Test Series (2023)

Mock Test-08

NEET

DURATION : 200 Minutes	19-04-2023	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. Standing waves are produced in 10 m long stretched string fixed at both ends. If the string vibrates in 5 segments and wave velocity is 20 m/s, the frequency is

(1) 5 Hz (2) 10 Hz

(3) 2 Hz (4) 4 Hz

2. Brewster angle for air to water transition is (refractive index of water is $\frac{4}{3}$)

(1) $\sin^{-1}\frac{3}{4}$ (2) $\cos^{-1}\frac{3}{4}$

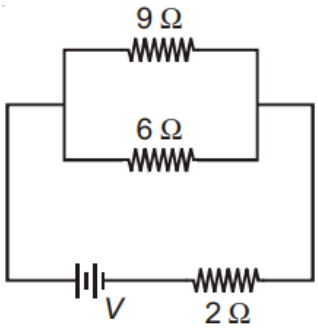
(3) $\tan^{-1}\frac{3}{4}$ (4) $\cot^{-1}\frac{3}{4}$

3. Electric charge q, q and $-2q$ are placed at the corners of an equilateral triangle ABC of side L. The magnitude of electric dipole moment of the system is

(1) qL (2) $2qL$

(3) $\sqrt{3}qL$ (4) $4qL$

4. If power dissipated in the 9Ω resistor in the circuit shown in 36 W, the potential difference across the 2Ω resistor is



(1) 2 V (2) 4 V

(3) 8 V (4) 10 V

5. Under the action of a force, a 2 kg bod moves such that its position x as a function of time t is given by $x=\frac{t^2}{3}$, where x is in metres and t in seconds. The work done by the force in first two seconds is

(1) 1600 J (2) 160 J

(3) 16 J (4) $\frac{16}{9}$ J

6. A coil having number of turns N and area A is rotated in a uniform magnetic field B with angular velocity ω about its diameter. Maximum e.m.f. induced in it is given by

(1) $NAB\omega$ (2) $\frac{NAB}{\omega}$

(3) $\frac{NA\omega}{B}$ (4) $\frac{B\omega}{NA}$

7. If two source have a randomly varying phase difference $\phi(t)$, the resultant intensity will be given by

(1) I_0 (2) $\frac{I_0}{2}$

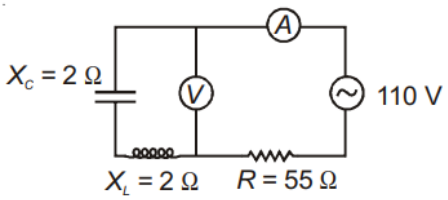
(3) $2I_0$ (4) $\frac{I_0}{\sqrt{2}}$

8. If wavelength of maximum intensity of radiation emitted by Sun and Moon are 0.5×10^{-6} m and 10^{-4} m respectively, then the ratio of their temperature is

(1) $\frac{1}{10}$ (2) $\frac{1}{50}$

(3) 100 (4) 200

9. The reading of ammeter in the circuit is



(1) 2 A (2) 3 A

(3) Zero (4) 1 A

10. A conducting sphere of radius R is given a charge Q. The electric potential and the electric field at the centre of the sphere respectively are

(1) Zero and $\frac{Q}{4\pi\varepsilon_0 R^2}$

(2) $\frac{Q}{4\pi\varepsilon_0 R}$ and zero

(3) $\frac{Q}{4\pi\varepsilon_0 R}$ and $\frac{Q}{4\pi\varepsilon_0 R^2}$

(4) Both are Zero

11. Two objects are thrown up at angles of 45° and 60° respectively, with the horizontal. If both objects attain same vertical height, then the ratio of magnitude of velocities with which these are projected is

(1) $\sqrt{\frac{5}{3}}$ (2) $\sqrt{\frac{3}{5}}$

(3) $\sqrt{\frac{2}{3}}$ (4) $\sqrt{\frac{3}{2}}$

12. A metallic chain 1m long lies on a horizontal surface of a table. The chain starts sliding on the table if 25 cm (or more of it) hangs over the edge of a table. The correct value of the coefficient of friction between the table and the chain is

(1) $\frac{1}{3}$ (2) $\frac{2}{3}$

(3) $\frac{1}{4}$ (4) $\frac{1}{5}$

13. In a standing wave, all particles of the medium cross the mean position with

(1) Different speeds at different instants
(2) Different speeds at same instant
(3) Same speed at different instant
(4) Same speed at same instant

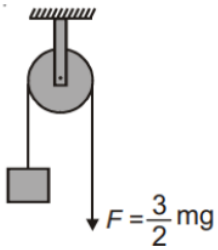
14. A magnet is brought near a coil in two ways (i) rapidly (ii) slowly. The induced charge will be

(1) More in case (i)
(2) More in case (ii)
(3) Equal in both the cases
(4) More or less according to the radius of the coil

15. Albert Einstein was awarded Nobel Prize and his work on

(1) Special theory of relativity
(2) General theory of relativity
(3) Photoelectric effect
(4) Mass-energy equivalence

16. In the arrangement shown, the mass m will ascend with an acceleration (Pulley and rope are massless)



(1) Zero (2) $\frac{g}{2}$

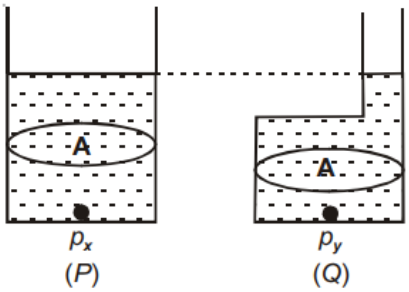
(3) g (4) $2g$

17. Energy stored per unit volume in a stretched wire having Young's modulus Y and stress 'S' is

(1) $\frac{YS}{2}$ (2) $\frac{S^2Y}{2}$

(3) $\frac{S^2}{2Y}$ (4) $\frac{S}{2Y}$

18. Figure shows two containers P and Q with same base area A and each filled upto same height with same liquid. Select the correct alternative



(1) $p_x = p_y$ (2) $p_x > p_y$

(3) $p_x > p_y$ (4) Cannot say

19. When current supplied by a cell to a circuit is 0.3 A, its terminal potential difference is 0.9 V. When the current supplied becomes 0.25 A, its terminal potential difference becomes 1.0 V. The internal resistance of the cell is

(1) 0.5 Ω (2) 2 Ω

(3) 1.2 Ω (4) 1 Ω

20. A particle starts its motion from rest under the action of a constant force. If the distance covered in first 10 seconds is S_1 and that covered in the first 20 seconds is S_2, then

(1) $S_2 = 3S_1$ (2) $S_2 = 4S_1$

(3) $S_2 = S_1$ (4) $S_2 = 2S_1$

21. How many electrons should be removed from a coin of mass 1.6 g, so that it may float in an electric field of intensity 10^9 N/C directed upward?

(1) 9.8×10^7 (2) 9.8×10^5

(3) 9.8×10^3 (4) 9.8×10^1

22. A particle is executing S.H.M. with total mechanical energy 90 J and amplitude 6 cm. If its energy is somehow decreased to 40 J then its amplitude will become

(1) 2 cm (2) 4 cm

(3) 8/3 cm (4) 4/3 cm

23. At what angle will a ray of light be incident on one face on an equilateral prism, so that the emergent ray may graze the second surface of the prism (μ = 2)?

(1) 30° (2) 90°

(3) 45° (4) 60°

24. A millivoltmeter of 25 millivolt range is to be converted into an ammeter of 25 ampere range. The value (in ohm) of necessary shunt will be

(1) 1 (2) 0.05

(3) 0.001 (4) 0.01

25. If magnitude of average speed and average velocity over an interval of time are same, then

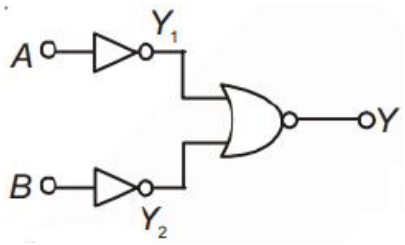
(1) Particle must move with zero acceleration

(2) Particle must move with uniform acceleration

(3) Particle must be at rest

(4) Particle must move in a straight line without turning back

26. Which logic gate is represented by the following combination of logic gates?



(1) NOR (2) OR

(3) NAND (4) AND

27. A boat carrying a number of stones is floating in a water tank. If the stones are unloaded into water, the water level in the tank will

(1) Remain unchanged

(2) Rise

(3) Fall

(4) Rise or fall depends on the number of stones unloaded

28. The electric and the magnetic field, associated with an e.m. wave, propagating along the +z-axis, can be represented by

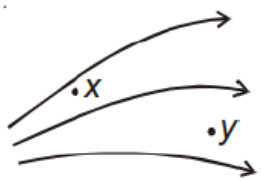
(1) $\left[\vec{E} = E_0\hat{j}, \vec{B} = B_0\hat{k}\right]$

(2) $\left[\vec{E} = E_0\hat{i}, \vec{B} = B_0\hat{j}\right]$

(3) $\left[\vec{E} = E_0\hat{k}, \vec{B} = B_0\hat{i}\right]$

(4) $\left[\vec{E} = E_0\hat{j}, \vec{B} = B_0\hat{i}\right]$

29. Figure shows electric lines on force. If E_x and E_y are the magnitudes of electric field at points x and y respectively, then



(1) $E_x > E_y$ (2) $E_x = E_y$

(3) $E_x < E_y$ (4) Any of these

30. We can reduce random errors by

(1) Taking large number of observations

(2) Corrected zero errors

(3) By following proper technique of experiment

(4) Both (1) and (3)

31. A particle executing simple harmonic motion of amplitude 5 cm has maximum speed of 31.4 cm/s. The frequency of its oscillation is

(1) 3 Hz (2) 2 Hz

(3) 4 Hz (4) 1 Hz

32. The input signal given to a *CE* amplifier having a voltage gain of 150 is $V_i = 2\cos\left(15t + \frac{\pi}{3}\right)$. The corresponding output signal will be

(1) $300\cos\left(15t + \frac{4\pi}{3}\right)$

(2) $300\cos\left(15t + \frac{\pi}{3}\right)$

(3) $75\cos\left(15t + \frac{2\pi}{3}\right)$

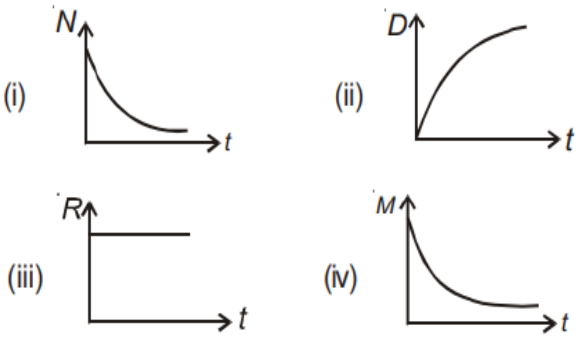
(4) $2\cos\left(15t + \frac{5\pi}{6}\right)$

33. The magnitude of potential energy per unit mass of an object at the surface of earth is E, then the escape velocity of the object is

(1) $\sqrt{2E}$ (2) $4E^2$

(3) $\sqrt{E}$ (4) $2E$

34. In a radioactive decay let N be the number of residual active nuclei, D the number of daughter nuclei, R the rate of decay and M the mass of active sample at any time t. Below are shown four curves.



