1) If both Assertion & Reason are true & the Reason is a correct explanation of the Assertion.
(2) If both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.
(3) If Assertion is True but the Reason if False.
(4) If both Assertion & Reason are False.

50. **Assertion:** An emf E is induced in a closed loop where magnetic flux is varied. The induced E is not a conservation filed.
Reason: The line integral of $\vec{E}.d\vec{\ell}$ around the closed loop is non-zero.
(1) If both Assertion & Reason are Ture & the Reason is a correct explanation of the Assertion.
(2) If both Assertion & Reason are Ture but Reason is not a correct explanation of the Assertion.
(3) If Assertion is Ture but the Reason is False.
(4) If both Assertion & Reason are False.

SECTION-II (CHEMISTRY)

SECTION - A

51. Which is the correct order of atomic radii?
(1) Mn > Fe > Co
(2) Mn = Fe = Co
(3) Sc < Ti > V
(4) Zn > Cu > Ni

52. Equal masses of methane and oxygen are mixed in an empty container at 25^{o} C. The fraction of the total pressure exerted by oxygen is
(1) $\frac{1}{2}$
(2) $\frac{2}{3}$
(3) $\frac{1}{3}\times\frac{273}{298}$
(4) $\frac{1}{3}$

53. In DNA, the linkages between different nitrogenous bases are:
(1) Phosphate linkages
(2) H-bonding
(3) Glycosidic linkages
(4) Peptide linkages

54. Which of the following is the correct expression for the 1st law of thermodynamics under adiabatic conditions?
(1) $\Delta U = q + 2W$ (2) $\Delta U = q - W$
(3) $q = -W$ (4) $\Delta U = W$

55. The function of enzymes in the living system is to:
(1) Catalyse biochemical reactions
(2) Provide energy
(3) Transport oxygen
(4) Provide immunity

56. Which of the following is not a hazardous pollutant present in automobile exhaust gases?
(1) N_2 (2) CO
(3) CH_4 (4) Oxide of Nitrogen

57. A compound is treated with Tollen's reagent. Formation of a silver mirror indicates the presence of the following group.
(1) –CHO (2) $-\overset{\overset{O}{\|}}{C}-$
(3) $-NO_2$ (4) $-NH_2$

58. The correct order of bond dissociation energy among N_2, O_2, O_2^- is shown in which of the following arrangements?

(1) $N_2 > O_2^- > O_2$

(2) $O_2^- > O_2 > N_2$

(3) $N_2 > O_2 > O_2^-$

(4) $O_2 > O_2^- > N_2$

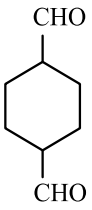
59. CsCl crystallises in body centered cubic lattice. If 'a' is its edge length then which of the following expression is correct?

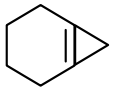
(1) $r_{Cs^+} + r_{Cl^-} = 3a$

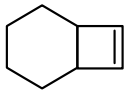
(2) $r_{Cs^+} + r_{Cl^-} = \frac{3a}{2}$

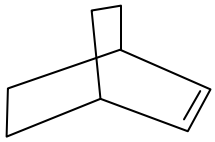
(3) $r_{Cs^+} + r_{Cl^-} = \frac{\sqrt{3}}{2}a$

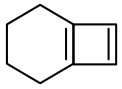
(4) $r_{Cs^+} + r_{Cl^-} = \sqrt{3}a$

60. An alkene (A) $\xrightarrow{\text{Ozonolysis}}$ 

(1) 

(2) 

(3) 

(4) 

61. Which of the following pairs have approximately the same atomic radii?

(1) Zr and Hf (2) Al and Mg

(3) Al and Ga (4) Na and Ne

62. The metal that gives hydrogen gas upon treatment with both acids as well as bases is:

1) Zinc (2) Mercury

(3) Iron (4) Magnesium

63. P_A and P_B are the vapour pressures of pure liquid components, A and B, respectively of an ideal binary solution. If χ_A represents the mole fraction of component A, the total pressure of the solution will be:

(1) $P_A + \chi_A(P_B - P_A)$

(2) $P_A + \chi_A(P_A - P_B)$

(3) $P_B + \chi_A(P_B - P_A)$

(4) $P_B + \chi_A(P_A - P_B)$

64. The rate of a chemical reaction tells us about

(1) The reactants taking part in the reaction

(2) The products formed in the reaction

(3) How slow or fast the reaction is taking place

(4) None of the above

65. Which one of the following statements is correct?

(1) All amino acids except lysine are optically active

(2) All amino acids are optically active

(3) All amino acids except glycine are optical active

(4) All amino acids except glutamic acids are optically active

66. Electrolytic reduction of nitrobenzene in weakly acidic medium gives:

(1) Aniline

(2) Nitrosobenzene

(3) N-Phenylhydroxylamine

(4) p-Hydroxyaniline

67. A mixture of ethyl alcohol and propyl alcohol has a vapour pressure of 290 mm at 300 K. The vapour pressure of propyl alcohol is 200 mm. If the mole fraction of ethyl alcohol is 0.6, its vapour pressure (in mm) at the same temperature will be

(1) 360 (2) 350

(3) 300 (4) 700

68. Salts of A(atomic mass: 15), B(atomic mass: 27), and C(atomic mass: 48) were electrolysed using the same amount of charge. It was found that when 4.5g of A was deposited, the mass of B and C deposited was 2.7g and 9.6g. The valency of A, B, and C, respectively;

(1) 1, 3 and 2 (2) 3, 1 and 3

(3) 2, 6 and 3 (4) 3, 1 and 2

69. $Be_2C + H_2O \rightarrow Be(OH)_2 + [X]$; "X" is:

(1) C_2H_2 (2) CH_4

(3) C_2H_4 (4) None of these

70. 10^{-6}M HCl is diluted to 100 times. Its pH is:

(1) 6 (2) 8

(3) 6.98 (4) 7.02

71. The chemical formula of Plaster of Paris is/are:

(1) $CaSO_4.2H_2O$

(2) $2CaSO_4.H_2O$

(3) $CaSO_4.\frac{1}{2}H_2O$

(4) $CaSO_4.H_2O$

72. How many number of atoms are effectively present in a cubic unit formed by an arrangement of eight BCC unit cells?

(1) 12 (2) 14

(3) 16 (4) 18

73. Which is the best description for the behaviour of Bromine in the reaction given below?

$H_2O + Br_2 \rightarrow HOBr + HBr$

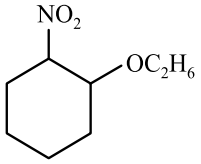
(1) Proton acceptor only

(2) Both oxidised and reduced

(3) Oxidised only

(4) Reduced only

74. The IUPAC name of the compound is:



(1) 1 - Ethoxy - 2 - nitrocyclohexane

(2) 1- Nitro-2-ethoxyhexane

(3) 2- Ethoxy - 1 - nitrocyclohexane

(4) 1 - Ethoxy - 2 - nitrobenzene

75. Standard reduction electrode potentials of three metals A, B & C are respectively +0.5 V, –3.0V & –1.2V. The reducing powers of these metals are

(1) A > B > C

(2) C > B > A

(3) A > C > B

(4) B > C > A

76. The carboxyl functional group (–COOH) is present in

(1) Picric acid

(2) Barbituric acid

(3) Ascorbic acid

(4) Aspirin

77. Assertion: The enthalpy of reaction remains constant in the presence of a catalyst.

Reason: A catalyst participating in the reaction forms different activated complex and lowers down the activation energy but the difference in energy of reactant and product remains the same.

(1) Both the assertion and the reason are correct, and the reason is the correct explanation of the assertion.

(2) Both the assertion and the reason are correct, and the reason is not correct explanation of the assertion.

(3) The assertion is correct, but the reason is incorrect.

(4) Both the assertion and the reason are incorrect

78. Which of the following salts has the same value as of van't Hoff factor (i) as that of $K_3[Fe(CN)_6]$?

(1) Na_2SO_4

(2) $Al(NO_3)_3$

(3) $Al_2(SO_4)_3$

(4) NaCl

79. Assertion: In strongly acidic solutions, aniline becomes more reactive towards electrophilic reagents.

Reason: The amino group being completely protonated in strongly acidic solution, the lone pair of electrons on the nitrogen is no longer available for resonance.

(1) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.

(2) Both Assertion and Reason are true but Reason is not correct explanation of Assertion.

(3) Assertion is true but Reason is false.

(4) Assertion is false but Reason is true.

80. Which of the following are incorrect orders of property indicated against it?

(1) $SO_4^{-2} < SO_3^{-2} < S^{-2}$ (Order of Polarizability)

(2) $ClO_4^{-1} < ClO^{-1} < ClO_2^{-1} < Cl^{-1}$ (order of Polarizability)

(3) $Sc^{+2} > Ti^{+3} > V^{+3} > Cr^{+3}$ (order of polarizing Power)

(4) $Cd^{+2} < Zn^{+2} < Hg^{+2}$ (order of polarizing power)

81. For a certain redox reaction, E° is positive. This means that

(1) $\Delta G°$ is positive, K is greater than 1

(2) $\Delta G°$ is positive, K is less than 1

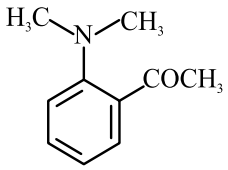
(3) $\Delta G°$ is negative, K is greater than 1

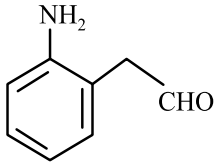
(4) $\Delta G°$ is negative, K is less than 1

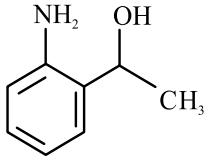
82. The tests performed on compound X and their inferences are:

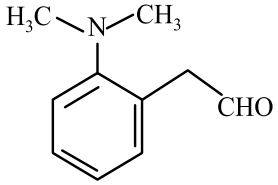
Test	Inference
(a) 2, 4-DNP test	Coloured
(b) Iodoform test	yellow precipitate
(c) Azo-dye test	No dye formation

Compound 'X' is:

(1) 

(2) 

(3) 

(4) 

