Test Series (2023)

Mock Test-05

NEET

Topics Covered

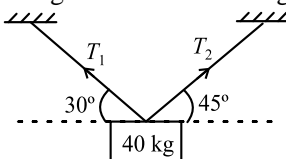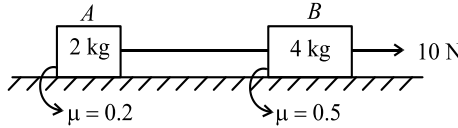|	
Physics :	Full Syllabus (Class 11 and 12)
Chemistry :	Full Syllabus (Class 11 and 12)
Biology :	**(Botany) :** Full Syllabus (Class 11 and 12)
	(Zoology) : Full Syllabus (Class 11 and 12)

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.
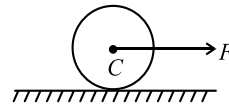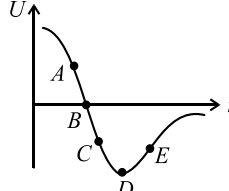
OMR Instructions:

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. The displacement of a particle is given as $X = \dfrac{P}{Q}\left(1 - e^{-Qt}\right)$, where t is time and P and Q are dimensional constant. The dimension of PQ will be

(1) $[M^0LT^{-1}]$ (2) $[M^0LT^{-2}]$

(3) $[MLT^{-2}]$ (4) $[M^0L^{-2}T]$

2. The least count of a stopwatch is 0.2s. The time of 100 oscillations is found to be 50s. The maximum error in the measurement is

(1) 0.4% (2) 0.2%

(3) 2% (4) 4%

3. A particle thrown up vertically reaches at half of the maximum height in time ($\sqrt{2}-1$)s. The speed of projection of the particle is ($g = 10$ m/s^2)

(1) $5\sqrt{2}$ m/s (2) 10 m/s

(3) 40 m/s (4) $10\sqrt{2}$ m/s

4. Virat Kohli can throw a ball to a maximum horizontal distance of 50 m. How much high above the ground can he throw the same ball?

(1) 25 m

(2) 50 m

(3) 100 m

(4) 75 m

5. If $\vec{A}=2\hat{i}+3\hat{j}$ and $\vec{B}=3\hat{i}+3\hat{j}+2\hat{k}$, then the unit vector in the direction of $\vec{A}+\vec{B}$ is

(1) $\dfrac{5\hat{i}+5\hat{j}+3\hat{k}}{\sqrt{59}}$ (2) $\dfrac{5\hat{i}+5\hat{j}-3\hat{k}}{\sqrt{59}}$

(3) $\dfrac{5\hat{i}+6\hat{j}-2\hat{k}}{\sqrt{65}}$ (4) $\dfrac{5\hat{i}+6\hat{j}+2\hat{k}}{\sqrt{65}}$

6. A body of a mass 40 kg is suspended by two massless strings as shown in the figure, then

(1) $\sqrt{2}T_1-\sqrt{3}T_2=0$ (2) $\sqrt{3}T_1-\sqrt{2}T_2=0$

(3) $\sqrt{3}T_1+\sqrt{2}T_2=0$ (4) $3T_1-2T_2=0$

7. Two blocks A and B are connected with an ideal string are pulled horizontally by a force of 10 N as shown in the figure. The force of friction acting on block A is

(1) 4 N (2) 10 N

(3) 6 N (4) Zero

8. The work done by an agent applying a force $\vec{F}=\left(\hat{i}+2\hat{j}+3\hat{k}\right)N$ on a particle in moving it from $A(0, 0, 0)$ m to $B(3, 4, 5)$ m is

(1) 26 J (2) 20 J

(3) 13 J (4) 39 J

9. Kinetic energy of any moving particle is

(1) Scalar, positive

(2) Scalar, may be negative

(3) May be vector, positive

(4) Vector, may be zero

10. A solid sphere placed on a rough horizontal surface, is pulled horizontally by a force F. If it undergoes pure rolling, then the frictional force developed is