The correct ones are

(1) (i), (ii) and (iv) (2) (ii), (iii) and (iv)

(3) (iii), (iv) and (i) (4) All of these

35. A nuclei with $Z = 92$ emits the following in a sequence $\alpha, \beta^-, \beta^-, \alpha, \alpha, \alpha, \alpha, \alpha, \beta^-, \beta^-, \beta^+, \alpha\ \beta^+, \alpha$. The Z of the resulting nucleus is

(1) 74 (2) 76

(3) 78 (4) 82

SECTION – B

36. A current i ampere flows in a circular arc of wire which subtends an angle $\frac{3\pi}{2}$ radian at its centre, whose radius is R. The magnetic field B at its centre is

(1) $\frac{\mu_0 i}{R}$ (2) $\frac{3\mu_0 i}{2R}$

(3) $\frac{3\mu_0 i}{4R}$ (4) $\frac{3\mu_0 i}{8R}$

37. The decreasing order of wavelength of infrared, microwave, ultraviolet and gamma rays is

(1) Infrared, microwave, ultraviolet, gamma rays

(2) Microwave, infrared, ultraviolet, gamma rays

(3) Gamma rays, ultraviolet, infrared, microwaves

(4) Microwaves, gamma rays, infrared, ultraviolet

38. A sample of an ideal gas undergoes an isothermal expansion. If dQ, dU and dW represented the amount of heat supplied, the change in internal energy and the work done respectively, the

(1) dQ = +ve and dU = +ve, dW = +ve

(2) dQ = +ve and $dU = 0$, dW = +ve

(3) dQ = +ve and dU = +ve, $dW = 0$

(4) dQ = –ve and dU = –ve, dW = –ve

39. When an electron is excited to n^{th} energy state in hydrogen, the possible number of spectral lines emitted are

(1) n (2) $2n$

(3) $\frac{n^2 - n}{2}$ (4) $\frac{n^2 + n}{2}$

40. Magnetic susceptibility for a diamagnetic substance is

(1) Large and positive

(2) Large and negative

(3) Small and positive

(4) Small and negative

41. An object placed in front of a concave mirror of focal length 0.15 m produces a virtual image, which is twice the size of the object. The position of the object with respect to the mirror is

(1) –5.5 cm (2) –6.5 cm

(3) –7.5 cm (4) –8.5 cm

42. Two persons of masses 55 kg and 65 kg respectively, are at the opposite ends of a boat. The length of the boat is 3.0 m and weighs 100 kg. The 55 kg man walks up to the 65 kg man and sits with him. If the boat is in still water the center of mass of the system shifts by

(1) Zero

(2) 0.75m

(3) 3.0 m

(4) 2.3 m

43. The energy of a photon of wavelength λ is given by

(1) $h\lambda$ (2) $ch\lambda$

(3) $\frac{\lambda}{hc}$ (4) $\frac{hc}{\lambda}$

44. A current loop in a magnetic field

(1) Can be in equilibrium in one orientation

(2) Can be in equilibrium in two orientations, both the equilibrium states are unstable

(3) Can be in equilibrium in two orientations, one stable while the other is unstable

(4) Experiences a torque whether the field is uniform or non-uniform in all orientations

45. If an a plano-convex lens, radius of curvature of convex surface is 10 cm and the focal length of lens is 30 cm, the refractive index of the material of the lens will be

(1) 1.5

(2) 1.66

(3) 1.33

(4) 3

46. If hydrogen gas is heated to a very high temperature, then the fraction of energy possessed by gas molecules correspond to rotational motion

(1) $\frac{3}{5}$ (2) $\frac{2}{7}$

(3) $\frac{3}{7}$ (4) $\frac{2}{5}$

47. Eddy currents are induced when

(1) A metal block is kept in a changing magnetic field

(2) A metal block is kept in a uniform magnetic field

(3) A coil is kept in a uniform magnetic field

(4) Current is passed in a coil

48. A photon and an electron both have wavelength 1Å. The ratio of energy of photon to that of electron is

(1) 1 (2) 0.012

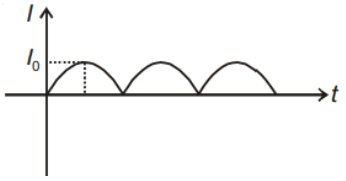
(3) 82.7 (4) 10^{-10}

49. A body constrained to move in z direction is subjected to a force given by $\vec{F} = (3\hat{i} - 10j + 5\hat{k})N$. What is the work done by this force in moving the body through a distance of 5 m along z-axis?

(1) 15 J (2) –15 J

(3) –50 J (4) 25 J

50. The output current versus time curve for a rectifier is shown in the figure. The average value of output current in this case is



(1) 0 (2) $\frac{I_0}{2}$

(3) $\frac{2I_0}{\pi}$ (4) I_0

SECTION-II (CHEMISTRY)

SECTION-A

51. The amine that does not react with acetyl chloride is

(1) CH_3NH_2 (2) $(CH_3)_2NH$

(3) $(CH_3)_3N$ (4) None of these

52. The standard enthalpy of formation $\left(\Delta_f H^0_{298}\right)$ for methane, CH_4 is –74.9 kJ mol^{-1}. In order to calculate the average energy given out in the formation of a C-H bond from this it is necessary to know which one of the following?

(1) The dissociation energy of the hydrogen molecule, H_2.

(2) The first four ionisation energies of carbon.

(3) The dissociation energy of H_2 and enthalpy of sublimation of carbon (graphite).

(4) The first four ionisation energies of carbon and electron affinity of hydrogen.

53. Which of the following is not formed when glycerol reacts with HI?

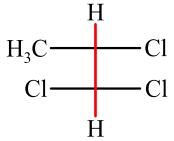
(1) CH_2=CH–CH_2I

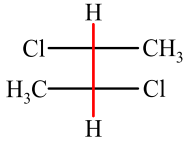
(2) CH_2 (OH)–CH(I)–CH_2OH

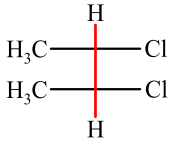
(3) CH_3–CH=CH_2

(4) CH_3–CH(I)–CH_3

54. Which of the following is optically inactive?

(1) 

(2) 

(3) 

(4) None of these

55. The reaction of zinc with dilute and concentrated nitric acid respectively, produces

(1) N_2O and NO_2 (2) NO_2 and NO

(3) NO and N_2O (4) NO_2 and N_2O

56. Which of the following is a biodegradable polymer?

(1) Polythene (2) Bakelite

(3) PHBV (4) PVC

57. In which of the following compounds, iron has the lowest oxidation number?

(1) $[Fe(CO)_5]$

(2) Fe_2O_3

(3) $K_4[Fe(CN)_6]$

(4) $FeSO_4 \cdot (NH_4)_2SO_4 \cdot 6H_2O$

58. The solubility of silver bromide in hypo solution is due to the formation of

(1) $[Ag(S_2O_3)_2]^{3-}$ (2) Ag_2SO_3

(3) $[Ag(S_2O_3)]^-$ (4) $Ag_2S_2O_3$

59. The cell constant of a given cell is 0.47 cm^{-1}. The resistance of a solution placed in this cell is measured to be 31.6 ohm. The conductivity of the solution (in S cm^{-1} where S has usual meaning) is

(1) 0.15 (2) 1.5

(3) 0.015 (4) 150

60. The reagent (s) which can be used to distinguish acetophenone from benzophenone is

(1) 2, 4- Dinitrophenylhydrazine

(2) Aqueous solution of $NaHSO_3$

(3) Benedict's reagent

(4) I_2 and NaOH

61. Which one of the following pairs of elements is called 'chemical twins' because of their very similar chemical properties?

(1) Mn and W

(2) Mo and Tc

(3) Fe and Re

(4) Hf and Zr

62. The end product (C) in the following sequence of reactions is:

$$HC \equiv CH \xrightarrow[20\%H_2SO_4]{1\%HgSO_4} A \xrightarrow[H_2O]{CH_3MgX} B \xrightarrow{[O]} (C)$$

(1) Acetic acid
(2) Isopropyl alcohol
(3) Acetone
(4) Ethanol

63. **Statement-1:** Jet aeroplane flying at high altitude need pressurization of the cabin.

Statement-2: Oxygen is not present at higher altitude.

(1) Statement I is incorrect but Statement II is true.
(2) Both Statement I and Statement II are true.
(3) Both Statement I and Statement II are false.
(4) Statement I is correct but Statement II is false.

64. Which one of the following statement is not true?

(1) The conjugate base of $H_2PO_4^-$ is HPO_4^{2-}.
(2) pH + pOH = 14 for all aqueous solutions.
(3) The pH of 1×10^{-8} M HCl is 8.
(4) Ammonia is a Lewis base.

65. An element has bcc structure having unit cells 12.08×10^{23}. The number of atoms in these cells is:

(1) 12.08×10^{23} (2) 24.16×10^{23}
(3) 48.38×10^{23} (4) 12.08×10^{22}

66. In which of the following, resonance will be possible?

(1) $CH_3–CH_2–CH_2$-CHO
(2) CH_2=CH-CH=O
(3) $CH_3\,COCH_3$
(4) CH_2=CH–CH_2–CH=CH_2

67. The oxide which is the anhydride of orthophosphoric acid, is

(1) P_4O_{10} (2) P_2O_5
(3) P_4O_6 (4) P_2O_3

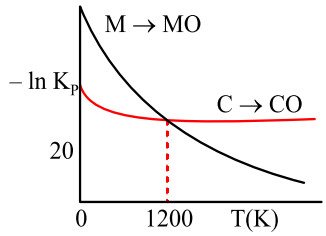
68. The ether that undergoes electrophilic substitution reactions is

(1) $CH_3OC_2H_5$
(2) $C_6H_5OCH_3$
(3) CH_3OCH_3
(4) $C_2H_5OC_2H_5$

69. The plot shows the variation of $\ln K_P$ versus temperature for the two reactions.

$$M(s) + \frac{1}{2}O_2(g) \rightarrow MO(s)$$

$$C(s) + \frac{1}{2}O_2(g) \rightarrow CO(s)$$



Identify the correct statement:

(1) At T < 1200 K, oxidation of carbon is unfavourable.
(2) Oxidation of carbon is favourable at all temperatures.
(3) At T < 1200 K, the reaction MO(s) + C(s) → M(s) + CO(g) is spontaneous.
(4) At T > 1200 K, carbon will reduce MO (s) to M(s).

70. For preparing a buffer solution of pH 6 by mixing sodium acetate and acetic acid, the ratio of the concentration of salt and acid should be ($K_a = 10^{-5}$):

(1) 1 : 10 (2) 10 : 1
(3) 100 : 1 (4) 1 : 100

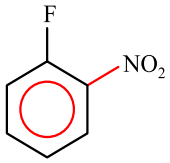
71. The activation energy for a hypothetical reaction, A → Product, is 12.49 kcal/mole. If temperature is raised from 295 to 305 K, the rate of reaction increased by

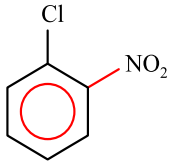
(1) 60% (2) 100%
(3) 50% (4) 20%

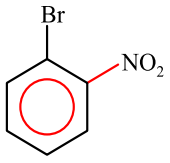
72. For the reaction, $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$, the standard free energy is $\Delta G° > 0$. The equilibrium constant (K) would be:

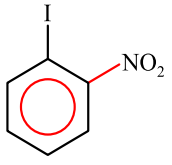
(1) K = 0 (2) K > 1
(3) K = 1 (4) K < 1

73. Which of the following compounds will undergo substitution of the halogen atom most readily with CH_3ONa in CH_3OH?

(1) 

(2) 

(3) 

(4) 

74. An organic compound, C_3H_6O does not give a precipitate with 2,4-dinitrophenylhydrazine reagent and does not react with metallic sodium. It could be:

(1) $CH_3–CH_2–CHO$ (2) $CH_2=CH–CH_2OH$

(3) $CH_3–CO–CH_3$ (4) $CH_2=CH–O–CH_3$

75. Among the following oxoacids, the correct decreasing order of acid strength is:

(1) $HClO_2 > HClO_4 > HClO_3 > HOCl$

(2) $HOCl > HClO_2 > HClO_3 > HClO_4$

(3) $HClO_4 > HOCl > HClO_2 > HClO_3$

(4) $HClO_4 > HClO_3 > HClO_2 > HOCl$

76. Given below are two statements.

Statement I: Frenkel defects are vacancy as well as interstitial defects.

Statement II: Frenkel defect leads to colour in ionic solids due to presence of F-centres.

Choose the most appropriate answer for the statements from the options given below:

(1) Statement I is incorrect but Statement II is true.

(2) Both Statement I and Statement II are true.

(3) Both Statement I and Statement II are false.

(4) Statement I is correct but Statement II is false.

77. An unknown metal M displaces nickel from nickel (II) sulphate solution but does not displace manganese from manganese sulphate solution. Which order represents the correct order of reducing power?

(1) Mn > Ni > M

(2) Ni > Mn > M

(3) Mn > M > Ni

(4) M > Ni > Mn

78. From the following statements regarding H_2O_2, choose the incorrect statement:

(1) It has to be stored in plastic or wax lined glass bottles in dark.

(2) It has to be kept away from dust.

(3) It can act only as an oxidizing agent.

(4) It decomposes on exposure to light.