83. Match the column:

(A)	A process carried out infinitesimally slowly	(p)	Adiabatic
(B)	A process in which no heat enters or leaves the system	(q)	$\Delta E = 0, \Delta H = 0$
(C)	A process carried out at constant temperature	(r)	Reversible
(D)	Cyclic process	(s)	Isothermal

(1) A-p, B-r, C-s, D-q
(2) A-r, B-p, C-s, D-q
(3) A-r, B-q, C-s, D-p
(4) A-p, B-s, C-q, D-r

84. Among the following complexes (A–F), $K_3[Fe(CN)_6]$ (A), $[Co(NH_3)_6]Cl_3$ (B), $Na_3[Co(oxalate)_3]$ (C), $[Ni(H_2O)_6]Cl_2$ (D), $K_2[Pt(CN)_4]$ (E) and $[Zn(H_2O)_6](NO_3)_2$ (F)
The diamagnetic complexes are:
(1) A, B, C, D
(2) A, C, E, F
(3) B, C, E, F
(4) B, C, D, E

85. The correct stability order for the following species is

(I) (II) (III) (IV)

(1) (II) > (IV) > (I) > (III)
(2) (I) > (II) > (III) > (IV)
(3) (II) > (I) > (IV) > (III)
(4) (I) > (III) > (II) > (IV)

SECTION - B

86. Vapour density of two gases are in the ratio of 2 : 9. What will be the ratio of their molar masses?
(1) 1 : 4 (2) 2 : 9
(3) 1 : 9 (4) 1 : 1

87. In the following sequence of reactions,

$$CH_3CH_2OH \xrightarrow{P+I_2} A \xrightarrow[Ether]{Mg} B \xrightarrow{HCHO} C \xrightarrow{H_2O} D$$

The compound D is
(1) propanal
(2) butanal
(3) n-butyl alcohol
(4) n-propyl alcohol

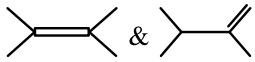
88. Which of the following is a condensation polymer?
(1) Nylon 6,6
(2) Neoprene
(3) Teflon
(4) Buna-S

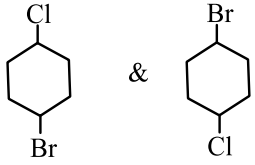
89. The correct match between Item I and Item II is

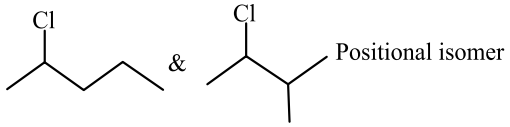
Item I		Item II	
(a)	Natural rubber	(I)	1, 3-butadiene + styrene
(b)	Neoprene	(II)	1, 3-butadiene + acrylonitrile
(c)	Buna N	(III)	Chloroprene
(d)	Buna S	(IV)	Isoprene

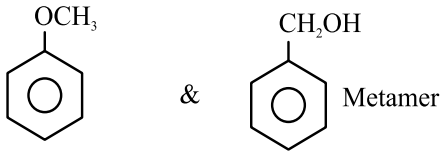
(1) (A) – (III), (B)-(IV), (C)-(I), (D)-(II)
(2) (A) – (III), (B)-(IV), (C)-(II), (D)-(I)
(3) (A) – (IV), (B)-(III), (C)-(II), (D)-(I)
(4) (A) – (IV), (B)-(III), (C)-(I), (D)-(II)

90. Which of the following is correctly matched?

(1)  Chain isomer

(2)  Identical

(3)  Positional isomer

(4)  Metamer

91. Assertion: Extraction of iron metal from iron oxide ore is carried out by heating with coke

Reason: The reaction, $Fe_2O_3(s) \rightarrow 2Fe\ (s) + 3/2\ O_2$ (g) is a spontaneous process

(1) Both the assertion and the reason are correct, and the reason is the correct explanation of the assertion.

(2) Both the assertion and the reason are correct, and the reason is not correct explanation of the assertion.

(3) The assertion is correct, but the reason is incorrect.

(4) Both the assertion and the reason are incorrect.

92. The value of van der Waals constant 'a' for gases O_2, N_2, NH_3 and CH_4 are x, y, z and c respectively, where z > c > y > x. The gas which can most easily be liquefied is:

(1) O_2

(2) N_2

(3) NH_3

(4) CH_4

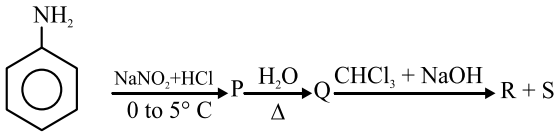
93. Tyndall effect is observed when:

(1) The diameter of the dispersed particle is much larger than the wavelength of light used

(2) The diameter of the dispersed particle is much smaller than the wavelength of light used

(3) The refractive index of the dispersed phase is greater than that of the dispersion medium

(4) The diameter of the dispersed phase particle is similar to the wavelength of light used

94. 

(A) P is benzene diazonium chloride.

(B) Q cannot give bromine water test.

(C) R and S are position isomers.

(D) During the formation of R and S from Q. Formation of a new C–C bond will take place.

Which of the following statement is/are correct?

(1) A, C and D are correct statements.

(2) A, B, C and D are correct statements.

(3) A and B are correct statements.

(4) A, B and C are correct statements.

95. In the following reaction,

$$B(OH)_3 + H_2O \rightarrow \left[B(OH)_4\right]^- + H^+$$

(1) $B(OH)_3$ is a tribasic acid.

(2) $B(OH)_3$ is a monoacidic Lewis basic

(3) $B(OH)_3$ is a monobasic Lewis acid

(4) $B(OH)_3$ is amphoteric

96. The pKa of a weak acid (HA) is 4.5. The pOH of an aqueous buffer solution of HA in which 50% of the acid is ionized is

(1) 7.0

(2) 4.5

(3) 2.5

(4) 9.5

97. The ore that contains both iron and copper is:

(1) Malachite

(2) Azurite

(3) Dolomite

(4) Copper pyrites

98. Find the number of chiral carbon in β–D–(+)–Glucose:

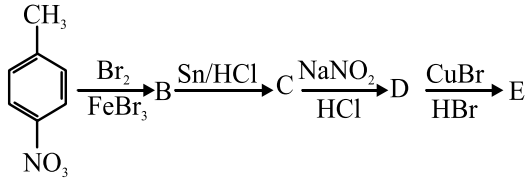
(1) 2

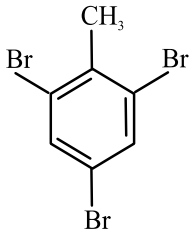
(2) 3

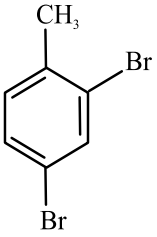
(3) 4

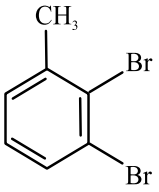
(4) 5

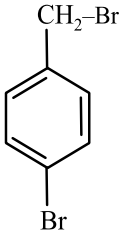
99. In a set of reactions, p-nitrotoluene yielded a product E. The product E is:



(1) 

(2) 

(3) 

(4) 

100. Which of the following will react with water:

(1) $CHCl_3$ (2) Cl_3CCHO

(3) CCl_4 (4) $ClCH_2CH_2Cl$

SECTION-III (BOTANY)

SECTION - A

101. In Basidiomycetes

(1) Mycelium is septate and branched.

(2) They are found as parasites on plants like wheat.

(3) Sex organs are present.

(4) Asexual spores are generally not found, but fragmentation occurs.

102. Match the different organisms with their respective features & select the correct option

(A)	Diatoms	(i)	Heterocysts
(B)	Protozoa	(ii)	Nucleoid
(C)	Bacteria	(iii)	Phytoplankton
(D)	*Gonyaulax*	(iv)	Holozoic nutrition
(E)	*Anabena*	(v)	Red tide

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

103. Which of the following statement is wrong about gymnosperms?

(1) The leaves in gymnosperms are well adapted to withstand extremes of temperature, humidity and wind

(2) Gymnosperms are heterosporous

(3) Male and female gametophytes have independent free-living existence

(4) In *Cycas*, male cones and megasporophylls are borne on different trees

104. Oogamous type of sexual reproduction is found in

(1) *Volvox* (2) *Ulothrix*

(3) *Eudorina* (4) *Spirogyra*

105. Taxonomic category, which is the assemblage of families exhibiting a few similar character is

(1) Class (2) Sub-class

(3) Division (4) Order

106. **Assertion (A):** In Liliaceae, perianth, stamens and carpels are present but still it is incomplete.

Reason (R): Calyx, corolla, androecium, and gynoecium are present in a complete flower.

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

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

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

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

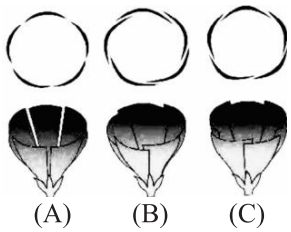
107. Underground stem of which of the plants is modified to store food in them?

(1) *Euphorbia*

(2) *Citrus*

(3) *Pistia*

(4) *Colocasia*

108. 

(A) (B) (C)

The given diagram showing types of aestivation in corolla. Identify aestivation found in Gulmohar, lady finger and calotropis respectively

(1) C, B, A (2) B, C, A

(3) A, B, C (4) C, A, B

109. The correct floral formula of *Sesbania* is–

(1) $\oplus \male\!\!\female\ k_{2+2}\ C_4\ A_{2+4}\ \underline{G}_{(2)}$

(2) $\%\male\!\!\female\ k_5\ C_{1+2+(2)}\ A_{9+1}\ \underline{G}_1$

(3) $\%\male\!\!\female\ k_{(5)}\ C_{1+2+(2)}\ A_{(9)+1}\ \underline{G}_1$

(4) $\oplus \male\!\!\female\ k_5\ C_5\ A_5\ \underline{G}_1$

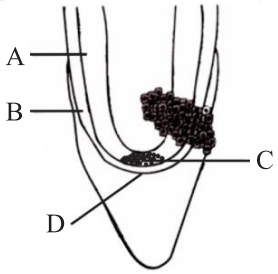
110. **Statement I:** Phellogen is primary cambium. It is made up of thick walled rectangular cells.
Statement II: Phellogen develops in cortex region cells of secondary cortex are parenchymatous.