(1) $\dfrac{5}{7}F$ (2) $\dfrac{3}{7}F$

(3) $\dfrac{3F}{5}$ (4) $\dfrac{2}{7}F$

11. 1 kg sugar have maximum mass

(1) At poles

(2) At equator

(3) In India

(4) Mass will be same everywhere

12. The curve between potential energy (U) and distance (r) between atoms of a diatomic molecule is shown in the figure. If $\vec{F}_A$, $\vec{F}_B$, $\vec{F}_C$, $\vec{F}_D$ and $\vec{F}_E$ are forces of interaction between atoms of molecules corresponding to points shown on curve, then

(1) $\left|\vec{F}_B\right|=0$ (2) $\left|\vec{F}_A\right|=0$

(3) $\vec{F}_E.\vec{F}_C>0$ (4) $\vec{F}_C.\vec{F}_E<0$

13. Elongation (E) of a steel wire varies with the elongation force (F) according to the graph (within elastic limit)

(1)   (2)

(3)   (4)
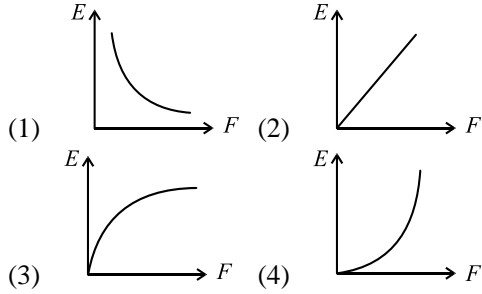
14. Pressure inside the two soap bubbles are 1.01 atm and 1.02 atm. The ratio of their free surface area is

(1) $2:1$ (2) $1:8$

(3) $101:102$ (4) $4:1$

15. If the temperature of the liquid rises, then its coefficient of viscosity

(1) Increases

(2) Decreases

(3) Remains same

(4) Increases and decreases periodically

16. An anisotropic material has coefficient of linear expansion α, 2α, 2α along x, y and z-axis respectively. Then coefficient of cubical expansion is

(1) 2α (2) 3α

(3) 5α (4) $\dfrac{5}{3}\alpha$

17. In the spectrum of a back body at two temperature T and 2T, let A_1 and A_2 be area under the two curves respectively. The value of $\dfrac{A_1}{A_2}$ will be

(1) $1:16$ (2) $4:1$

(3) $8:1$ (4) $2:1$

18. An ideal diatomic gas undergoes a cyclic process as shown in $P - V$ diagram. The dotted curves are isothermal. The efficiency of the heat engine based on these processes is
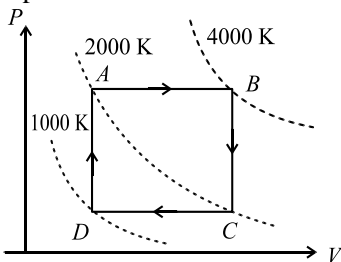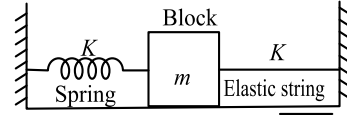

(1) $\dfrac{2}{13}$ (2) $\dfrac{2}{19}$

(3) $\dfrac{1}{5}$ (4) $\dfrac{1}{7}$

19. The rms speed of an ideal diatomic gas at temperature T is V. When gas dissociates into atoms then its new rms speed becomes double. The temperature at which the gas dissociated into atoms are:
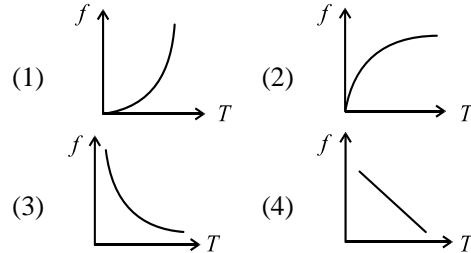
(1) T (2) $\sqrt{2}T$