79. Which of the following statement is not correct?

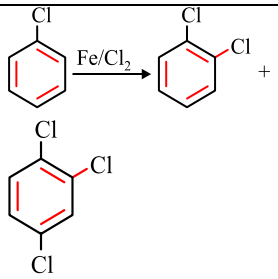
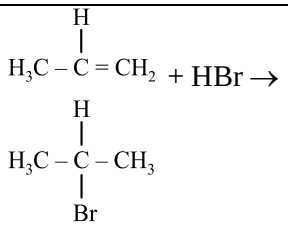
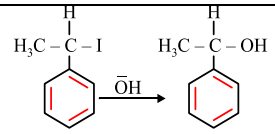
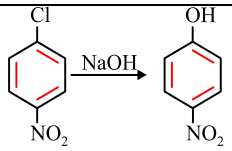
(1) La $(OH)_3$ is less basic than Lu $(OH)_3$.

(2) La is actually an element of transition series rather than lanthanoids.

(3) Atomic radius of Zr and Hf is same.

(4) In lanthanoid series, the ionic radius of Lu^{3+} is smallest.

80. Match the reactions given in column I with the types of reactions given in Column II:

	Column-I		**Column-II**
(A)		1	Nucleophilic aromatic substitution reaction
(B)		2	Electrophilic aromatic substitution
(C)		3	Saytzeff elimination
(D)		4	Electrophilic addition
		5	Nucleophilic substitution reaction

(1) A→2, B→4, C→5, D→1

(2) A→3, B→1, C→5, D→2

(3) A→5, B→4, C→3, D→2

(4) A→4, B→5, C→3, D→2

81. At STP, the order of root mean square speed of molecules H_2, N_2, O_2 and HBr is:

(1) $H_2 > N_2 > O_2 > HBr$

(2) $HBr > O_2 > N_2 > H_2$

(3) $HBr > H_2 > O_2 > N_2$

(4) $N_2 > O_2 > H_2 > HBr$

82. Which of the following is not true?

(1) Some disinfectants can be used as antispetics.

(2) Sulphadiazine is a synthetic antibacterial.

(3) Aspirin is analgesic as well as antipyretic.

(4) Polystyrene is used to make non-stick cookware.

83. A solution is prepared by mixing 8.5 g of CH_2Cl_2 and 11.95 g of $CHCl_3$. If vapour pressure of CH_2Cl_2 and $CHCl_3$ at 298 K are 415 and 200 mm Hg respectively, the mole fraction of $CHCl_3$ in vapour form is:

(Molar mass of Cl = 35.5 g mol^{-1})

(1) 0.162 (2) 0.675

(3) 0.325 (4) 0.486

84. Match list I with list II and select the correct answer using the codes given below the lists:

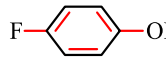
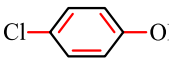
	List I		List II
I.	Cyanide process	A.	Ultrapure Ge
II.	Floatation process	B.	Pine oil
III.	Electrolytic reduction	C.	Extraction of Al
IV.	Zone refining	D.	Extraction of Au

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

85. Chromyl chloride oxidises toluene to benzaldehyde, this reaction is known as
(1) Rosenmund reaction
(2) Wurtz reaction
(3) Etard reaction
(4) Fittig reaction

SECTION-B

86. Dissolving 120 g of a compound of (mol. wt. 60) in 1000 g of water gave a solution of density 1.12 g/mL. The molarity of the solution is:
(1) 1.00 M
(2) 2.00 M
(3) 2.50 M
(4) 4.00 M

87. **Assertion:**  is less acidic than  .

Reason: F exerts better + mesomeric effect than Cl.
(1) If both assertion and reason is true and reason is the correct explanation of assertion.
(2) If both assertion and reason is true but reason is not the correct explanation of assertion.
(3) If assertion is true but reason is false.
(4) If both assertion and reason are false.

88. A particle A moving with a certain velocity has the de-Broglie wavelength of 1 Å. For particle B with mass 25% of A and velocity 75% of A, calculate the de-Broglie wavelength of particle B.
(1) 3 Å
(2) 5.33 Å
(3) 6.88 Å
(4) 0.48 Å

89. The rate constant of reaction A → B is 0.6×10^{-3} mole per litre per second. If the concentration of A is 5 M, then concentration of B after 20 minutes is:
(1) 0.36 M
(2) 0.72 M
(3) 1.08 M
(4) 3.60 M

90. In a reaction A + B ⇌ C + D, the initial concentrations, of A and B were 0.9 mol dm^{-3} each. At equilibrium the concentration of D was found to be 0.6 mol dm^{-3}. What is the value of equilibrium constant for the reaction?
(1) 8 (2) 4
(3) 9 (4) 3

91. Transition elements form binary compounds with halogens, which of the following elements will form MF_3 type compounds?
(1) Cr (2) Zn
(3) Cu (4) Ni

92. An organic compound "A" on treatment with benzene sulphonyl chloride gives compound B. B is soluble in dil. NaOH solution. Compound A is:
(1) $C_6H_5–N(CH_3)_2$
(2) $C_6H_5–CH_2NHCH_3$
(3) $C_6H_5 — \underset{\displaystyle CH_3}{\underset{|}{CH}} — NH_2$
(4) $C_6H_5–NHCH_2CH_3$

93. Number of electrons transferred in each case when $KMnO_4$ acts as an oxidising agent to give MnO_2, Mn^{2+}, $Mn(OH)_3$ and MnO_4^{2-} are respectively.
(1) 3,5,4 and 1
(2) 4,3,1 and 5
(3) 1,3,4 and 5
(4) 5,4,3 and 1

94. For a reaction of type A + B ⟶ products, it is observed that doubling concentration of A causes the reaction rate to be four times as great, but doubling the amount of B does not affect the rate. The rate equation is:
(1) Rate = k[A][B]
(2) Rate = $\frac{k}{4}$ $[A]^2$
(3) Rate = $k[A]^2 [B]^0$
(4) Rate = $k[A]^2 [B]^2$

95. Which one of the following characteristics of the transition metal is associated with their catalytic activity?

(1) Variable oxidation states
(2) Colour of hydrated ions
(3) Paramagnetic behaviour
(4) High enthalpy of atomization

96. Which one of the following statements regarding helium is correct?

(1) It is used in gas-cooled nuclear reactors.
(2) It is used to produce and sustain powerful super conducting magnets.
(3) It is used as a cryogenic agent for carrying out experiments at low temperatures.
(4) All are correct.

97. Potassium ferrocyanide yields a chocolate brown precipitate with

(1) Copper salts
(2) Ferric salts
(3) Ferrous salts
(4) Silver salts

98. Green chemistry in day-to-day life is in the use of:

(1) Chlorine for bleaching of paper.
(2) Large amount of water alone for washing clothes.
(3) Tetrachloroethene for laundry.
(4) Liquified CO_2 for dry cleaning of clothes.

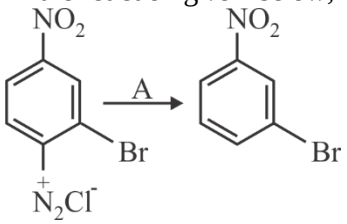
99. Match List-I and List-II.

	List-I		**List-II**
A	$R-\overset{\overset{O}{\|\|}}{C}-Cl \rightarrow R-CHO$	(i)	$Br_2/NaOH$
B	$R-CH_2-COOH \rightarrow R-\underset{\underset{Cl}{\|}}{CH}-COOH$	(ii)	$H_2/Pd\text{-}BaSO_4$
C	$R-\overset{\overset{O}{\|\|}}{C}-NH_2 \rightarrow R-NH_2$	(iii)	Zn(Hg)/Conc.HCl
D	$R-\overset{\overset{O}{\|\|}}{C}-CH_3 \rightarrow R-CH_2-CH_3$	(iv)	Cl_2/Red P, H_2O

Choose the correct answer from the options given below:

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

100. In the reaction given below, what would be A?



(1) $HgSO_4/H_2SO_4$ (2) Cu_2Cl_2
(3) H_3PO_2 and H_2O (4) H^+/H_2O

SECTION-III (BOTANY)

SECTION – A

101. Select the correct classification for the given plant.

	Division	**Class**	**Order**	**Family**
(1)	Plantae	Angiospermae	Asteraceae	Asteraceae
(2)	Angiospermae	Dicotyledonae	Asterales	Asteraceae
(3)	Angiospermae	Dicotyledonae	Polymoniales	Compositae
(4)	Dicotyledonae	Asteraceae	Asterales	Compositae

102. Coenocytic mycelium is

(1) Uninucleate, septate
(2) Multinucleate, septate
(3) Multinucleate, aseptate
(4) Both (2) and (3).

103. Major photosynthetic pigments in green algae are

(1) Chl *a* and *b*
(2) Chl *a*, *c* and fucoxanthin
(3) Chl *a*, *d*/and phycoerythrin
(4) Chl *a* and *c*.

104. Which type of sexual reproduction is found in *Volvox*?

(1) Isogamous (2) Anisogamous
(3) Oogamous (4) All of these

105. Which of the following represents the edible swollen portion of *Allium cepa*?
(1) Aerial stem
(2) Roots
(3) Internodes
(4) Leaf bases

106. If the gynoecium is present in the topmost position of the thalamus, then the flower is referred to as
(1) Hypogynous
(2) Perigynous
(3) Epigynous
(4) None of these

107. Radial vascular bundles characteristically occur in
(1) Monocot and dicot stems
(2) Monocot and dicot leaves
(3) Monocot and dicot roots
(4) All of these.

108. Which of the following tissue systems constitutes bulk of the plant body?
(1) Epidermal tissue system
(2) Ground tissue system
(3) Vascular tissue system
(4) Both (1) and (3)

109. Match the cell organelles given in **column-I** with cellular processes in **column-II** and select the correct option from the codes given below.

column-I		**column-II**	
A.	Lysosome	(i)	Protein synthesis
B.	Ribosomes	(ii)	Hydrolytic activity
C.	Smooth endoplasmic	(iii)	Steroid synthesis
D.	Centriole	(iv)	Formation of spindle

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

110. Which of the following statements is incorrect for centrioles?
(1) Both the centrioles in a centrosome lie perpendicular to each other.
(2) Central proteinaceous hub is missing in a centriole.
(3) Each centriole has an organisation like that of a cartwheel.
(4) Centrosome usually contains 2 cylindrical centrioles.

111. Which of the following is not the feature of meiosis?
(1) Meiosis involves two sequential cycles of nuclear and cell division, meiosis I and meiosis II but only a single cycle of DNA replication.
(2) Meiosis I is initiated after the parental chromosomes have replicated to produce identical sister chromatids at the S-phase.
(3) Meiosis involves pairing of non-homologous chromosomes and recombination between them.
(4) Four haploid cells are formed at the end of meiosis II.

112. At which stage, the homologous chromosomes separate due to repulsion, but are yet held by chiasmata?
(1) Zygotene (2) Pachytene
(3) Diplotene (4) Diakinesis

113. Read the given statements and select the correct option.
Statement 1: Plant cells do not rupture when placed in distilled water.
Statement 2: Animal cells rupture when placed in distilled water.
(1) Both statements 1 and 2 are correct.
(2) Statement 1 is correct but statement 2 is incorrect
(3) Statement 1 is incorrect but statement 2 is correct
(4) Both statements 1 and 2 are incorrect.

114. A plasmolysed cell can be deplasmolysed by placing it in
(1) Pure water or hypotonic solution
(2) Hypertonic solution
(3) Isotonic solution
(4) Saturated solution.

115. Which of the four most abundant elements in most plants (C, H, 0 and N), does a terrestrial green plant procure mainly through its roots from the soil?
(1) H and O (2) H and N
(3) C and O (4) O and N

116. If by radiation all nitrogenase enzyme is inactivated, then there will be no
(1) Fixation of nitrogen in legumes
(2) Conversion of nitrate into nitrogen
(3) Conversion from nitrate to nitrite in legumes
(4) Conversion from ammonium to nitrate in soil.