(1) Both statements are correct
(2) Both statements are incorrect
(3) Only statement I is correct
(4) Only statement II is correct

111. Ring arrangement of vascular bundles is a characteristic of

(1) Dicot stem (2) Monocot root
(3) Dicot root (4) Monocot stem

112. The given diagram showing root apical meristem label the parts A, B, C, D in the given diagram.



	A	B	C	D
(1)	Cortex	Protoderm	Root apical meristem	Initials of root cap
(2)	Protoderm	Cortex	Initials of root cap	Root apical meristem
(3)	Cortex	Root apical meristem	Protoderm	Initials of root cap
(4)	Protoderm	Cortex	Root apical meristem	Initials of root cap

113. **Statement I:** Small bodied organisms are metabolically more active, as they have more surface area/volume ratio.
Statement II: A cell keeps its chemical composition steady within its boundary.

(1) Both statements are correct
(2) Both statements are incorrect
(3) Only statements I is correct
(4) Only statements II is correct

114. Which of the following statement is wrong?

(1) Microtubules and microfilaments are found only in eukaryotes.
(2) Centriole has 9 + 2 microtubular arrangement while cilium has 9 + 0
(3) Cell within the cell is stated for mitochondria and chloroplasts
(4) In prokaryotic cells, respiratory enzymes are located on plasma membrane

115. Mitochondria are sites of

(1) Glycolysis (2) Hill reaction
(3) Calvin cycle (4) Krebs cycle

116. Synapsis of homologous chromosomes to form bivalents occur in

(1) Zygotene
(2) Pachytene
(3) Diplotene
(4) Leptotene

117. How many mitotic divisions are needed for a single cell to make 1024 cells?

(1) 8 (2) 9
(3) 7 (4) 10

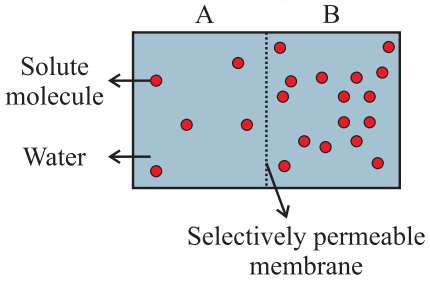
118. One bacterial cell divides into two after every 20 minutes. How many bacteria will be produced after 3 hours, if one started with 10 bacterial cells?

(1) $2^9 \times 10$ (2) $2^8 \times 10$
(3) $2^{10} \times 10$ (4) $2^9 \times 10^9$

119. Histone proteins synthesised in a eukaryotic cell in which stage of cell cycle

(1) G_2 phase (2) Metaphase
(3) G_1 phase (4) S-phase

120. In the given figure, there are two chambers A & B containing solutions are separated by a semi-permeable membrane. Choose the correct statement from the following:



(1) Solution of chamber B has a lower water potential
(2) Solution of chamber A has a lower water potential
(3) Solution of chamber B has higher solute potential
(4) Osmosis will occur from B → A chamber

121. In lac operon, the genes y, a, z, i gene codes for respectively
(1) Permease, β-galactosidase, transacetylase, repressor
(2) Transacetylase, permease, β-galactosidase, repressor
(3) Transacetylase, β-galactosidase, permease, repressor
(4) Permease, transacetylase, β-galactosidase, repressor

122. Which of the following is not a purpose of transpiration?
(1) Supplies water for photosynthesis
(2) Maintain shape and structure of plants by keeping cells turgid
(3) Transports minerals from soil to all parts of plants
(4) Root pressure is involved in transpirational pull

123. What would happen to rate of photosynthesis in C_3 plants if CO_2 concentration level almost doubles from its present level in the atmosphere?
(1) Rate of photosynthesis in C_3 plants increases with increase in CO_2 concentration.
(2) Rate of photosynthesis in C_3 plants decreases with increase in CO_2 concentration.
(3) No food synthesis occur, as plants would be damaged.
(4) Rate of photosynthesis would remain constant.

124. Who demonstrated that photosynthesis is a light dependent reaction based on his studies of purple and green bacteria?
(1) Cornelius van niel (2) Englemann
(3) Juluis von sachs (4) Arnon

125. Identify the correct statements from the following about population interactions
(a) Predation is helpful in maintaining species diversity in a community
(b) When both the organisms are benefitted it said to be commensalism
(c) Resource portioning is related to mutualism
(d) Pencilluim resisting the growth of bacteria by killing them is an example of ammensalism
(e) Many parasites have evolved to be host specific.
(1) Only a, b, d are correct
(2) Only b, d, e are correct
(3) Only a, d, e are correct
(4) Only a, d are correct

126. The enzyme ATP synthase is located in
(1) Head of F_1 particles
(2) Head of F_0 particles
(3) $F_0 – F_1$ junction
(4) Inner mitochondria membrane

127. **Assertion (A):** In plants, during water stress condition, ABA play an important role.
Reason (R): ABA stimulates the closure of stomata, it is called as stress hormone.
(1) Both (A) and (R) are true but (R) is correct explanation of (A)
(2) Both (A) and (R) are true but (R) is not correct explanation of (A)
(3) (A) is true but (R) is false
(4) (A) is false but (R) is true

128. To elongate fruits like apple and to improve their shape which plant hormone is used?
(1) Auxins (2) Ethylene
(3) Cytokinin (4) Gibberellins

129. Which element is main constituent of coenzyme A?
(1) Sulphur (2) Magnesium
(3) Iron (4) Potassium

130. Denitrification is carried out by which bacteria
(1) *Nitrobacter* (2) *Nitrococcus*
(3) *Thiobacillus* (4) *Nitrosomonas*

131. Which of the following statements is incorrect for female gametophyte?
(1) Three cells are at chalazal end and are called as Antipodals
(2) A typical angiosperm embryo sac at maturity contains 7 cells, each cell is uninucleate
(3) Only one megaspore is functional and other three degenerate in majority of flowering plants.
(4) Mitotic divisions are strictly free-nuclear in female gametophyte formation.

132. Pollination in eichhornia occurs by
(1) Water (2) Insects
(3) Wind (4) Both (2) and (3)

133. Which of the plant is not monoecious?
(1) Castor (2) Maize
(3) Date palm (4) All of these

134. T.H. Morgan experimentally verified chromosomal theory of inheritance. He worked with fruit flies for his studies because:
(1) They could be grown on suitable synthetic medium in labs
(2) They show sexual dimorphism
(3) They show hereditary variations that can easily be seen with low power microscopes.
(4) All of the above

135. Phenylketonuria is an example of
(1) Polygenic inheritance
(2) Pleiotropy
(3) Epistasis
(4) Aneuploidy

SECTION - B

136. If a female carrier of haemophilic gene marries a haemophilic male. Then what could be the probability of their daughter to be haemophilic
(1) 100% (2) 25%
(3) 50% (4) 0%

137. Identify the wrongly matched pair
(1) Klinefelter syndrome – Sterility in males
(2) Turner syndrome – XXY condition
(3) Haemophilia – Sex linked recessive
(4) Thalassemia – Anaemia

138. In a RNA molecule
(1) Every nucleotide residue has on additional – OH group present at 3'-position in ribose
(2) 5-methyl uracil is found at place of thymine
(3) A single strand is present which is self-replicating
(4) RNA has a backbone made up of phosphate and ribose sugar

139. Experimental proof that DNA replicates semi-conservatively is given by
(1) Meselson and Stahl
(2) Hershey and Chase
(3) Watson and Crick
(4) Avery and Macleod

140. If following is the sequence of nucleotides in mRNA, what will be the sequence of amino acids coded by it?
5'AUG UUC UCU GGG UGC GUU3'
(1) met – phe – cys – ser – gly – val
(2) met – cys – phe – gly – val – ser
(3) met – phe – ser – gly – cys – val
(4) phe – met – cys – gly – ser – val

141. **Assertion (A):** Endodermis is impervious to water because of a band of suberized matrix called casparian strips.
Reason (A): Movement of water through root layers is apoplastic in the endodermis.
(1) Both (A) and (R) are true but (R) is correct explanation of (A)
(2) Both (A) and (R) are true but (R) is not correct explanation of (A)
(3) (A) is true but (R) is false
(4) (A) is false but (R) is true

142. Select the wrong statement regarding salient feature of human genome
(1) Less than 2% of genome codes for proteins
(2) Chromosome Y has most genes
(3) The functions are unknown for over 50% of discovered genes
(4) Human genome contains 3164.7 million bp

143. Match the varieties of different crops with their associated examples

(A)	Pusa shubhra	(i)	Cauliflower
(B)	Pusa komal	(ii)	Bhindi
(C)	Prabhani kranti	(iii)	Cowpea
(D)	Pusa Gaurav	(iv)	Brassica

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

144. Which enzymes are used in detergents formulations helps to remove oily stains from the laundry?
(1) Pectinases (2) Lipases
(3) Proteases (4) Hydrolases

145. Flocks are
(1) Masses of anaerobic bacteria associated with fungal filaments
(2) Masses of aerobic bacteria associated with fungal filaments
(3) Masses of green algae associated with bacteria
(4) Algal and fungal association to form mesh like structure

146. In aquatic animals body concentrations of body fluids change with that of ambient air, water osmotic concentration. These animals are
(1) Regulators
(2) Partial regulators
(3) Inhibitors
(4) Conformers

147. **Assertion (A):** ATP is utilised at two steps in glycolysis.
Reason (R): Two molecules of ATP are synthesized during glycolysis.
(1) Both (A) and (R) are true but (R) is correct explanation of (A)
(2) Both (A) and (R) are true but (R) is not correct explanation of (A)
(3) (A) is true but (R) is false
(4) (A) is false but (R) is true

148. Rate of formation of new organic matter by consumers is called
(1) Secondary productivity
(2) GPP
(3) Primary productivity
(4) NPP

149. Identify the wrong matched extincted species and the respective country
(1) Dodo – Mauritius
(2) Thylacine – Russia
(3) Quagga – Africa
(4) Tiger – Bali

150. A scrubber is used to remove pollutants in exhaust of a chemical industrial plant. It removes gases like
(1) SO_2
(2) CO_2
(3) Ozone and CH_4
(4) Nitrous oxides

SECTION-IV (ZOOLOGY)

SECTION - A

151. *Adamsia* is known as
(1) Sea-pen (2) Sea-fan
(3) Sea-anemone (4) Sea-fur

152. Which of the following phylum shows polymorphism?
(1) Porifera
(2) Coelentrata
(3) Ctenophora
(4) Platyhelminthes

153. Ecdysis is
(1) Process of shedding of exoskeleton at regular interval
(2) Occurrence of the same species in more than one type of individual
(3) Alternation of generation
(4) All of these

154. Which of the following statement is without exception for sponges?
(1) They all have calcareous spicules
(2) They have high regenerative power
(3) They are found only in marine
(4) They are all radially symmetrical

155. Choose the correct statements:
(1) All chordate have a dorsal heart
(2) Notochord in all vertebrate is replaced by a cartilaginous or bony vertebral column
(3) Cyclostome have a circular and suctorial mouth
(4) All reptiles possess a three-chambered heart

156. Read the given statements and select the correct option for *Periplanata*.
Statement I: Foregut is lined by chitinous cuticle.
Statement II: This region does permit any digestive, secretory or absorptive activity.
(1) Both statement I and statement II are correct
(2) Both statement I and statement II are incorrect
(3) Statement I is incorrect but statement II is correct
(4) Statement I is correct but statement II is incorrect

157. Which of the following muscle fibres donot show striation and taper at both ends
(1) Cardiac muscle fibre
(2) Smooth muscle fibre
(3) Skeletal muscle fibre
(4) Voluntary muscle fibre

158. Choose the correct statement about cellulose.
(1) Cellulose contain complex helices and hence hold I_2
(2) Cellulose is branched hetero polysaccharide
(3) It is the most abundant organic compound in the biosphere
(4) Cotton fibre contain no cellulose

159. Alcoholic amino acid is
(1) Cysteine
(2) Methionine
(3) Serine
(4) Histidine

160. **Assertion (A):** Protein is a heteropolymer.
Reason (R): Proteins are large-sized macromolecule having one or more polypeptides.
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)

161. Which of the following is nucleoside?
(1) Adenine (2) Adenosine
(3) Adenylic acid (4) All of these

162. 10 base pairs per turn is present in
(1) A-form of DNA
(2) B-form of DNA
(3) C-form of DNA
(4) D-form of DNA

163. Sugars such as glycogen are characterized by presence of which set of functional groups?
(1) Hydroxyl and amino
(2) Sulfhydryl and phosphate
(3) Carbonyl and hydroxyl
(4) Carbonyl and amino

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

165. Which of the following are not polymeric?
(1) Nucleic acid (2) Proteins
(3) Polysaccharide (4) Lipids

166. The opening of oesophagus into the stomach is regulated by
(1) Pancreatic duct
(2) Sphincter of oddi
(3) Duct of santorini
(4) Gastro-oesophageal sphincter

167. **Assertion (A):** In mammals, complex respiratory system has developed.
Reason (R): Mammalian skin is impermeable to gases.
Choose the correct option:
(1) Both (A) and (R) are true and (R) is the correct explanation of (A)
(2) Both (A) and (R) are true but (R) is not the correct explanation of (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

168. CO_2 transported as $HbCO_2$ is
(1) 7% (2) 23%
(3) 70% (4) All of these

169. The total volume of air present in the lungs after maximum inspiration is.
(1) ERV + TV + IRV
(2) RV + ERV + TV + IRV
(3) IC – FRC
(4) IC + ERV

170. The total duration of cardiac cycle is
(1) 0.8 second (2) 0.7 second
(3) 0.1 second (4) 0.5 second

171. Select the incorrect statement w.r.t. nodal tissue of the heart.
(1) The entire nodal tissue from sino-atrial node to purkinje fibre has the ability to generate action potentials
(2) All parts of nodal tissue can generate same number of action potential per minute
(3) Both sino-atrial and atrio-ventricular nodes are present in right atrium
(4) Sino-atrial node normally acts as the pacemaker.

172. Uricotelism is found in
(1) Mammals and birds
(2) Fishes and fresh water protozoans
(3) Birds, reptiles and insects
(4) Frogs and toads

173. All of the following organisms excrete nitrogenous waste as uric acid in the form of pellet or paste except.
(1) Kiwi (2) land snails
(3) Lizard (4) Cartilaginous fish

174. Locomotory structures in macrophages found in tissues are
(1) Flagella (2) Cilia
(3) Stereocilia (4) Pseudopodia

175. The number of lumbar vertebrae in human skeleton is
(1) 12 (2) 7
(3) 5 (4) 2

176. Activities of cerebellum are
(1) All involuntary but may involve learning in their early stage
(2) All voluntary and may involve learning in their early stage
(3) All voluntary and do not involve learning in their early stage
(4) All involuntary and do not involve learning in their early stage

177. Depolarisation of neural membranes is caused due to
(1) Rapid influx of Na^+ ions
(2) Rapid influx of K^+ ions
(3) Rapid efflux of Na^+ ions
(4) Rapid influx of Cl^- ions

178. Nervous system differs from endocrine system because in the former
(1) Transmission of information is comparatively slower
(2) Response is comparatively slower
(3) Response is of longer duration
(4) Response is limited to only those cells which are innervated by neurons

179. Hyposecretion of which hormone since pregnancy causes stunted growth in human?
(1) PRH (2) FSH
(3) Thyroxine (4) Insulin

180. Trophoblast is not involved in the formation of
(1) Protective and trophic membrane
(2) Foetal portion of placenta
(3) Body of developing embryo
(4) Chorionic villi

181. Seminal plasma in human males is rich in
(1) Ribose and potassium
(2) Fructose and calcium
(3) Glucose and calcium
(4) DNA and testosterone

182. Secretions from which one of the following are rich in fructose, calcium and some enzymes?
(1) Male accessory gland
(2) Liver
(3) Pancreas
(4) Salivary gland

183. **Statement I:** Surgical methods, also called sterilisation, are generally adviced for the male/female partner a terminal method to prevent any more pregnancies.
Statement II: Surgical intervention blocks gamete transport and thereby prevent conception.
(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 statement II are correct
(4) Both statement I and statement II are incorrect

184. Evolutionary biology is the study of
(1) Civilisation
(2) History of life forms on earth
(3) Hardy-Weinberg equilibrium
(4) Reproductive success

185. All of the following are the mammals wholly living in water except.
(1) Penguins (2) Dolphins
(3) Seals (4) Sea-cows

SECTION - B

186. Which of the following experiments suggests that simplest living organisms could not have originated spontaneously from non-living matter?
(1) Larvae could appear in decaying organic matter
(2) Microbes did not appear in stored meat
(3) Microbes appeared from unsterilized organic matter
(4) Meat was not spoiled when heated and kept in a sealed vessel

187. Reason of fast speciation in present day crop plant is
(1) Drift
(2) Isolation
(3) Polyploidy
(4) Sexual reproduction

188. What was the most significant trend in the evolution of modern man (*Homo sapiens*) from his ancestors?
(1) Increasing cranial capacity
(2) Upright posture
(3) Shortening of Jaw
(4) Binocular vision

189. Which of the following pair of diseases is caused by virus?
(1) Rabies, mumps
(2) Cholera, tuberculosis
(3) Typhoid, tetanus
(4) AIDS, syphilis

190. The term active immunity means
(1) Increasing rate of heart beat
(2) Increasing quantity of blood
(3) Resistance developed after disease
(4) Resistance developed before disease

191. Saline solution is given to patient of cholera because
(1) Na^+ prevent water loss from body
(2) NaCl function as regulatory material
(3) NaCl produces energy
(4) NaCl is antibacterial

192. Which of the following organisation is mainly related with AIDS?
(1) NACO
(2) DOTS
(3) RCH
(4) WHO

193. **Assertion (A):** Fish is a rich source of protein for cattle and poultry
Reason (R): Fish meal is prepared from the non-edible parts of fishes such as tails, fins and bones.
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 but the (R) is not the correct explanation of (A)
(3) (A) is true statement but (R) is false
(4) Both (A) and (R) are false statements

194. PCR technique is best for
(1) RNA synthesis
(2) Protein amplification
(3) DNA amplification
(4) DNA ligation

195. Addition of antibiotic in chemical engineering process helps in
(1) Mixing and aeration of media
(2) Maintaining anti-foaming condition
(3) Maintaining aseptic condition
(4) Maintenance of constant temperature & pH

196. Extraction of bonds of DNA of interest from the agrose gel is termed as
(1) Downstream processing
(2) Upstream processing
(3) Elution
(4) Insertional inactivation

197. PCR proceeds in three distinct steps governed by temperature, they are in order of
(1) Denaturation, Annealing, synthesis extension
(2) Synthesis, Annealing, Denaturation
(3) Annealing, Synthesis, Denaturation
(4) Denaturation, synthesis, Annealing

198. Which of the following is considered as molecular glue?
(1) Alkaline phosphatase
(2) Restriction endonuclease
(3) DNA ligase
(4) DNA polymerase

199. DNA or RNA segment tagged with a radioactive molecule is called
(1) Plasmid (2) Vector
(3) Probe (4) Clone

200. Find the correct match
(1) Cry I Ac $\rightarrow$ Corn borer
(2) Cry II Ab $\rightarrow$ Cotton bollworm
(3) Cry I Ab $\rightarrow$ Cotton bollworm
(4) Cry II Ac $\rightarrow$ Corn borer

Test Series (2023)

Full Syllabus Test - 1

NEET

DURATION : 200 Minutes | 23-04-2023 | M. MARKS : 720

ANSWER KEY

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

SECTION – I (PHYSICS)

1. **(3)**

Form the relation

$F = ma$

$\Rightarrow \quad a = \dfrac{F}{m}$

As the force is breaking force acceleration is $-1\ \text{m/s}^2$ using relation $v^2 = u^2 + 2as$,

$$\Rightarrow \quad s = \frac{u^2}{2a} = \left(\frac{18 \times \frac{5}{18}}{2}\right)^2 = 12.5\,\text{m}$$

2. **(2)**

Initial tension, $T_0 = mg$

When accelerated upward then final tension,

$T = m\,(g + a)$

According to question

$T = 2T_0$

$2\,mg = m\,(g + a)$

$a = g = 9.8\ \text{m/s}^2$

3. **(4)**

By ideal gas equation

$PV = nRT$

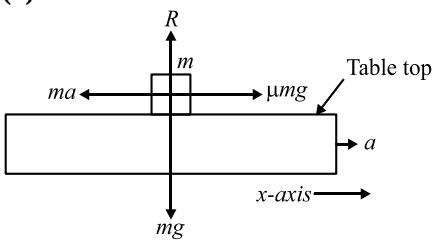
But $R = N_A K$

$PV = nN_AKT$ and $N = nN_a$ represent number of molecules

4. **(4)**

Factual.