117. Select the incorrect statement with respect to Kranz anatomy.
(1) Undifferentiated mesophyll occurs in concentric layers around vascular bundles.
(2) The word Kranz represents arrangement of cells.
(3) Large sized bundle sheath cells are arranged in a wreath-like manner in one to several layers.
(4) Bundle sheath cells are characterised by few chloroplast and thin walls, pervious to gaseous exchange

118. Which of the following statement about dark reactions is correct
(1) They occur in darkness.
(2) They are not light dependent completely.
(3) They are dependent upon the products synthesised during light reactions.
(4) All of these

119. The pathway of respiration common in all living organisms is X; it occurs in the Y and the products formed are two molecules of Z.
Identify X, Y and Z in the above paragraph and select the correct answer.

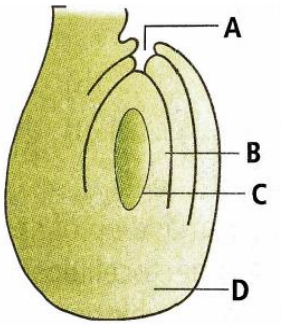
	X	Y	Z
(1)	EMP pathway	Mitochondrion	Pyruvic acid
(2)	EMP pathway	Cytoplasm	Pyruvic acid
(3)	Krebs' cycle	Cytoplasm	Acetyle CoA
(4)	Krebs' cycle	Mitochondrion	Acetyle CoA

120. As per chemiosmotic coupling hypothesis, in mitochondria, protons accumulate in the
(1) Outer membrane
(2) Inner membrane
(3) Intermembrane space
(4) Matrix.

121. Which of the following is an example of differentiation?
(1) Lignocellulosic wall thickenings of tracheids
(2) Loss of nucleus, vacuolisation and end wall perforations in sieve tube elements
(3) Elongation, thickening and emptying of sclerenchyma fibres
(4) All of these

122. Ethylene is used for
(1) Retarding ripening of tomatoes
(2) Hastening of ripening of fruits
(3) Slowing down ripening of apples
(4) Both (2) and (3).

123. Identify the parts labelled as A, B, C and D in the given figure and select the correct option



	A	B	C	D
(1)	Chalaza	Female gametophyte	Embryo sac	Micropyle
(2)	Chalaza	Nucellus	Embryo sac	Micropyle
(3)	Micropyle	Egg	Embryo sac	Chalaza
(4)	Micropyle	Nucellus	Embryo sac	Chalaza

124. Which of the following is not a water pollinated plant?
(1) *Zostera*
(2) *Vallisneria*
(3) *Hydrilla*
(4) *Cannabis*

125. Some of the dominant traits studied by Mendel were
(1) Round seed shape, green seed colour and axial flower position
(2) Terminal flower position, green pod colour and inflated pod shape
(3) Violet flower colour, green pod colour and round seed shape
(4) Wrinkled seed shape, yellow pod colour and axial flower position.

126. Mendel formulated the law of segregation" on the basis of
(1) Monohybrid cross
(2) Dihybrid cross
(3) Test cross
(4) Back cross.

127. First experimental proof for semi-conservative DNA replication was shown in
(1) *Streptococcus pneumoniae*
(2) *Escherichia coli*
(3) *Neurospora crassa*
(4) *Rattus rattus.*

128. Which of the following statements regarding 'human genome' is incorrect?

(1) Human genome consists of 3×10^9 bp and about 30,000 genes.

(2) The average gene size is 3000 bp and dystrophin is the largest known human gene.

(3) Chromosome 1 contains maximum (2968) number of genes and Y-chromosome has the least (231) number of genes.

(4) Repeated (or repetitive) sequences are not present in human genome.

129. Arrange the various steps of DNA fingerprinting technique in the correct order.

(i) Separation of DNA fragments by electrophoresis.

(ii) Digestion of DNA by restriction endonucleases.

(iii) Hybridisation using labelled VNTR probe.

(iv) Isolation of DNA.

(v) Detection of hybridised DNA fragments by autoradiography.

(vi) Transferring the separated DNA fragments to nitrocellulose membrane.

(1) (iv) → (ii) → (i) → (vi) → (iii) → (v)

(2) (iv) → (i) → (ii) → (iii) → (vi) → (v)

(3) (ii) → (i) → (iv) → (vi) → (iii) → (v)

(4) (iii) → (v) → (iv) → (ii) → (i) → (vi)

130. Select the option showing the correct sequential steps to produce a new genetic variety of a crop.

(1) Selection of parents Hybridisation of selected parents Germplasm collection → Selection of superior recombinants → Testing and release of new varieties

(2) Germplasm collection → Selection of parents → Hybridisation of selected parents → Selection of superior recombinants → Testing and release of new varieties

(3) Selection of superior recombinants → Germplasm collection → Hybridisation of selected parents → Selection of parents → Testing and release of new varieties

(4) Germplasm collection → Selection of parents → Hybridisation of selected parents → Testing and release of new varieties → Selection of superior recombinants

131. 250 g of *Methylophilus methylotrophus* can be expected to produce ____ tonnes of protein.

(1) 15 (2) 25

(3) 40 (4) 50

132. Read the following statements and select the incorrect one.

(1) The dough used for making dosa and idli is fermented by bacteria.

(2) Microbes are used to ferment fish, soybean and bamboo shoots to make food.

(3) The large holes in 'Swiss cheese' are due to production of large amount of CO_2 by a fungi called *Propionibacterium shermanii*.

(4) 'Toddy' is a traditional drink of Southern India made by fermentation by microbes.

133. The purpose of biological treatment of waste water is to

(1) Reduced BOD

(2) Increase BOD

(3) Reduced sedimentation

(4) Increase sedimentation.

134. A microbial biocontrol agent that can be used to control butterfly caterpillars is

(1) *Trichoderma polysporum*

(2) *Bacillus thuringiensis*

(3) *Streptococcus*

(4) Mycorrhiza

135. Exponential growth is observed in a population when

(1) Resources in the habitat are unlimited

(2) Each species has the ability to realise its full innate potential

(3) Both (1) and (2)

(4) None of these.

SECTION – B

136. Which of the following statements is incorrect?

(1) A population has certain attributes which an individual does not have.

(2) Tiger census in our National parks and tiger reserves is often based on pug marks.

(3) If a new habitat is being colonised, birth rate may contribute more significantly than immigration to population growth.

(4) Both (1) and (3)

137. Pyramid of biomass for a grazing food chain represents

(1) Gradual decrease in biomass from apex to base

(2) Gradual decrease in biomass from producers to the tertiary consumers

(3) Gradual increase of the biomass from producers to the tertiary consumers.

(4) No change in biomass.

138. Out of the total proposed cost of various ecosystem services, cost of climate regulations and habitat for wildlife are

(1) 50% (2) 10%
(3) 6% (4) 25%

139. Organisation responsible for maintaining Red list is

(1) IUCN (2) WWF
(3) CITES (4) IBWL

140. Which of the following is a reason for the greater biological diversity of tropical regions?

(1) Tropical latitudes have remained almost undisturbed for millions of years.
(2) Tropical environments are less seasonal, relatively more constant and predictable.
(3) More solar energy is available in the tropics, resulting in high productivity.
(4) All of these

141. The term 'terror of Bengal' is used for

(1) Algal bloom
(2) *Eichhornia crassipes*
(3) Increased biochemical oxygen demand
(4) Eutrophication.

142. Polyblend is

(1) A mixture of two different types of plastics
(2) A fine powder of recycled modified plastic
(3) A blend of plastic and benzene
(4) None of these.

143. A marriage between a colour-blind man and a normal woman produces.

(1) All carrier daughters and normal sons
(2) 50% carrier daughter, 50% normal daughters
(3) 50% colour-blind son, 50% normal sons
(4) All carrier off springs.

144. Watson and Crick (1953) proposed DNA double helix model and won the Nobel Prize; their model of DNA was based on

(i) X- ray diffraction studies of DNA done by Wilkins and Franklin
(ii) Chargaff's base equivalence rule
(iii) Griffith's transformation experiment
(iv) Meselson and Stahl's experiment.

(1) (i), (ii) and (iv) (2) (i) and (ii)
(3) (iii) and (iv) (4) (i), (ii), (iii) and (iv)

145. In **C4** plants, Calvin cycle enzymes are presents in

(1) Chloroplasts of mesophyll cells
(2) Chloroplasts of bundle sheath cells
(3) Cytoplasm of guard cells
(4) Cytoplasm of epidermal cells.

146. Which of the following cellular metabolic processes can occur both in the presence or absence of O_2?

(1) Glycolysis
(2) Fermentation
(3) TCA cycle
(4) Electron transport coupled with chemiosmosis

147. Find out the incorrect match.

(1) Sterile stamen - Staminode
(2) Stamens attached to petals - Epipetalous
(3) Stamens attached to perianth- Episepalous
(4) Free stamens- Polyandrous

148. The prebiotic atmosphere of the earth was of a reducing nature. It was transformed into an oxidising atmosphere of present day due to the emergence of

(1) Cyanobacteria
(2) Angiosperms
(3) Photosynthetic protists
(4) Eukaryotic algae.

149. Which of the following statements is not correct regarding jhum cultivation?

(1) It is also called as shifting cultivation and has resulted in deforestation.
(2) It helps in increasing crop yield to a considerable extent.
(3) A time-gap of several years is required for the recovery of the land after cultivation.
(4) It involves cutting down of trees of the forest, burning of the plant remains and then using the land for farming.

150. **Assertion:** The endomembrane system includes endoplasmic reticulum (ER), Golgi complex, lysosomes and vacuoles.

Reason: Mitochondria, chloroplast and peroxisomes are not the part of endomembrane system because their functions are not coordinated with the same.

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

SECTION-IV (ZOOLOGY)

SECTION – A

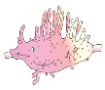
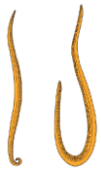
151. Select the correct statements with respect to cyclostomes:

(a) They have paired fins.
(b) They have circular mouth without Jaws.
(c) They bear 6-15 pairs of gills.
(d) They migrate to deep sea for spawning.

Choose the most appropriate answer from the options given below :

(1) (a) and (b) only (2) (b) and (c) only
(3) (b) and (d) only (4) (a) and (d) only

152. Choose the most appropriate answer from the options given below :

	Animal	Phylum	Characters
(1)		Cnidaria	Found in polyp form, it's common name is jellyfish
(2)		Cnidaria	Coral-made up of $CaCO_3$
(3)		Aschelminthes	Developed muscular pharynx, Pseudocoelomate
(4)		Arthropoda	Body is covered by calceseous shell, Respiration by book-lungs

153. Which one of the following animal shows bioluminiscence?

(1) *Hydra*
(2) *Pleurobrachia*
(3) *Aurelia*
(4) *Obelia*

154. Find out the correct statement with respect to Bone :-

(1) Matrix is hard
(2) Having solid and pliable intracellular material which can resist compression
(3) Chondrocytes are enclosed in small cavities
(4) At very few locations in vertebrates cartilage replacement occur by bone

155. The cell junctions called tight, adhering and gap junctions are mostly found in which type of tissues?

(1) Muscular tissue
(2) Epithelial tissue
(3) Connective tissue
(4) Neural tissue

156. Female genital aperture of earthworm is located in the segment :-

(1) 5 to 9
(2) 14
(3) 17 and 19
(4) 18

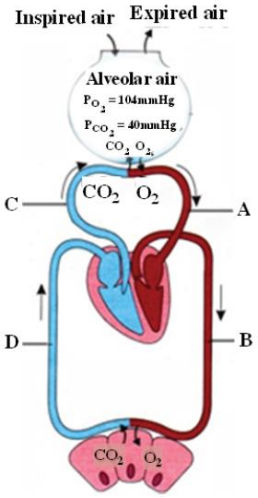
157. **Assertion :** The sight, smell and presence of food in the oral cavity can stimulate secretion of saliva.
Reason : Salivary amylase works at pH-6.8.

(1) Both assertion & reason are true & the reason is a correct explanation of the assertion.
(2) Both assertion & reason are true but reason is not a correct explanation of the assertion.
(3) Assertion is true but the reason is false.
(4) Both assertion & reason are false.

158. What will happen if the secretion of oxyntic cells of the gastric glands is blocked with an inhibitor?

(1) Gastric juice will be deficient in gastric lipase
(2) Absorption of vit B12 will remain occur
(3) In the absence of secretion, pH will fall in stomach
(4) Protein will not be digested in stomach

159. Identify the various sites of circulatory system labelled A, B, C, D in diagram.



(1) A - PO_2 = 104 mm Hg
(2) B - PO_2 = 40 mm Hg
(3) C - PCO_2 = 40 mm Hg
(4) D - PCO_2 = 40 mm Hg

160. Match the terms given in column I with their physiological processes given in Column II and choose the correct answer.