5. **(2)**



Let the mass of the block is m

The block will not slip on the surface of the table such that,

$\mu mg \geq ma$

or $\mu g \geq a$

So, for not slipping $a_{max} = \mu g$

$$a_{max} = \left|\frac{d^2x}{dt^2}\right|_{max} = \omega^2 A$$

$(2\pi f)^2 A = \mu g$

$$\Rightarrow A = \frac{\mu g}{4\pi^2 f^2} = \frac{0.72 \times 10}{4 \times (3.14)^2 3^2}$$

$= 0.02$ m

6. **(1)**

In the conduction mode, the molecules remain at their places and transmission of energy occurs by molecular collisions.

7. **(3)**

$V = V_0\,(1 + \gamma \Delta T)$

or $L^3 = L_0(1 + a_1 \Delta T) L_0^2 (1 + \alpha_2 \Delta T)^2$

$= L_0^3 (1 + \alpha_1 \Delta T)(1 + \alpha_2 \Delta T)^2$

$= L_0^3 (1 + \alpha_1 \Delta T)(1 + 2\alpha_2 \Delta T)$

$[(1 + x)^n = 1 + nx]$

or $V = V_0 (1 + \alpha_1 \Delta T)(1 + 2\alpha_2 \Delta T)$

Hence, $1 + \gamma \Delta T = (1 + \alpha_1 \Delta T)\,(1 + 2\alpha_2 \Delta T)$

$1 + \gamma \Delta T = 1 + (\alpha_1 + 2\alpha_2)\,\Delta T$

Hence, $\gamma = \alpha_1 + 2\alpha_2$

8. **(4)**

At constant temperature internal energy of the mixture, $U = U_1 + U_2$

$nC_v = n_1 C_{v1} + n_2 C_{v2}$

Total number of moles. in the mixture

$n = n_1 + n_2$

$$nC_v = n_1 \frac{R}{\gamma_1 - 1} + n_2 \frac{R}{\gamma_2 - 1}$$

$$\because \quad C_P = \gamma C_V$$

$$\therefore \quad nC_P = n_1 \frac{\gamma_1 R}{\gamma_1 - 1} + n_2 \frac{\gamma_2 R}{\gamma_2 - 1}$$

$$\therefore \quad \gamma = \frac{C_P}{C_v} = \frac{n_1 \frac{\gamma_1 R}{\gamma_1 - 1} + n_2 \frac{\gamma_2 R}{\gamma_2 - 1}}{n_1 \frac{R}{\gamma_1 - 1} + n_1 \frac{R}{\gamma_2 - 1}}$$

$$\therefore \quad \gamma = \frac{n_1 \gamma_1 (\gamma_2 - 1) + n_2 \gamma_2 (\gamma_1 - 1)}{n_1 (\gamma_2 - 1) + n_2 (\gamma_1 - 1)}$$

9. **(3)**

If the ball hits the n^{th} step, the horizontal and vertical distances travelled are nb and nh respectively. Let t be the time taken by the ball for these horizontal and vertical displacement. Then velocity along horizontal direction remains constant = u initial vertical velocity is zero

$\therefore \quad nb = ut \qquad \ldots (1)$

$nh = 0 + (1/2)\,gt^2 \qquad \ldots (2)$

From (1) & (2) we get

$nh = (1/2)\,g\,(nb/u)^2$

$$\Rightarrow \quad n = \frac{2hu^2}{gb^2}$$

10. **(1)**

Factual.

11. (3)

If the original frequency of the source is n, the apparent frequency heard by the observer is

$$n' = \frac{v - v_0}{v + v_s} n$$

$$1950 = \frac{350 - 10}{340 + 10} n$$

$$\Rightarrow n = \frac{35}{33} \times 1950 = 2070\,\text{Hz}$$

12. (3)

$$F = -\frac{dU}{dx}$$

$$\Rightarrow \quad -\frac{d}{dx}\left[-6x^2 + 2x\right] = 12x - 2$$

$F\ (x = 1) = 12 \times 1 - 2 = 10\text{N}$

13. (2)

$a = 3x^2 \Rightarrow v\dfrac{dv}{dx} = 3x^2$

$\Rightarrow \quad v\,dv = 3x^2\,dx$

On integrations

$$\Rightarrow \frac{v^2}{2} = 3\frac{x^2}{3} + c$$

at $t = 0$, $v = 0$, $x = 0$

$\therefore \quad c = 0$ Now, $\dfrac{v^2}{2} = x^3$

$v^2 = 2x^3 \Rightarrow v = \sqrt{2}x^{3/2} \qquad \ldots (1)$

$$\Rightarrow \frac{dx}{dt} = \sqrt{2}x^{3/2}$$

$$dx = \sqrt{2}x^{3/2}dt$$

$$\frac{dx}{\sqrt{2}x^{3/2}} = dt$$

On integration

$$\frac{-2}{\sqrt{2}x^{1/2}} = t + C_1$$

$t = 0$, $x = 0$

$\therefore C_1 = 0$

$$x = \frac{2}{t^2} \qquad \ldots (2)$$

From (1) and (2) $v = \sqrt{2}\left(\dfrac{2}{t^2}\right)^{3/2}$,

at $t = 2$ sec $\Rightarrow v = 0.5$ m/sec

14. (3)

$$R = \frac{V}{I} = \frac{20 \pm 1}{2.5 \pm 0.5} = 8 \pm \Delta R$$

The error in the measurement is

$$\frac{\Delta R}{R} = \frac{\Delta V}{V} + \frac{\Delta I}{I} = \frac{1}{20} + \frac{0.5}{2.5} = 0.05 + 0.2$$

$= 0.25$

$\Delta R = 0.25R = 0.25 \times 8 = 2\Omega$

Thus the resistance of the wire with the error is $(8 \pm 2$ ohm).

15. (1)

Phase difference = $\dfrac{2\pi}{\lambda}$ path difference

$$\delta = \frac{2\pi n}{V}\Delta$$

$$\delta = \frac{2\pi \times 400}{100} \times 0.1 = 0.8\pi \text{ Radian}$$

16. (1)

$$|B| = \sqrt{7^2 + (24)^2} = \sqrt{625} = 25$$

Unit vector in the direction of A

$$\hat{A} = \frac{3\hat{i} + 4\hat{j}}{5}$$

Required vector

$$= 25\left(\frac{3\hat{i} + 4\hat{j}}{5}\right) = 15\hat{i} + 20\hat{j}$$

17. (3)

$$W_{\text{water}} = \frac{2}{3}V \times 1 \times g$$

$$W_{\text{liquid}} = \frac{1}{4}V \times \rho \times g$$

$\therefore \quad \dfrac{2}{3}Vg = \dfrac{1}{4}V\rho g$ or $\rho = \dfrac{8}{3}gm/c.c$

18. (2)

Since $F = 6\pi\,\eta\,r\,v$ so $F \propto v$

19. (2)

Excess pressure inside a drop $p_{ex} = \dfrac{2T}{r}$

$$\therefore \quad \frac{p_{ex,1}}{p_{ex,2}} = \frac{r_2}{r_1} = \frac{20 \times 10^{-6}}{2 \times 10^{-3}} = \frac{1}{100}$$

20. (3)

Relativistic energy

21. (4)

$$\frac{1}{\lambda_L} = Rz^2\left(\frac{1}{1^2} - \frac{1}{\infty^2}\right)$$

$$\lambda_L = \frac{1}{Rz^2}$$

$$\frac{1}{\lambda_P} = Rz^2\left(\frac{1}{3^2} - \frac{1}{\infty^2}\right)$$

$$\left[\lambda_P = \frac{9}{Rz^2} = 9\lambda_L\right]$$

22. **(2)**

A–S, B– P, C–Q, D–R

23. **(3)**

24. **(4)**

25. **(4)**

Given, area = $10 \times 20\ cm^2$

$= 200\times10^{-4}\ m^2$

$B = 0.5\ T$

$N = 60$

$\omega = 2\pi \times 1800/60$

$\because e = -\dfrac{d(N\phi)}{dt}$

$e = -N\dfrac{d}{dt}(BA\ \text{Cos}\ \omega t)$

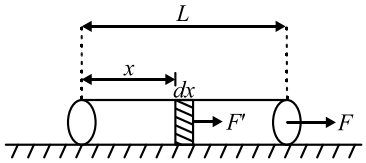
$e = NBA\omega \sin \omega t$

$\therefore \quad e_{max} = NAB\omega$

$= 60 \times 2 \times 10^{-2} \times 0.5 \times 2\pi \times 1800/60$

$= 36\ \pi V.$

26. **(3)**



Take a small element *dx* at a distance *x* from free end.

The magnitude of force at this element, $F' = F\dfrac{x}{L}$

Stress produce in this element, $\sigma = \dfrac{F'}{A} = \dfrac{Fx}{AL}$

Let $d\delta$ small elongations in this element.

$d\delta = \dfrac{F}{YAL}x\,dx \Rightarrow \delta = \dfrac{F}{YAL}\int_0^L x\,dx$

$\delta = \dfrac{FL}{2YA}$

27. **(2)**

The flow of induced current is anti-clock wise in loop.

28. **(1)**

Real image.

29. **(4)**

$\tan\theta = \dfrac{B_V}{B_H} = \dfrac{B_V}{\sqrt{3}B_V}$

$= \dfrac{1}{\sqrt{3}} = \tan 30° \qquad \therefore \quad \theta = 30°$

30. **(4)**

$W = MB\ (\cos\theta_1 - \cos\theta_2)$

$\therefore \quad W_1 = MB\ (\text{Cos}\ 0° - \cos 60°) = \dfrac{MB}{2}$

$\therefore \quad W_2 = MB\ (\cos 30° - \cos 90°) = \dfrac{\sqrt{3}MB}{2}$

$W_2 = \sqrt{3}W_1.$

31. **(2)**

$f = \dfrac{(D)^2 - (d)^2}{4D},$

D = object screen distance,

d = distance between both positions of lens and

f = focal length of the lens

$d = 25$ cm and $D = 75$ cm.

$f = \dfrac{(75)^2 - (25)^2}{4\times75} = \dfrac{(75-25)(75+25)}{4\times75}$

$= \dfrac{50\times100}{4\times75} = \dfrac{50}{3}$

$= 16.7$ cm

32. **(3)**

Effective power P is

$= P_1 + P_2 = 4 - 3 = 1\text{D}$

33. **(1)**

$\tau_{max} = MB$ or $\tau_{max} = ni\pi a^2 B$

$l = n\ (2\pi a)$

or $a = \dfrac{l}{2\pi n}$

$\tau_{max} = \dfrac{ni\pi B\ell^2}{4\pi^2 n^2} = \dfrac{\ell^2 iB}{4\pi n_{min}}\dfrac{\ell^2 iB}{4\pi n_{min}}$

$\tau_{max} \propto \dfrac{1}{n_{min}},$

So, $n_{min} = 1$

34. **(1)**

$B = \dfrac{Kve}{r^2}$

$= \dfrac{10^{-7}\times3\times10^6\times1.6\times10^{-19}}{\left(2\times10^{-10}\right)^2} = 1.2$ Tesla.

35. **(1)**

$\mu_b = 1.532$ and $\mu_r = 1.514$ $\qquad A = 18°$

Angular dispersion

$= (\mu_b - \mu_r)A$

$= (1.532 - 1.524) \times 18$

$= 0.008\times18 = 0.144°.$

36. **(1)**

$e = -\frac{d\phi}{dt} = -\frac{d}{dt}(BA) = -\frac{d}{dt}(\mu_0 ni A)$

$= -\mu_0 nA\frac{di}{dt}$

$e = \frac{15}{10^{-2}} \times \mu_0 \times 2 \times 10^{-4}\left(\frac{4-2}{0.1}\right)$

$= 60 \times \mu_0 \times 10^{-1} = 6\,\mu_0$

37. **(4)**

Let Fuel consumption rate is m gm/sec

$m \times 4 \times 10^4 = 3 \times 10^3 \times 4.2 \times (77 - 27)$

$m = 15.7$ gm

38. **(2)**

$|dB| = \frac{\mu_0}{4\pi}\frac{id\ell \sin\theta}{r^2}$

$dl = \Delta x = 10^{-2}$ m

$i = 10$ $r = 0.5$ $\theta = 90°$

$|dB| = 10^{-7} \times \frac{10 \times 10^{-2}}{25 \times 10^{-2}} = 4 \times 10^{-8} T$

39. **(4)**

Bohr's atomic model apply for only single electron atom.

40. **(1)**

Liquid pressure increases downward

41. **(2)**

Form balanced Wheatstone bridge concept,

$\frac{55\Omega}{R} = \frac{20}{80}$

$\Rightarrow \quad R = 220\Omega$

42. **(2)**

$V = l \times A$, A = area of cross-section

$R = \rho\frac{l}{A} = \frac{\rho}{V}l^2$

Where V = Volume of wire,

$R = \frac{\rho}{V}l^2$

$\log R = \log \rho + 2 \log l - \log V$

on differentiating,

$\frac{dR}{R} = 0 + \frac{2dl}{l} - 0 = 2\frac{dl}{l}$

$\frac{dR}{R} = 2 \times 2 = 4\%$

43. **(2)**

Electrostatic force, $F = qE$,

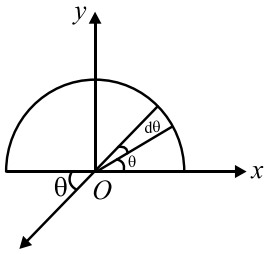
$q = \frac{\sigma}{A}$

$E = \frac{\sigma}{2\varepsilon_0}$

$F = \frac{\sigma^2}{2A\varepsilon_0}$

$F \propto \sigma^2$

44. **(3)**



Liner charge density. $\lambda = \frac{q}{\pi r}$

$dq = qrd\theta$

Small charge on small length = $\lambda rd\theta$

So, electric field due to this small element at O

$\vec{E} = \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} dE\,\cos\theta\left(-\hat{j}\right)$

$\vec{E} = 2\int_{0}^{\frac{\pi}{2}} \frac{k\lambda rd\theta}{r^2}\cos\theta\left(-\hat{j}\right)$

$\vec{E} = \frac{2k\lambda}{r}\int_{0}^{\frac{\pi}{2}} \cos\theta d\theta\left(-\hat{j}\right)$

$\vec{E} = -\frac{q}{2\pi^2\varepsilon_0 r^2}\left(\hat{j}\right)$

45. **(2)**

By definition

46. **(4)**

Fact Based

47. **(1)**

Fact Based

48. **(4)**

Fact Based

49. **(1)**

Fact Based

50. **(1)**

Fact Based

SECTION – II (CHEMISTRY)

51. (2)

d block elements are there and very slight change almost negligible change is observed in Mn, Fe and Co.

52. (4)

$$P_{O_2} = X_{O_2} \times P_T$$

$$P_{O_2} = P \times \frac{1}{3} = \frac{P}{3}$$

53. (2)

Bases are bonded through Hydrogen bonds

54. (4)

Under adiabatic conditions dq = 0

dU = dq + dW

So $\Delta U = W$.

55. (1)

Catalyse biochemical reactions

56. (1)

N_2

57. (1)

Aldehyde group give silver mirror test.

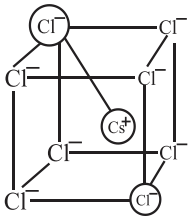
58. (3)

The bond order of N_2, O_2, and O_2^- are 3, 2 and 1.5 respectively.

Since higher bond order implies higher bond dissociation energy, hence the correct order will be

$$N_2 > O_2 > O_2^-$$

59. (3)



Relation between radius of cation, anion and edge length of the cube

$$2r_{Cs^+} + 2r_{Cl^-} = \sqrt{3}a$$

$$r_{Cs^+} + r_{Cl^-} = \frac{\sqrt{3}a}{2}$$

60. (3)

Alkene on ozonolysis gives aldehyde or ketone group.

61. (1)

Zr and Hf due to lanthanoid contraction.

62. (1)

The metal that gives hydrogen gas upon treatment with both acids as well as bases is Zinc.

63. (4)

$P_T = \chi_A (P_A - P_B) + P_B$

64. (3)

The rate of a chemical reaction tells us about the speed of reaction, that is how slow or fast the reaction is taking place.

65. (3)

All amino acids except glycine are optically active. And lysine and glutamic acids are optically active

66. (1)

Aniline

67. (2)

$$P_A^o = ?, \text{Given } P_B^o = 200\,\text{mm}, X_A = 0.6$$

$$X_B = 1 - 0.6 = 0.4, P = 290$$

$$P = P_A + P_B = P_A^o X_A + P_B^o X_B$$

$$290 = P_A^o \times 0.6 + 200 \times 0.4$$

$$\therefore P_A^o = 350\,\text{mm}$$

68. (4)

$$n_A : n_B : n_C = \left(\frac{M_A}{W_A}\right)\left(\frac{it}{nF}\right) : \left(\frac{M_B}{W_B}\right)\left(\frac{it}{nF}\right) : \left(\frac{M_C}{W_C}\right)\left(\frac{it}{nF}\right)$$

$$n_A : n_B : n_c = \left(\frac{4.5}{15}\right) : \left(\frac{2.7}{27}\right) : \left(\frac{9.6}{48}\right)$$

$n_A : n_B : n_C = 3 : 1 : 2$

69. (2)

Methane will be produced as gas.

70. (3)

After 100 times dilution, Concentration of H^+ ions will be 10^{-8} M. So, Its pH will be 6.98, because we have to consider the concentration of H^+ from water also.

71. **(3)**

Chemical formula of Plaster of Paris is

$CaSO_4.\frac{1}{2}H_2O$

72. **(3)**

1 BCC unit cell has 2 atoms;
Therefore, 8 BCC unit cells will have
$8 \times 2 = 16$ atoms

73. **(2)**

Oxidation number of Br in HOBr = +1
Oxidation number of Br in HBr = –1
So, it is Both oxidised and reduced.

74. **(1)**

1 - Ethoxy - 2 - nitrocyclohexane

75. **(4)**

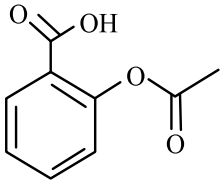
A	B	C
+0.5V	–3.0V	–1.2V

The higher the negative value of reduction potential, the more is the reducing power.

Hence, B > C > A

76. **(4)**

The carboxyl functional group (–COOH) is present in aspirin.



77. **(1)**

Both the assertion and the reason are correct, and the reason is the correct explanation of the assertion .

78. **(2)**

$K_3[Fe(CN)_6] \rightarrow 3K^+ + [Fe(CN)_6]^{-4}$; i = 4;

Now for, $Al(NO_3)_3$ also has i = 4

79. **(4)**

In strongly acidic solutions, aniline becomes anilinum ion due to which it become more electrophilic in nature. So, the assertion is incorrect. Reason is correct.

80. **(3)**

$Sc^{+2} > Ti^{+3} > V^{+3} > Cr^{+3}$ is incorrect because Sc^{+2} will not have high polarising power due to its charge So given order is incorrect.

81. **(3)**

Since, E° is positive. So, $\Delta G° = -nFE°$ = negative.

Also, $\Delta G° = -RT\ln K$, $\Delta G°$ is negative. So, K will be greater than 1.

82. **(1)**

2,4-DNP test is given by aldehyde and ketone. The Iodoform test is only given by those groups, which contain the $-COCH_3$ type group. So, the only option (1) is that compound, which follow all three conditions.

83. **(2)**

A process carried out infinitesimally slowly - Reversible process. A process in which no heat enters or leaves the system - Adiabatic process. A process carried out at constant temperature - Isothermal process. Cyclic process - $\Delta E = 0$,

$\Delta H = 0$

84. **(3)**

If the unpaired electron is zero, then the complex will be a diamagnetic complex.