Column-I		Column-II	
A	Proximal convoluted tubule	i	Formation of concenterated urine
B	Distal convoluted tubule	ii	Absorption of small amount of area
C	Henle's loop	iii	Reabsorption of Nutrients
D	Countercurrent mechanism	iv	Conditional reabsorption
E	Collecting duct	v	Maintenance of concentration gradient in medulla

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

161. Urea, $NaHCO_3$, K^+, H^+, NH_3, uric acid, CO_2 bilirubin, cholesterole oxalate salt, NaCl
How many of the substances given above causes an increasing osmotic gredient in renal matrix
(1) Two (2) Six
(3) Eight (4) Four

162. How many of the following statements is/are correct?
(A) The number of RBC in human female is 5.5 to 6.0 billions/mm .
(B) WBCs are the most abundant cells of blood.
(C) Human RBCs is oval and non nucleated.
(D) Average life span of RBCs is 120 days.
(1) 1 (2) 2
(3) 3 (4) 4

163. In which the following group ventricle pumps out mixed blood?
(1) Mammals (2) Amphibia
(3) Birds (4) Fishes

164. Find out incorrect statement :
(1) In heart attack, heart muscles are suddenly damaged
(2) 130/90 is hypotension
(3) Heart failure and cardiac arrest are different
(4) Angina pectoris is identified as acute chest pain

165. When a Neuron is not conducting any impulse i.e, resting, the axonal membrane comparatively _____ to potassium ions (K^+) and nearly _____ to sodium (Na^+) ions:
(1) Less permeable, impermeable respectively
(2) More permeable, impermeable respectively
(3) Less permeable, more impermeable respectively
(4) Impermeable, impermeable respectively

166. Which part of peripheral nervous system is known as voluntary nervous system :-
(1) Autonomic nervous system
(2) Visceral nervous system
(3) Somatic nervous system
(4) Sympathetic nervous system

167. In Human eye when Red, Green and Blue cones are stimulated equally, a sensation of ___ is Produced:
(1) Red light
(2) Green light
(3) Blue light
(4) White light

168. In eye the visual acuity is greatest at :
(1) Macula lutea
(2) Blind spot
(3) Fovea centralis
(4) Limbus

169. Mark the correct statement :
(1) Vestibular apparatus is influenced by gravity and movements
(2) Vestibular apparatus is a part of middle ear.
(3) The external ear receives sound waves and directs them to the round window
(4) Both (1) and (2)

170. During muscle contraction -
A. I bands get reduced
B. A band retain the length
C. Length of sarcomere decrease.
D. Breakdown of ATP
E. H-zone remain unchange.
(1) Only A, B, C are correct
(2) Only A, B, C and D are correct
(3) Only A, B, C and E are correct
(4) All are correct statements

171. Which of the following statements are true /false?

i. Thyrocalcitonin regulates blood glucose levels.

ii. Oxytocin stimulates contractions of uterine muscles during birth.

iii. Grave's disease is caused by malfunctioning of the thyroid gland.

iv. ADH stimulates the absorption of water and increased urine production.

(1) i and iii are true ; ii and iv are false

(2) i and ii are true ; iii and iv are false

(3) i and iv are false ; ii and iii are true

(4) i, ii and iii are true ; iv only false

172. **Statement I :** Progesterone acts on mammary glands & stimulates the formation of alveoli and milk secretion.

Statement II : ADH stimulates resorption of water and electrolytes by distal tubules

(1) Both Statement I and Statement II are correct

(2) Both Statement I and Statement II are Incorrect

(3) Statement I is correct but Statement II is incorrect

(4) Statement I is incorrect but Statement II is correct

173. _____ stimulates the synthesis and secretion of steroid hormones from the _____ ?

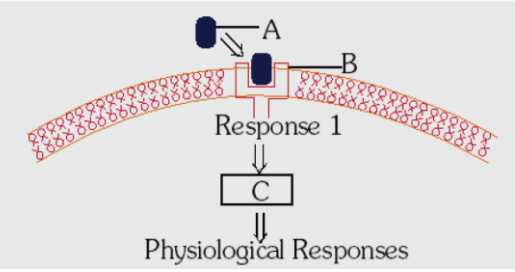
(1) CRH, Adrenal Medulla

(2) Gonadotrophins, Gonads

(3) CRH, Adrenal Cortex

(4) ACTH, Adrenal medulla

174. Identify A, B and C in the diagramatic representation of the mechanism of hormone action.



Select the correct option from the following :

(1) A-Steroid Hormone; B-Hormone-receptor Complex, C-Protein

(2) A-Protein Hormone, B-Receptor; C-Cyclic AMP

(3) A-Steroid Hormone; B-Receptor, C – Second Messenger

(4) A-Protein Hormone; B-Cyclic AMP, C-Hormone-receptor Complex

175. Read the following statement carefully and answer the question given below :

(A) Cyclic changes occurs in endometrium during menstrual cycle.

(B) External thin membrane of uterus is perimetrium.

(C) Strong uterine contraction occur in myometrium at the time of parturition.

(D) The uterus opens into narrow cervix through vagina.

How many of the above statements are correct?

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

(3) A, B and D (4) B and D

176. **Assertion :** The male sex accessory ducts include rete testis, vasa efferentia, epididymis and vas deferens

Reason : The male accessory glands include paired seminal vesicles, a prostate and paired bulbourethral glands.

(1) Assertion and reason both are true and the reason is correct explanation of assertion

(2) Assertion and reason both are true but reason is not correct explanation of assertion

(3) Assertion is true but reason is wrong

(4) Assertion and reason both are wrong

177. Fill in the blanks in the following statements :-

The human male ejaculates about ..... million sperms during a coitus of which, for normal fertility, at least ..... percent sperms must have normal shape and size and at least ..... percent of them must show vigorous motility.

(1) 400 - 500, 60, 40 (2) 100 - 120, 40, 60

(3) 200 - 300, 60, 40 (4) 200 - 300, 40, 60

178. Which hormone is essential to maintain wall of uterus during pregnancy?

(1) FSH (2) LH

(3) GnRH (4) Progesterone

179. Choose the incorrect statement :-

(1) In embryo transfer technique embryos with more than 8 blastomeres are transferred into the uterus.

(2) Artificial insemination technique is used when female partner in couple is infertile.

(3) Amniocentesis is needed to test for presence of sickle cell anaemia in foetus.

(4) Amniocentesis is misused to determine the sex of the unborn child.

180. **Assertion (A):** Opium is derived from latex of unripe fruits of *papavar Somniferum*

Reason (R): Excessive doses of drug may lead to comma and death

(1) A and R are correct, R is correct explanation of A.

(2) A and R are correct but R is not the correct explanation of A.

(3) A is correct but R is incorrect.

(4) A and R both are incorrect.

181. Brunner's glands are found in

(1) Submucosa of stomach

(2) Mucosa of duodenum

(3) Submucosa of duodenum

(4) Submucosa of ileum

182. Select the correct and incorrect statement from following and choose the correct option :-

(A) According to theory of special creation, earth is about 4000 years old.

(B) About 15 billion years ago, primates called *Dryopithecus* and *Ramapithecus* were existing.

(C) Some land reptiles probably 300 million years ago went back into water to evolve into fish like reptiles

Option	Correct	Incorrect
(1)	A & B	Only C
(2)	Only A	B & C
(3)	B & C	only A
(4)	only B	A & C

183. According to Darwin :-

(A) which are **(B)** and which make resource utilization **(C)** for few, will enable only those to reproduce and leave **(D)** progeny". Fill in the blanks and select correct option ?

	A	B	C	D
(1)	Mutations	Non-directional	Best	Less
(2)	Variations	Directional	Better	More
(3)	Variations	Heritable	Better	More
(4)	Heritable	Trait	good	Few

184. Which of the following tools of recombinant DNA technology is incorrectly paired with its use?

(1) Restriction enzyme – Production of blunt ends

(2) DNA ligase – Creates sticky ends of restriction fragments

(3) DNA polymerase – used in a PCR to amplify section of DNA

(4) Reverse transcriptase – Production of cDNA from mRNA

185. Match column-I with column-II and select the correct answer from the codes given below.

Column-I		Column-II	
(A)	PCR	(i)	Pest resistant crop
(B)	Gene therapy	(ii)	Study of disease
(C)	GM plant	(iii)	AIDS patients
(D)	Transgenic animals	(iv)	Correction of genetic defect

(1) A-(i), B-(iii), C-(ii), D-(iv)

(2) A-(iii), B-(iv), C-(i), D-(ii)

(3) A-(i), B-(ii), C-(iii), D-(iv)

(4) A-(iii), B-(i), C-(ii), D-(iv)

SECTION – B

186. The process of RNA interference has been used in developement of plants resistant to:

(1) Nematodes (2) Fungi

(3) Virus (4) Insects

187. Primary structure of a protein relates to

(1) α-helical folding of a polypeptide

(2) Association of two polypeptides

(3) The sequence of amino acids

(4) β-pleated sheet folding of a polypeptide

188. In water canal system of Spongilla, water flows through which one of the following way ?

(1) Spongocoel → ostia → osculum → exterior

(2) Ostia → spongocoel → osculum → exterior

(3) Osculum → spongocoel → ostia → exterior

(4) Osculum → ostia → spongocoel → exterior

189. In Ctenophora offspring is produced _____and development is _____ ?

(1) Sexually & indirect.

(2) Asexually & indirect.

(3) Sexually and asexually both & direct.

(4) Sexually and asexually both & indirect.

190. Bones and cartilages are considered as :-

(1) Loose and dense connective tissue respectively

(2) Dense regular and dense irregular tissue respectively

(3) Both are specialised connective tissue

(4) Both are loose connective tissue

191. Find out the correct pair for cockroach -

(1) A pair of testis 2nd to 4th abdominal segmental

(2) Mushroom gland 6th to 7th abdominal segmental

(3) Titillator–Right phallomere

(4) Outermost layer of spermatophore– Utriculi brevivores

192. Protein coated fat globules are called___which are transported into ___ in villi

Select the correct option which correctly fills up both the blanks:

(1) Cholesterol, capillaries

(2) Chylomicrons, Lacteals

(3) Micelles, Chylomicrons

(4) Phospholipids, Lacteals

193. Find correct option about occupational respiratory disorders :

(1) Inflammation leading to Anemia

(2) Not seen in stone grinding workers

(3) Proliferation of muscular tissue

(4) Cause serious lung damage.

194. Match the column-A and column-B about the embryonic development of human :-

Column-A		Column-B	
(i)	End of one month	(a)	Most of the major organ systems
(ii)	End of second month	(b)	Appearance of hair on the head
(iii)	End of third month	(c)	Heart formation
(iv)	During fifth month	(d)	Eye-lids separated
(v)	End of sixth month	(e)	Limbs and digits formation

(1) (i) – e, (ii) – b, (iii) – c, (iv) – a, (v) – d

(2) (i) – e, (ii) – c, (iii) – b, (iv) – b, (v) – d

(3) (i) – c, (ii) – e, (iii) – b, (iv) – a, (v) – d

(4) (i) – c, (ii) – e, (iii) – a, (iv) – b, (v) – d

195. **Statement-I** :- There may even be some far reaching implications of drug alcohol abuse.

Statement-II :- The adverse effects of drug alcohol abuse are just not restricted to the person who is using them.

Choose the correct answer from the given options:-

(1) Both statement-I and statement-II are correct.

(2) Statement-I is correct but statement-II is not correct.

(3) Both statement-I and statement-II are not correct.

(4) Statement-I is not correct but statement-II is correct.

196. Select the correct statements about AIDS from the statements given below :-

(A) It spreads through body fluids

(B) It also spreads through physical contact by mere touch

(C) Intravenous drug addicts are more prone to AIDS

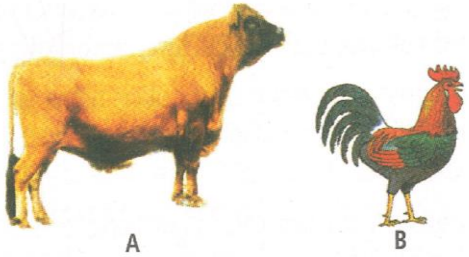
(D) Now a days it is spreading through conscious behaviour pattern

(E) HIV destroys T-helper cells

(1) One (2) Two

(3) Three (4) Four

197. 'A' is an improved breed of cattle and 'B' is an improved breed of chicken. Which of the following options correctly identifies A and B?