85. **(4)**

Higher alpha hydrogen increases the stability of carbocation. +M group always stabilize the carbocation. Tertiary carbocation is more stable than secondary and primary carbocation.

86. **(2)**

$$\frac{VD_1}{VD_2} = \frac{2}{9}, \text{ As V.D.} = \frac{M}{2}, (\text{M = Molar Mass})$$

$$\frac{\left(\frac{M_1}{2}\right)}{\left(\frac{M_2}{2}\right)} = \frac{2}{9}$$

87. **(4)**

$$CH_3CH_2OH \xrightarrow{P+I_2} \underset{(A)}{CH_3CH_2I} \xrightarrow[Ether]{Mg}$$

$$CH_3CH_2MgI \xrightarrow[(B)]{HCHO} H-\underset{H}{\overset{CH_2CH_3}{\overset{|}{\underset{|}{C}}}}-OMgI \xrightarrow{H_2O}$$

(C)

$$H-\underset{H}{\overset{CH_2CH_3}{\overset{|}{\underset{|}{C}}}}-OH$$

(D)

n–Propylalcohol

88. **(1)**

Wherever we have multiple bonds are addition polymers and where its not present are the condensation polymer

89. **(3)**

(A) Natural rubber – Polymer of isoprene

(B) Neoprene – Polymer of chloroprene

(C) Buna N – Polymer of 1, 3 butadiene and acrylonitrile

(D) Buna S – Polymer of 1, 3 butadiene and styrene

90. **(2)**

They are identical as both chain and functional groups attached are similar.

91. **(3)**

The assertion is correct, but the reason is incorrect

92. **(3)**

Higher the value of 'a', more attraction and thus easy liquefaction.

93. **(4)**

The diameter of the dispersed phase particle should be almost similar to the wavelength used.

94. **(1)**

P is benzene diazonium chloride, Q is phenol and Q undergoes into Reimer-Tiemann reaction.

95. **(3)**

$B(OH)_3$ take one OH^- ion and act as monobasic Lewis acid.

96. **(4)**

For acidic buffer $pH = pK_a + \log\left[\frac{salt}{acid}\right]$

$$pH = 4.5 + \log\frac{[salt]}{[acid]}$$

As HA is 50% ionized so [salt] = [acid]

$\therefore$ pH = 4.5

$\therefore$ pH + pOH = 14

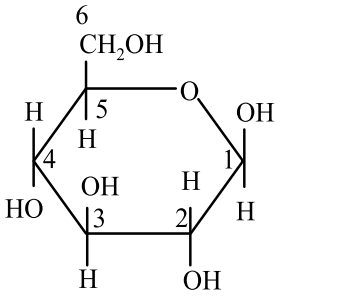
pOH = 14 – pH = 14–4.5 = 9.5

97. **(4)**

Copper pyrites $\rightarrow CuFeS_2$.

98. **(4)**

Carbon numbers 1, 2, 3, 4, and 5 are chiral



β-D-(+)-Glucopyranose

99. **(2)**

(i) In the very first step, bromination takes place at ortho position to the methyl group.

(ii) After the formation of B, reduction of NO_2 group happens to produce amine group

(iii) In presence of $NaNO_2$ and HCl, the amine group gets converted to diazonium chloride(BDC); This reaction is known as diazotization reaction ;

(iv) In the last step, Sandmeyer reaction takes place to the final product that is ortho para bromine substituted toluene.

100. **(2)**

H_2O is a polar solvent and like dissolves like;

Cl_3CCHO interacts with water

SECTION – III (BOTANY)

101. (3)

Basidiomycetes is class of kingdom fungi. They grow in soil, on logs, tree stumps and as parasites e.g. Rusts, smuts.

Sex organs are absent, but plasmogamy is brought about by fusion of two vegetative or somatic cells of different stages or genotypes. Mycelium is septate and branched. Asexual spores are generally not found but vegetative reproduction by fragmentation is common.

102. (2)

Diatoms – Phytoplankton
Protozoans – Holozoic nutrition (e.g. Amoeba)
Bacteria – Nucleoid
Gongaulax – Red tides
Anabena – Heterocysts

103. (3)

In gymnosperms, male and female gametophytes do not have an independent free-living existence. They remain within sporangia retained on the sporophytes.

Gymnosperms produces two kinds of spores i.e. haploid microspores and megaspores hence, they are heterosporous. In *Cycas*, male cones and megasporophylls are borne on different trees while in *Pinus*, male or female cones or strobili may be borne on same tree.

104. (1)

In *volvox*, *fucus*, oogamous type of sexual reproduction is found in this there is fusion between one large non-motile female gamete and a small motile male gamete.

105. (4)

Order being a higher category is the assemblage of families exhibiting a few similar characters. e.g. plant families like convolvulaceae, Solanaceae are included in order polymonales.

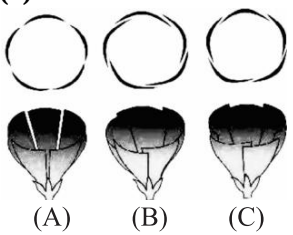
106. (1)

In Liliaceae family, six (3 + 3) tepals are found. Calyx, corolla are not present, these in no differentiation between sepals and petals. Hence it is a incomplete flower.

107. (4)

Underground stems of potato, ginger, zaminkand, colocasia are modified to store food in them. Stem of *colocasia* is modified into corm. Corm is used to store food in the form of carbohydrates.

108. (1)



A: Showing valvate aestivation. It is found in calotropis when sepals and petals just touch one another without overlapping. It is said to be valvate.

B: Showing twisted aestivation. In this, one margin of appendage overlaps that of next one. It can be seen in lady finger, cotton etc.

C: Showing imbricate aestivation. In this, margins of sepals and petals overlap one another, not in any particular direction. It is seen in Gulmohar cassia etc.

109. (3)

Sesbania is a fodder plant which belong to family fabaceae.

Its floral formula is:

$\%\male\ k_{(5)}\ C_{1+2+(2)}\ A_{(9)+1}\ \underline{G}_1$

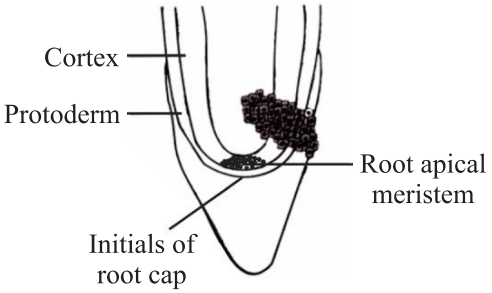
110. (4)

Phelllogen develops usually in the cortex region. Phellogen or cork cambium is a secondary meristem that gives rise to secondary growth. It is couple of layers thick, made up of narrow, thin walled and nearly rectangular cells. It cut of cells on both sides. Inner cells differentiate into secondary cortex or phelloderm. Cells of phelloderm are parenchymatous. Outer cells differentiate into cork or phellem.

111. (1)

Ring arrangement of vascular bundles is a characteristic of dicot stem. Each vascular bundles is conjoint open and with endarch protoxylem. These vascular bundles are arranged in a ring.

112. (1)



The given diagram showing root apical meristem cortex, protoderm, root apical meristem, Initials of root cap are being labelled.

113. (2)

The smaller the organisms mass, the higher its metabolic rate. They have more surface area (volume) ratio. Cells are structural and fundamental unit of living organisms. A cell keeps its chemical composition steady within its boundary.

114. (2)

Cilia, used for motion have 9 + 2 arrangement of microtubules while centrioles are arranged in 9 + 0 configuration.

Central part of centriole is proteinaceous called hub which is connected with tubules of peripheral triplets by radial spokes made up of protein.

115. (4)

Mitochondria are sites of Krebs cycle. The cycle takes place in matrix of mitochondria producing energy in the form of ATP, $FADH_2$, NADH.

116. (1)

Pairing called synapsis of homologous chromosomes to form bivalents occur at Zygotene stage of prophase I of meiosis I. If occurs due to forces of attraction between alleles on the homologous chromosomes.

117. (4)

A single cell undergo mitotic division to form two cells. It has to undergo 10 mitotic divisions to form 1024 cells.

118. (1)

As per question one bacterial cell divides into two after every 20 minutes. In 3 hours, i.e. 180 minutes there will be 9 cycles of 20 minutes each. If starting with 10 bacteria after 9 cycles of 20 minutes each, it will be divided into $(2^9 \times 10)$ after 3 hours.

119. (4)

Synthesis of histones (basic proteins) found in eukaryotes occurs at S or synthetic phase of interphase.

120. (1)

Solution of chamber B has lower water potential because of the presence of more solute in chamber B as compared to chamber A. Chamber B have lesser free water molecules and therefore lower water potential. Solution of chamber B has lower solute potential because of more solutes present. Addition of more solutes decrease the water potential and thus solute potential decreases.

Osmosis will occur form A $\rightarrow$ B chamber because chamber A has more water and less solute than chamber B.

121. (4)

In lac operon, the gene y codes for permease enzyme, a codes for transacetylase, enzyme, z codes for β-galactosidase enzyme and i-gene codes for repressor of lac operon. These three gene-products of lac operon are required for metabolism of lactose.

122. (4)

Root pressure is not involved in transpirational pull root pressure is a positive pressure developed in plant roots and can be responsible for pushing up water to small heights in the stem.

123. (1)

Rate of photosynthesis in C_3 plants increases with increase in CO_2 concentration. It leads to higher productivity and used in greenhouse crops like tomatoes bell pepper to grow and give higher yield by growing them in CO_2 enriched atmosphere.

124. (1)

Cornelius van niel (1897–1985) based on his studies on purple and green bacteria demonstrated that photosynthesis is essentially a light dependent reaction in which hydrogen from a suitable oxidisable compound reduces CO_2 to carbohydrates.

$$2H_2A + CO_2 \xrightarrow{\text{light}} 2A + CH_2O + H_2O$$

125. (3)

When both the organisms are benefitted in population interaction, it is mutualism.