(1) A– Jersey, B–Leghorn

(2) A–Surti, B–Sangamneri

(3) A–Marwari, B–Sirohi

(4) A– Beetal, B–Jamunapuri

198. Finches of Darwin in Galapagos island adapted for:

(1) Vegetarian

(2) Insect eating

(3) Fish eating

(4) Both (1) and (2)

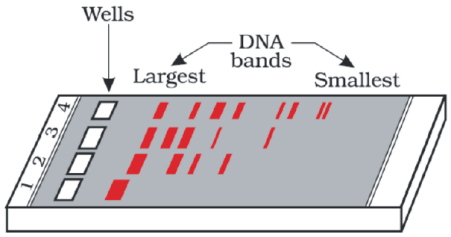
199. Match the organism with its use in biotechnology.

(a)	*Bacillus thuringiensis*	(i)	Cloning Vector
(b)	*Taq polymerase*	(ii)	T-DNA
(c)	*Agrobacterium tumifaciens*	(iii)	*Thermus aquaticus*
(d)	pBR-322	(iv)	Cry Protein

Select the correct option from the following:

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

200. In following figure of agarose gel electrophoresis, which lane showing undigested DNA?



(1) 1
(2) 4
(3) 3
(4) 2

Test Series (2023)

Mock Test-08

NEET

DURATION : 200 Minutes | **19/04/2023** | **M. MARKS : 720**

ANSWER KEY

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

SECTION – I (PHYSICS)

1. **(1)**

The question refers to the 5th harmonic of a vibrating wave.

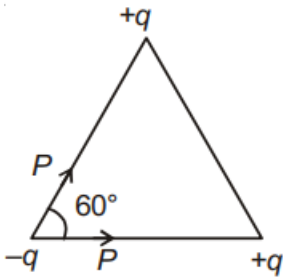
Frequency of 5th harmonic is $= \frac{nv}{2l} = \frac{5\times20}{2\times10} = 5Hz$

2. **(4)**

Brewster's angle is given by $\tan^{-1}\mu = \tan^{-1}\frac{4}{3}$

which is also written as $\cot^{-1}\frac{3}{4}$

3. **(3)**

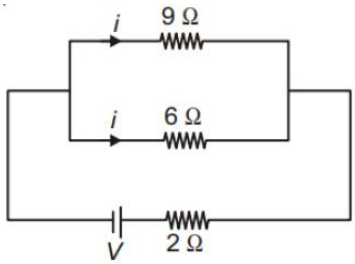


$P = qL$

$P_{net} = \sqrt{P^2 + P^2 + 2P^2\cos 60°}$

$P_{net} = \sqrt{3}P = \sqrt{3}qL$

4. **(4)**



$36 = i^2 9$

$i^2 = 4$

$i = 2$

$\frac{2}{i_1} = \frac{6}{9}$

$i_1 = 3$

$\Delta V_2 = (5)\,(2) = 10\ V$

5. **(4)**

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

$W = \Delta K.E. = \frac{1}{2}(2)\left[\left(\frac{4}{3}\right)^2 - 0\right]$

$= \frac{16}{9}J$

6. **(1)**

$\phi = NBA\cos\theta = NBA\cos\omega t$

$\varepsilon = -\frac{d\phi}{dt}$

$\varepsilon = NBA\omega\sin\omega t$

$\varepsilon_{max} = NBA\omega$

7. **(3)**

If phase difference varies randomly with time, the wave are incoherent and the intensity of resultant waves is sum of individual intensities or $2I_0$.

8. **(4)**

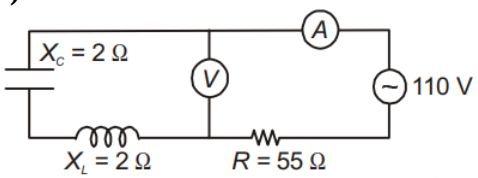
$\lambda_m T_1 = \text{constant}$

$\Rightarrow \lambda_1 T_1 = \lambda_2 T_2$

$0.5 \times 10^{-6} \times T_1 = 10^{-4} \times T_2$

$\frac{T_1}{T_2} = 200$

9. **(1)**



$Z = \sqrt{R^2 + (X_L - X_C)^2}$

$= \sqrt{(55)^2} = 55\Omega$

$V = \frac{100}{55} = I \Rightarrow I = 2\text{A}$

10. **(2)**

Electric field inside a conductor is always zero and conductor is a equipotential body. The value of electric potential at the surface will be at the centre.

11. **(4)**

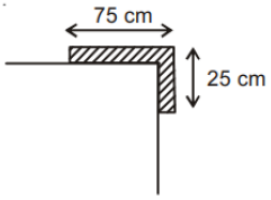
$h_1 = h_2$

$\frac{u_1^2\sin^2 45°}{2g} = \frac{V_2^2\sin^2 60°}{2g}$

$\frac{u_1^2}{u_2^2} = \frac{\frac{\sqrt{3}}{2}\times\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \frac{3}{2}$

$\frac{V_1}{V_2} = \sqrt{\frac{3}{2}}$

12. **(1)**



$\frac{M}{4}g = \frac{\mu 3M}{4}g$

$\mu = \frac{1}{3}$

13. (2)

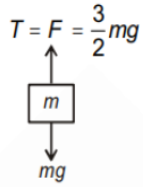
In a standing wave all particles of same wave have same v and hence vibrate in phase passing the mean point at same time. The amplitude of the waves is different at different points hence the speed is different.

14. (3)

Induced charged is independent of speed of magnet.

15. (3)

16. (2)



$F_{net} = ma$

$\frac{3}{2}mg - mg = ma$

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

17. (3)

$\Delta U = \frac{1}{2} \times \text{stress} \times \text{strain}$

$= \frac{1}{2} \times \text{stress} \times \frac{\text{stress}}{Y}$ $\{\because \text{stress } Y \cdot \text{strain}\}$

$= \frac{1}{2} \times \frac{S^2}{Y}$

18. (1)

The level of water above both points is same so by hydrostatic paradox.

$p_x = p_y$

19. (2)

$0.9 = E - 0.3\,r$

$1 = E - 0.25\,r$

$0.1 = 0.05\,r$

$r = 2\,r$

20. (2)

$u = 0,\ a \rightarrow$ Constant

$S_1 = \frac{1}{2}a(10)^2,\ S_2 = \frac{1}{2}a(20)^2$

$\frac{S_1}{S_2} = \frac{10^2}{(20)^2} = \frac{100}{400}$

$S_2 = 4S_1$

21. (1)

$qE = mg$

$neE = mg$

Use $n = \frac{mq}{eE}$

22. (2)

$\frac{1}{2}mA^2\omega^2 = 90\,\text{J}$

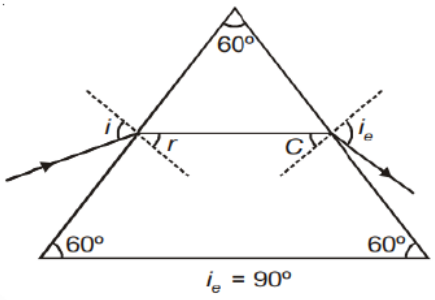
m and ω remaining same energy is reduced to 40 J.

$\frac{A_1^2}{A_2^2} = \frac{9}{4}$

or $\frac{A_1}{A_2} = \frac{3}{2}$

or $A_2 = 4$ cm

23. (2)



Let C by critical angle $\mu = 2 = \frac{\sin i}{\sin r}$

$i_e = 90°$

$60° = r + C$ from geometry

$\frac{1}{\mu} = \frac{1}{2} = \frac{\sin C}{\sin i_e}$ [At emergent interface]

$C = \sin^{-1}\frac{1}{2} = 30°$

$r = 30°$

$\frac{\sin i}{\sin r} = 2$

$\sin i = 1$

$i = \frac{\pi}{2}$

24. (3)

$\frac{25}{1000} = 25R$

$R = 0.001\ \Omega$

25. (4)

Particle should have same distance and displacement in order to have final average speed and average velocity which is only possible only in case of an object moving on a straight line without turning back.

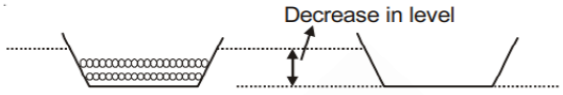
26. (4)

From Boolean

$\overline{\overline{A}+\overline{B}} = A \cdot B$

27. (3)

Previously when stones are on the boat they are increasing the weight on the boat and to balance this weight boat needs to generate buoyancy force by displacing more water, but when stones are removed the boat starts displacing less amount of water hence the level of water in tank falls.



28. (2)

If wave is propagating in +z direction then $\vec{E}$ and $\vec{B}$ will be in *x*-*y* plane.

Also, $\vec{E} \times \vec{B}$ = direction of propagation

$\vec{E} = E_0\hat{i}, \vec{B} = B_0\hat{j}$

29. (1)

30. (1)

The only method of reducing random errors is by taking more and more number of observations.

31. (4)

A = 5 cm

Maximum speed ($A\omega$)= 31.4

$\omega = \frac{31.4}{5}$

or $2\pi f = 31.4$

$f = \frac{31.4}{10 \times 3.14}$

f = 1 Hz

32. (1)

$V_0 = \beta V_i$ and phase difference of π

$= V_0 = 150 \times 2\cos\left(15t + \frac{\pi}{3} + \pi\right)$

$= 300\cos\left(15t + \frac{4\pi}{3}\right)$

33. (1)

P.E. of an object on earth surface = $-\frac{GMm}{R}$

Magnitude of potential energy per unit mass

$= \left(\frac{GM}{R}\right) = E$

$V_{\text{escape}} = \sqrt{\frac{2GM}{R}} = \sqrt{2E}$

34. (1)

Daughter nuclei increase exponentially mass of active sample and number of active nuclei decreases exponentially.

Rate decreases exponentially but since it is not shown as such (iii) is wrong.

35. (3)

If it goes through 8 alpha decays and two β^+ decays

Hence, net decreases = $8 \times 2 + 2 \times 1$

= 18 protons

Net increase is due to β^- decays = 4×1

Hence, final $Z = 92 - 18 + 4 = 78$

36. (4)

$B = \frac{\mu_0 i}{2R}\left(\frac{3\pi}{2(2\pi)}\right) = \frac{3\mu_0 i}{8R}$

37. (2)

Maximum wavelength = microwaves

Minimum wavelength = γ-rays

38. (2)

dQ = positive, dU = zero, dW = positive

$\because\ dQ = dU + dW$

39. (3)

${}^nC_2 = \frac{n(n-1)}{2}$

40. (4)

41. (3)

$m = \frac{f}{f-u}$

f = – 0.15 m

m = + 2 (virtual image)

$2 = \frac{-0.15}{-0.15-u}$

$\Rightarrow$ – .075 m or – 7.5 cm

42. (1)

Net external force on the man and boat is zero and centre of mass is initially at rest. So centre of mass will not move.

43. (4)

Energy of a photon = $\frac{hc}{\lambda}$

44. (3)

45. **(3)**

$R = 10$ cm

$f = 30$ cm

$$\frac{1}{f} = (\mu - 1)\left(\frac{1}{R} - \frac{1}{\infty}\right)$$

$$\frac{1}{30} = (\mu - 1)\frac{1}{10}$$

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

46. **(2)**

Hydrogen is a diatomic molecules and if vibrational degrees of freedom are increased the degrees of freedom will be 3 translation 2 rotational and two vibrational.

$\therefore$ So total degree of freedom.

Fractiopn of energy possessed due to rotational motion : Degree of freedom due to rotation total degree of freedom $= \frac{2}{7}$

47. **(1)**

48. **(3)**

E (photon) = $\frac{hc}{\lambda}$

E (electron) = $\frac{P^2}{2m_e} = \left(\frac{h}{\lambda}\right)^2 \frac{1}{2m_e}$

49. **(4)**

$W = (3\hat{i} - 10\hat{j} + 5\hat{k}) \cdot 5\hat{k}$

= 25 J

50. **(3)**

$$I_{avg} = \frac{\int I\,dt}{\int dt}$$

So, $I_{avg} = \frac{2I_0}{\pi}$

SECTION – II (CHEMISTRY)

51. **(3)**

The compounds containing active H-atoms (H atoms attached to N, O or S) react with CH_3COCl to form acetyl derivatives.