In commensalism, one organism is benefitted and other mains unaffected e.g., barnacles growing on whale back. Resource portioning is related to competition. As per this, if two species competing for same resource they could avoid completion by choosing for instance different times for feeding or different forging patterns.

126. (1)

The enzyme ATP synthase is associated with complex V in electron transport chain.

ATP synthase is located in head of F_1 particles.

127. (1)

Abscisic acid (ABA) is a plant growth inhibitor and it stimulates the closure of stomata and increase the tolerance of plants to various kinds of stresses. Therefore, it is called stress hormone.

128. (4)
Gibberellins are plant hormones that causes fruits like apple to elongate and change its shape. They also delay senescence.

129. (1)
Sulphur is a macronutrient. It is main constituent of several coenzyme, vitamins (thiamine, Biotin) and coenzyme-A.

130. (3)
Nitrate present in the soil reduced to nitrogen by bacteria like *pseudomonas* and *thiobacillus*.

131. (2)
A typical angiospermic embryo sac or female gametophyte at maturity is 7-celled 8 nucleate. One central cell possess two polar nuclei.

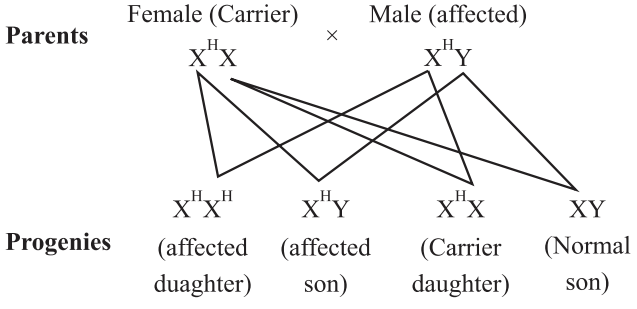
132. (4)
Eichhornia crassipes (water hyacinth) pollinated by wind or Insects, not by water.

133. (3)
Date palm is a dioecious plant as male and female flower appear on different plants.

134. (4)
T.H. Morgan experimentally verified chromosomal theory of inheritance given by Sutton and Boveri. He worked with Drosophila melanogaster (fruit flies) for his studies as they can be early grown on suitable synthetic medium in laboratories. They have rapid generation time, low cost and they show sexual dimorphism, i.e., males are smaller than females. They show hereditary variations that can be easily observed in low power microscope.

135. (2)
Pleiotropy refers to expression of multiple traits by a single gene. Phenylketonuria disorder is caused by deficiency of enzyme phenylalanine hydroxylase which is essential for conversion of amino acid phenylalanine into tyrosine. Phenylketonuria is an example of pleiotropy. There is a single gene which can control the various chemical reactions involved in phenylalanine metabolism.

136. (3)
Haemophilia is a sex-linked recessive genetic disorder.



So, probability of daughter being haemophilic is 50%.

137. (2)
Turner syndrome is a chromosomal disorder in which a female is borne with only one X-chromosome i.e. 45 chromosomes (XO) condition. Such females have rudimentary ovaries becomes sterile.

138. (4)
In a RNA molecule, every nucleotide residue has an additional –OH group present at 2' position in ribose. 5-methyl uracil another chemical name for thymine is present in DNA. In RNA uracil is present RNA is a single stranded molecule which do not undergo self-replication.

139. (1)
DNA replicates semi-conservatively is proved by Meselson and Stahl experiment by using E. coli bacteria. They performed experiments in 1958.

140. (3)
mRNA sequence – 5'AUG UUC UCU GGG UGC GUU3'
as, AUG codes for methionine amino acid
UUC codes for phenylalanine amino acid
UCU codes for serine amino acid
GGG codes for glycine amino acid
UGC codes for cysteine amino acid
GUU codes for valine amino acid
So, amino acids sequences coded by them will be-
met – phe – ser – gly – cys – val

141. (3)
Movement of water through root layers is symplastic in the endodermis as endodermis is impervious to water because of a band of suberised matrix called casparian strips.

142. (2)
In human genome, chromosome 1 has most genes (2968) and chromosome Y has fewest (231) genes.

143. (1)

Pusa shubhra	–	Cauliflower
Pusa komal	–	Cowpea
Prabhani kranti	–	Bhindi
Pusa gaurav	–	*Brassica*

144. (2)
Lipases are enzymes used in detergent formulations used to remove oily stains.

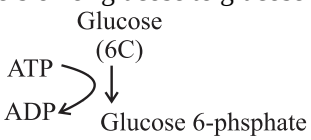
145. (2)
Flocs are masses of bacteria associated with fungal filaments to form mesh like structure. In secondary treatment, there is vigorous growth of useful aerobic microbes which form flocs.

146. (4)

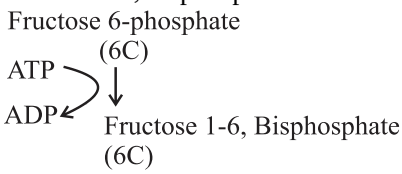
Conformers are organisms that can not maintain constant internal environment. Their body temperature, osmotic concentration of body fluid changes with that of ambient temperature and ambient air, water osmotic concentration.

147. (2)

ATP is utilised in two steps in glycolysis i.e. first in conversion of glucose to glucose 6-phasphate.



next in conversion of fructose 6-phosphate to fructose 1-6, bisphosphate.



A total of two molecules are synthesized during glycolysis.

148. (1)

Rate of formation of new organic matter by consumers is called secondary productively.

149. (2)

Thylacine is a recent extinction noted. It extincted from Australia.

150. (1)

A scrubber remove gases like sulphur-dioxide. It is used to remove pollutants in a chemical industrial plant.

SECTION – IV (ZOOLOGY)

151. (3)

Adamsia is known as sea-anemone.

152. (2)

Coelentrate shows polymorphism. Polyp and medusa are example of polymorphism. Occurrence of the same species in more than one type of individuals, which differ in form (structure) and function from one another, is known as polymorphism.

153. (1)

Process of shedding of exoskeleton at regular interval is ecdysis.

154. (2)

All sponges have high regenerative power.

155. (3)

All chordates have ventral heart. The vertebral column is a curved structure composed of bony vertebrae that are interconnected by cartilaginous intervertebral disc. Cyclostomes have a circular and suctorial mouth. With the exception of crocodiles, with have a four chambered heart, all reptiles have a three chambered heart.

156. (4)

Foregut is lined by chitinous cuticle most digestion, secretory and absorptive activity takes place in midgut.

157. (2)

Smooth muscle fibres do not show striation and taper at both ends.

158. (3)

Cellulose is the most abundant organic compound in the biosphere. Cotton fibre contains largest amount of cellulose. Cellulose is a homopolysaccharide. It does not contain complex helices.

159. (3)

Serine is alcoholic amino acid. Cysteine and methionine are sulphur containing amino acid and histidine in heterocyclic amino acid.

160. (4)

Protein is a heteropolymer, proteins are large macromolecule having one or more polypeptide.

161. (2)

Adenosine is nucleoside.

162. (2)

B-form of DNA has 10 base pairs per farm.

163. (3)

Sugar such as glycogen are characterised by presence of carbonyl and hydroxyl functional group.

164. (1)

Phosphodiester bond is characteristically found in deoxyribonucleic acid.

165. (4)
Lipids are not polymer.

166. (4)
The opening of oesophagus into the stomach is regulated by gastro-oesophageal sphincter.

167. (2)
In mammals complex respiratory system has developed. Mammalian skin is impermeable to gases.

168. (2)
CO_2 transported as bicarbonate as 23%.

169. (2)
The total volume of air present in the lungs after maximum inspiration is RV + ERV + TV + IRV.

170. (1)
The total duration of cardiac cycle is 0.8 second.

171. (2)
Number of action potential that could be generated in a minute varies at different parts of the nodal system.

172. (3)
Ureotelism is found in birds, reptiles and insect.

173. (4)
Kiwi, land snail and lizard excrete nitrogenous waste as uric acid in the form of pellete or paste.

174. (4)
Locomotory structure in macrophages found in tissue are pseudopodia.

175. (3)
The number of vertebrae in human skeleton is 5.

176. (1)
Activity of cerebellum are all involuntary but many involve learning in their early stage.

177. (1)
Depolarisation of neural membrane is caused due to rapid influx of Na^+ ions.

178. (4)
Nervous system differ from endocrine system because in the former response is only limited to only those cells which are innervated by neurons.

179. (3)
Hyposecretion of thyroxine hormone since pregnancy caused stunted growth in human.

180. (3)
Trophoblast is not involved in the formation of body of developing embryo.

181. (2)
Seminal plasma is rich in fructose and calcium.

182. (1)
Male accessory gland secretion are rich in fructose, calcium and some enzyme.

183. (3)
Surgical methods, also called sterilisation, are generally adviced for male/female partner as a terminal method to prevent any more pregnancy. Surgical intervation blocks gamete transport and thereby prevents conception.

184. (2)
Evolutionary biology is the study of history of life form on earth.

185. (1)
Dolphins, seals and sea-cow are the mammals wholly living in water.

186. (4)
Meat was not spoiled when heated and kept in a sealed vessel suggest that simplest living organisms could not have originated spontaneously from non-living matter.

187. (3)
Reason of fast speciation in present day crop plant is polyploidy.

188. (1)
Increasing cranial capacity shows significant trend in the evolution of modern man (*Homo sapiens*) from his ancestors.

189. (1)
Rabies and mumps are caused by virus.

190. (3)
The term ‘active immunity’ means resistance developed after disease.

191. (1)
Saline solution is given to patient of cholera because sodium prevent water loss from body.

192. (1)
NACO is mainly related with AIDS.

193. (2)
Fish meal is a rich source of proteins for cattle and poultry. Fish meal is prepared from non-edible parts of fishes such as tails, fins and bones.

194. (3)
PCR technique is best for DNA amplification.

195. (3)
Addition of antibiotic in chemical engineering process helps in maintaining aseptic condition.

196. (3)
Extraction of bands of DNA of interest from the agrose gel is termed as elution.

197. (1)
PCR proceeds in three steps governed by temperature, they are in order of denaturation, annealing and synthesis.

198. (3)
DNA ligase is considered as molecular glue.

199. (3)
DNA or RNA molecule tagged with radioactive molecule is called probe.

200. (2)
Cry II Ab controls cotton bollworm