52. **(3)**

To calculate average enthalpy of C-H bond in methane, following information is required:

(i) dissociation energy of H_2 i.e.

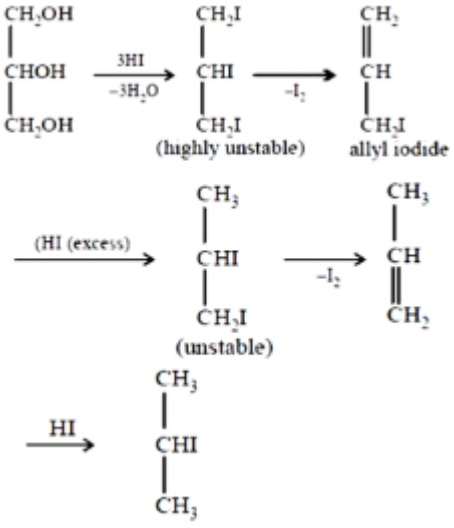
$$\frac{1}{2}H_2(g) \rightarrow H(g) \rightarrow \Delta H = x \text{ (suppose)}$$

(ii) Sublimation energy of C (graphite) to C(g)

C(graphite) $\longrightarrow$ C(g); $\Delta H = y$ (suppose)

because, $C_{(g)} + H_{(g)} \longrightarrow C - H$.

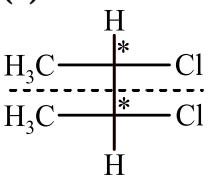
53. **(2)**



2-iodopropane

Option (2) is correct.

54. **(3)**



Due to presence of plane of symmetry, option (3) is optically inactive.

55. **(1)**

Dil. HNO_3 gives N_2O while conc. HNO_3 gives NO_2.

56. **(1)**

PHBV is a biodegradable polymer.

57. **(1)**

In metal carbonyls, the oxidation number of metal is always zero.

(1) Oxidation state of Fe in $[Fe(CO)_5]$ is zero.

(2) Oxidation state of Fe in Fe_2O_3 is +3.

(3) Oxidation state of Fe in $K_4[Fe(CN)_6]$ is +2.

(4) Oxidation state of Fe in $FeSO_4 \cdot (NH_4)_2SO_4 \cdot 6H_2O$ is +2.

58. **(1)**

The solubility of silver bromide in hypo solution is due to the formation of $Na_3[Ag(S_2O_3)_2]$

$$AgBr + 2Na_2S_2O_3 \rightarrow \underset{\substack{\text{Sodium argento thiosulphate} \\ \text{(Colourless)}}}{Na_3\left[Ag(S_2O_3)_2\right]} + NaBr$$

59. (3)

$$k = \frac{1}{R} \times \text{ Cell constant} = \frac{0.47}{31.6} = 0.01487 \text{ S cm}^{-1}.$$

60. (2)

I_2 and NaOH react with acetophenone ($C_6H_5COCH_3$) to give yellow ppt. of CHI_3 but benzophenone ($C_6H_5COC_6H_5$) does not and hence can be used to distinguish between them. Oxidation of methyl ketones with sodium Hypoiodite (NaOI) or (I_2+NaOH) gives iodoform (CHI_3) but not in case of benzophenone.

61. (4)

Zr and Hf possess similar atomic size and hence are called twins of periodic table. It is due to lanthanide contraction.

62. (3)

$$HC \equiv CH \xrightarrow[20\%H_2SO_4]{1\%HgSO_4} \underset{[A]}{CH_3CHO} \xrightarrow[H_2O]{CH_3Mgx}$$

$$\underset{[B]}{CH_3CHOHCH_3} \xrightarrow{[O]} \underset{[C]}{CH_3COCH_3}$$

63. (4)

The air pressure decreases with increase in altitude. So, the partial pressure of oxygen is not sufficient for breathing at higher altitude and thus pressurization is needed to increase the concentration of oxygen.

64. (3)

The pH of 1×10^{-8} M HCl is always less than 7. It can be shown as:

$\left[H^+\right] = 10^{-7}$ M from H_2O and 10^{-8} M from HCl.

$$\left[H^+\right] = 10^{-8}(10+1)\,M$$

$$\left[H^+\right] = 10^{-8}\times 11 M$$

$$pH = -\log\left[H^+\right] = 8\log 10 - \log 11$$

$$pH = 8 - \log 11$$

$$pH = 6.93$$

65. (2)

Number of atoms = Number of unit cells × Z

$= 12.08\times10^{23}\times 2$ [for bcc, Z = 2]

$= 24.16\times10^{23}$ atoms.

66. (2)

Only structure (2) has a conjugated system, which is necessary for resonance.

67. (1)

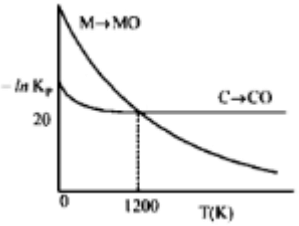
Both P_4O_{10} and P_2O_5 may be regarded as anhydrides of H_3PO_4 but since, P_2O_5 occurs as a dimer, the right answer is P_4O_{10} and not P_2O_5.

$P_4O_{10} + 6H_2O \longrightarrow 4H_3PO_4$

68. (2)

Only alkyl aryl ethers e.g., $C_6H_5OCH_3$ undergoes electrophilic substitution reactions.

69. (3)



At $T < 1200$ K, carbon will reduce $MO(s)$ to M(s). Hence, chemical reaction

$MO(s) + C(s) \rightarrow M(s) + CO(g)$ is spontaneous.

70. (2)

$$pH = pK_a + \log\frac{[\text{ Salt}]}{[\text{ Acid}]}$$

$$6 = -\log 10^{-5} + \log\frac{[\text{ Salt}]}{[\text{ Acid}]}$$

$$= 5 + \log\frac{[\text{Salt }]}{[\text{Acid}]}$$

$$\therefore \frac{[\text{ Salt}]}{[\text{ Acid}]} = \frac{10}{1} \text{ or } 10:1$$

71. (2)

$A \rightarrow$ products $\qquad E = 12.49$ kcal / mole

$$\ln\frac{K_{T_2}}{K_{T_1}} = \frac{-Ea}{R}\left[\frac{1}{T_2} - \frac{1}{T_1}\right]$$

$$\ln\frac{K_{T_2}}{K_{T_1}} = \frac{-12.49\times10^3}{2}\left[\frac{1}{305} - \frac{1}{295}\right]$$

$$\ln\frac{K_{T_2}}{K_{T_1}} = \frac{12.49\times10^3}{2}\times\left[\frac{1}{295} - \frac{1}{305}\right]$$

$$\frac{K_{T_2}}{K_{T_1}} = 2$$

$$\% \text{ increase} = \frac{K_{T_2} - K_{T_1}}{K_{T_1}}\times 100$$

$$= \frac{2-1}{1}\times 100$$

$$= 100\%$$

72. **(4)**

As $\Delta G° > 0$, the equilibrium constant K would be less than 1($\Delta G° = -RT \ln K$).

73. **(1)**

In bimolecular nucleophilic aromatic substitution reactions, the order of reactivity of aryl halides is: ArF > ArCl > ArBr > ArI.

The greater reactivity of fluorides is probably due to the strong electron-withdrawing effect of fluorine atom which favours the initial nucleophilic attack on the aromatic ring.

74. **(4)**

Negative reaction with 2, 4-dinitrophenyl-hydrazine indicates absence of aldehydic (option 1) and ketonic (option 3) groups, while negative reaction with metallic sodium indicates absence of an alcoholic group (option 2), hence, the organic compound C_3H_6O is $CH_2 = CH–O–CH_3$ (option 4).

75. **(4)**

As the oxidation number of Cl decreases from +7 in $HClO_4$ to +5 in $HClO_3$ to +3 in $HClO_2$ and +1 in HOCl, its tendency to attract the electrons of the O–H bond decreases. As a result, the tendency of O–H bond to dissociate to give H^+ ions decreases and hence, the acid strength decreases accordingly in the order: $HClO_4 > HClO_3 > HClO_2 > HOCl$.

76. **(4)**

Frenkel defect exhibit both vacancy and interstitial defects. When smaller ion, generally cation is dislocated from its normal lattice site to an interstitial site, the vacancy defect is produced at its lattice site along with an interstitial defect. It does not leads to appearance of colour in ionic solid due to presence of F centre. It is produced in metal excess defect. Therefore, statement-I is correct and II is wrong.

77. **(3)**

Oxidation potential of M is more than Ni and less than Mn. Hence, reducing power is Mn > M > Ni.

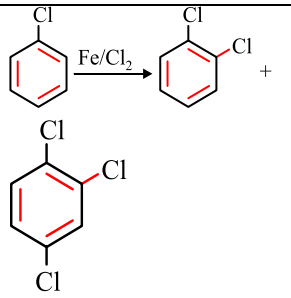
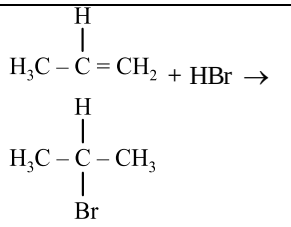
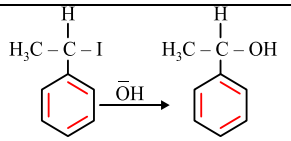
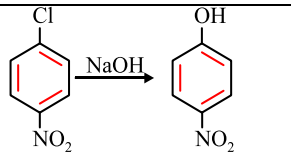
78. **(3)**

H_2O_2 has oxidizing and reducing properties both.

79. **(1)**

As we move along a period from La to Lu due to decrease in size, basic character of hydroxides decreases. Hence, $La(OH)_3$ is more basic than $Lu(OH)_3$.

80. **(1)**

	Column-I		Column-II
(A)		2	Electrophilic aromatic substitution
(B)		4	Electrophilic addition
(C)		5	Nucleophilic substitution reaction
(D)		1	Nucleophilic aromatic substitution reaction

Hence, option (1) is correct

81. **(1)**

$\mu_{rms} \propto \sqrt{\frac{1}{M}}$ at S.T.P.

As the molecular mass of gas increases, its root mean square velocity decreases.

82. **(4)**

0.2% solution of phenol can be used as antiseptic while 1% solution of phenol acts as a disinfectant. Hence, some disinfectants can be used as antispetics.

83. **(3)**

Molar mass of $CHCl_3$=119.5 g/ mole.

Molar mass of CH_2Cl_2 = 85 g/mole.

Moles of $CHCl_3 = \frac{11.95}{119.5} = 0.1$ mole.

Moles of $CH_2Cl_2 = \frac{8.5}{85} = 0.1$ mole.

Mole fraction of $CHCl_3 = \frac{0.1}{0.2} = 0.5$ mole.

Mole fraction of $CH_2Cl_2 = \frac{0.1}{0.2} = 0.5$ mole.

Given:

Vapour pressure of $CHCl_3$=200 mm Hg=0.263 atm

Vapour pressure of CH_2Cl_2=415 mm Hg=0.546 atm

$P_T = x_{CH_2Cl_2} \times P^0_{CH_2Cl_2} + x_{CHCl_3} \times P^0_{CHCl_3}$

$= 0.5 \times 0.263 + 0.5 \times 0.546 = 0.4045$

Mole fraction of $CHCl_3$ in vapour form = $\frac{P_{CHCl_3}}{P_T}$

$= \frac{0.1315}{0.4045} = 0.325.$

84. (2)

For Froth Floatation process, Pine oil is used as frother.

Aluminium is extracted through electrolytic reduction.

Semiconductors (Ge, Si) are refined by zone refining process.

Gold is extracted through cyanide process.

Hence, option (2) is correct.

85. (3)

Etard reaction.

86. (2)

Given

mass of solute = 120 g

mass of solvent = 1000 g

Mol. mass of solute = 60 g/mol

density of solution = 1.12 g/mL

From the given data,

Mass of solution =1000 + 120 = 1120 g

$\because \quad d = \frac{\text{given mass}}{V}$

or $\quad V = \frac{\text{given mass}}{d}$

Volume of solution:

$V = \frac{1120}{1.12} = 1000$ mL or = 1 litre

Now, molarity $(M) = \frac{w}{\text{Mol. mass} \times V(\text{ lit.})}$

$= \frac{120}{60 \times 1} = 2\,M$

87. (1)

p-chlorophenol is more acidic because F and C have identical p-orbitals (both belong to 2nd period), due to which their overlapping is perfect. Hence, F exerts better +R effect than Cl, which makes it less acidic. Hence, option (1) is correct.

88. (2)

$\lambda_A = \frac{h}{m_A v_A}$ and $\lambda_B = \frac{h}{m_B v_B}$

$\frac{\lambda_A}{\lambda_B} = \frac{m_B v_B}{m_A v_A}$

Here, $\quad m_B = 25\%$ of $m_A = 0.25 m_A$

$v_B = 75\%$ of $v_A = 0.75 v_A$

$\therefore \quad \frac{\lambda_A}{\lambda_B} = \frac{0.25 m_A \times 0.75 v_A}{m_A \times v_A} \qquad (\because\ \lambda_A = 1\ Å)$

or $\quad \lambda_B = 5.33\ Å$

89. (2)

The unit mol L^{-1} s^{-1} of the rate constant shows that it is a zero order reaction.

For a zero order reaction, $x = kt$.

$\therefore$ Amount of A reacted (x)

$= (0.6 \times 10^{-3}$ mol L^{-1} $s^{-1})$ $(20 \times 60$ s)

$= 0.72$ mol L^{-1}

[B] formed = [A] reacted = 0.72 mol L^{-1}.

90. (2)

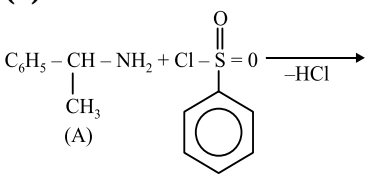
	A	+	B	$\rightleftharpoons$	C	+	D
Intial	0.9		0.9		0		0
At eqm.	0.3		0.3		0.6		0.6

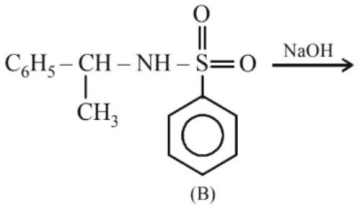
$K_c = \frac{0.6 \times 0.6}{0.3 \times 0.3} = 4$

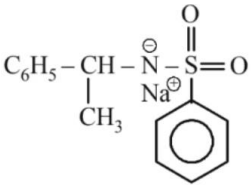
91. (1)

Cr forms CrF_3, but Zn, Cu and Ni do not form MF_3 type compound.

92. (3)







Compound (B) possess acidic hydrogen, so it is soluble in NaOH.

93. (1)

MnO_2	Mn^{2+}	$Mn(OH)_3$	MnO_4^{2-}
+4	+2	+3	+6
3	5	4	1

94. (3)

Let the rate law equation be

$r = k[A]^x[B]^y$ … (1)

when [A] becomes double

$4r = k[2A]^x[B]^y$ … (2)

Divide (2) by (1)

$$\frac{4r}{r} = \frac{k[2A]^x[B]^y}{k[A]^x[B]^y}$$

$\therefore 4 = (2)^x$, Hence, $x = 2$

When [B] becomes double

$r = k[A]^x[2B]^y$ … (3)

$\therefore$ Divide (3) by (1)

$$\frac{r}{r} = \frac{k[A]^x[2B]^y}{k[A]^x[B]^y}$$

$1 = (2)^y$

$\therefore y = 0$

$\therefore$ Rate $= k[A]^2[B]^0$

95. (1)

The transition elements, on account of their variable valency, are able to form unstable intermediate compounds very readily and hence, show catalytic behaviour.

96. (4)

Helium has the lowest melting and boiling point, which makes liquid helium an ideal coolant for extremely low temperature applications such as superconducting magnets and cryogenic research where temperature close to absolute zero is needed.

Hence, option (4) is the answer.

97. (1)

$2CuCl_2 + K_4[Fe(CN)_6] \rightarrow Cu_2[Fe(CN)_6] + 4KCl$

Chocolate Brown ppt.

98. (4)

Chlorine gas was used earlier for bleaching paper. These days, hydrogen peroxide (H_2O_2) with suitable catalyst.

Tetra chlroroethene ($Cl_2C = CCl_2$) was earlier used as solvent for dry cleaning. The compound contaminates the ground water and is also a suspected carcinogen. Replacement of halogenated solvent by liquid CO_2 will result in less harm to groundwater.

Hence, given statement (4) is correct.

99. (3)

(A) $R-\overset{\overset{O}{\|}}{C}-Cl \xrightarrow[Pd-BaSO_4]{H_2} R-\overset{\overset{O}{\|}}{C}H$

Rosenmund Reduction

(B) $R-CH_2-COOH \xrightarrow[H_2O]{Cl_2/P} R-\underset{\underset{Cl}{|}}{CH}-COOH$

HVZ reaction

(C) $R-\overset{\overset{O}{\|}}{C}-NH_2 \xrightarrow[NaOH]{Br_2} R-NH_2$

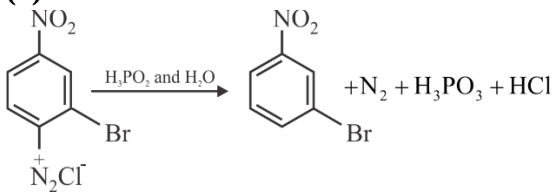
Hoffmann Bromamide reaction

(D) $R-\overset{\overset{O}{\|}}{C}-CH_3 \xrightarrow[Conc.HCl]{Zn(Hg)} R-CH_2-CH_3$

Clemmenson reduction

Hence, option (3) is correct.

100. (3)



SECTION – III (BOTANY)

101. (2)

Division $\rightarrow$ Angiospermae

Class $\rightarrow$ Cotyledonal

Order $\rightarrow$ Asterales

Finally $\rightarrow$ Asteraceae

102. (3)

Coenocytic mycelium is multinucleate aseptates

103. (1)

Major photosynthetic pigmeter is green algae are chl *a, b*

104. (3)

Oogamous type of reproduction is found in volvox

105. (4)

Leay bases are edible portion of *Allium cepa*

106. (1)

If the of gynoecium is present on the top most position of thalamus, then the flower is refferd as by hypogynous

107. (3)

Radial vascular bundles

Charactestically occur in monocot and dicot roots

108. (2)

Ground tissue system constitute bulk of the plant body

109. (1)

Lysosomes → Hydrolytic activity

Ribosomes → Protein synthetics

S.E.R → Steroids synesthetic

Centeole → Formation of spindles.

110. (2)

Meiosis involves pairing of homologous chromosomes and recombination between them.

111. (3)

Refer to NCERT chapter cell cycle and cell division

112. (3)

During Diplotene the homologous chromosomes separate due to repulsion but are yet held by chiasmata.

113. (1)

Plant cell do not rupture when placed in distilled water due to presence of cell wall

114. (1)

A plasmolysed cell can be de plasmolysed by placing in hypotonic solution

115. (2)

H, N are element that are procure mainly through roots.

116. (1)

Fixation of nitrogen in legumes nitrogen in legumes will be affected if nitrogenic enzymes is in inactivated

117. (4)

Refer to NCERT chapter Photosynthesis in higher plants

118. (3)

Refer to NCERT chapter Respiration in plants

119. (2)

X → EMP pathway

Y → Cytoplasm / cytosol

Z → Pyruvic acid

120. (3)

As per chemiosmotic coupling hypothesis in mitochondria protons accumulation in inter-membrane space.

121. (4)

Refer to NCERT chapter Anatomy of flowering plants

122. (2)

Ethylene is used to hasten of ripening of fruits

123. (4)

Refer to NCERT chapter Sexual reproduction in flowering plants

124. (4)

Cannabis is not a water pollinated plants

125. (3)

Refer to NCERT chapter Principles of inheritance and variations

126. (1)

Mendel formulated the law of segregation on the basis of monohybrid cross

127. (2)

Refer to NCERT chapter Molecular basis of inheritance

128. (4)

Refer to NCERT chapter Molecular basis of inheritance

129. (1)

Refer to NCERT chapter Molecular basis of inheritance

130. (2)

Refer to NCERT chapter Stratergies for enhancement in food production

131. (2)

250 kg cow → 25 gm

250 gm of *Methylophilus* → 25 tonnes

132. (3)
Refer to NCERT chapter Microbes in human welfare

133. (1)
The purpose 1 biological treatment of waste water is to reduce BOD

134. (2)
Bacillus Thuringiensis is a bacteria used to control butterfly caterpillars

135. (3)
Refer to NCERT chapter Populations and organisms

136. (3)
Refer to NCERT chapter Ecosystem

137. (2)
Refer to NCERT chapter Ecosystem

138. (3)
Refer to NCERT chapter Ecosystem

139. (1)
Refer to NCERT chapter Ecosystem

140. (4)
Refer to NCERT chapter Bioderversity and conservation

141. (2)
The terror of Bengal is used for *Eichhornia crassipes*

142. (2)
Polyblend is a fine powder of recycled modified plastic

143. (1)
Refer to NCERT chapter Principles of inheritance and variations

144. (2)
Refer to NCERT chapter Molecular basis of inheritance

145. (2)
In C4 plants calvin cycle enzymes are located in chloroplast of bundle shaeah cells

146. (1)
Glycolysis occurs both in presence of oxygen and in absence of oxygen

147. (3)
Refer to NCERT chapter Morphology of flowering plants

148. (1)
Refer to NCERT chapter Environmental issues

149. (2)
Refer to NCERT chapter Environmental issues

150. (2)
Refer to NCERT chapter cell the unit of life

SECTION – IV (ZOOLOGY)

151. (2)
They have circular mouth without Jaws.
They bear 6-15 pairs of gills.

152. (3)
NCERT XI, Pg. No. 46,50,52,53

153. (2)
Textual based question

154. (1)
NCERT Pg. # 104

155. (2)

156. (2)
NCERT–XI, Pg. # 110

157. (2)
Both assertion and reason are correct but reason is not the correct explanation of assertion

158. (4)
If oxyntic cell blocked protein will not digested

159. (1)
Image based question

160. (2)
Textual based question

161. (1)
NCERT XII Pg.# 00

162. (1)
NCERT–XI, Pg#279, 18.1.2

163. (2)
NCERT XI Pg.No.282

164. (2)
NCERT–XI, Pg#287, 288

165. (2)
NCERT-XI, [E] Pg#317, [H] Pg#317

166. (3)
Somatic nervous system is called voluntary nervous system

167. (4)
NCERT XI Pg.No.324

168. (3)
NCERT XI, Page No. 324

169. (1)
NCERT XI Pg.No.327

170. (2)
H zone also decrease in length during muscle contraction

171. (3)
Thyrocalcitonin regulate calcium level.

172. (1)
Vasopressin stimulates reabsorption of water and reduction of urine secretion. Vasopressin is also called ADH.

173. (2)
NCERT Pg.# 333

174. (2)
Image based question

175. (2)
NCERT Pg.# 46

176. (2)
Both assertion and reason explain about male accessory duct and gland are true but reason is not the explanation of assertion

177. (3)
Textual based question

178. (4)
Progesterone is required for maintaining the pregnancy

179. (2)
NCERT-XII, Para-3, Page-64

180. (2)
Both A and R are correct and R is the correct explanation of A

181. (3)
Brunner gland are found in submucosa of duodenum

182. (2)
NCERT XII (E) Pg. 128, 140

183. (3)
NCERT XII (E) Pg. 135, 3rd pare.

184. (2)
DNA ligase is also known as molecular glue

185. (2)
Textual based question

186. (1)
The Process of RNA interference has been used in development of plant resistant to nematodes

187. (3)
Textual based question

188. (2)
Ostia → spongocoel → osculum → exterior

189. (1)
In Ctenophora offspring is produced sexually and development is indirect

190. (3)
NCERT XI, Pg. # 103

191. (2)
Textual based question

192. (2)
Protein coated fat globules are called chylomicrons which are transported into lacteal in villi

193. (4)
Occupational respiratory disorder causes serious lung damage

194. (4)
Textual based question

195. (1)
Textual based question

196. (4)
NCERT XII (Bio)_Pg-155

197. (1)
Image based question

198. (4)
Finches are vegetarian and insect eating

199. (1)
NCERT XII Pg # 199, 200, 203, 209

200. (1)
Image based question