(3) $\dfrac{T}{2}$ (4) $2T$

**20.** The time period of a given spring-mass-string system is

(1) $2\pi\sqrt{\dfrac{m}{2K}}$ (2) $2\pi\sqrt{\dfrac{m}{K}}$

(3) $\left(\sqrt{2}+1\right)\pi\sqrt{\dfrac{m}{2K}}$ (4) $\left(\sqrt{2}+1\right)\pi\sqrt{\dfrac{m}{K}}$

21. If graph between fundamental frequency (f) and corresponding tension (T) in a sonometer wire is plotted, then it is best represented by

(1)   (2)

(3)   (4)

22. A tuning fork is kept between two organ pipes A and B. organ pipe A is closed at one end and is of length 18 cm while organ pipe B is opened at both ends as shown in the figure. If fourth over-tone of pipe B and first overtone of pipe A are in resonance with tuning fork, then the length of open organ pipe B is
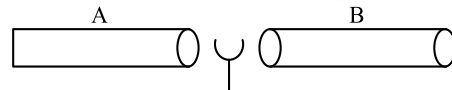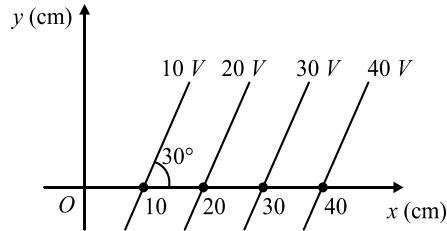

(1) 60 cm   (2) 50 cm

(3) 40 cm   (4) 30 cm

**23** An infinite number of charges, each of charge 1 μC are placed on x-axis with co-ordinates $X(m)$ = 1, 2, 4 8, ...∞. If a charge $2C$ is placed at origin, then the net force on $2C$ charge is

(1) 18000 N

(2) 24000 N

(3) 48000 N

(4) 72000 N

24. The figure shows some of the equipotential surfaces. The magnitude and direction of the electric is field given by


(1) 200 V/m, −60° with + x-axis
(2) 200 V/m, 120° with + x-axis
(3) 100 V/m, 30° with + x-axis
(4) 100 V/m, 120° with + x-axis

25. In the given arrangement of parallel plates. Each plate has area A and distance between two consecutive plates is d. The equivalent capacitance of the system between x and y is given as
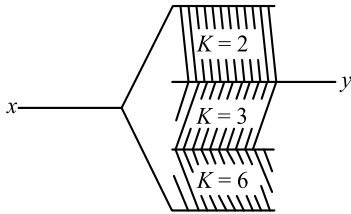
(1) $\dfrac{\varepsilon_0 A}{d}$ (2) $\dfrac{2\varepsilon_0 A}{d}$

(3) $\dfrac{3\varepsilon_0 A}{d}$ (4) $\dfrac{4\varepsilon_0 A}{d}$

26. The potential difference between points P and Q in the given circuit is
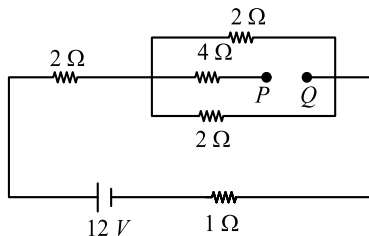
(1) 2 V   (2) 1 V
(3) 3 V   (4) 4 V

27. The V –I characteristics of a non-linear device is shown in the figure. The region showing negative resistance is
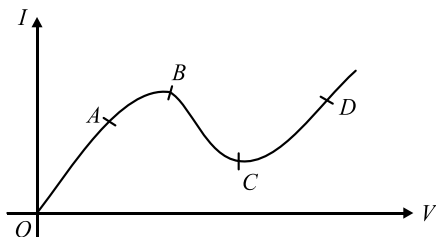
(1) OA (2) AB
(3) CD (4) BC

28. The magnetic field at point O in the figure shown below is
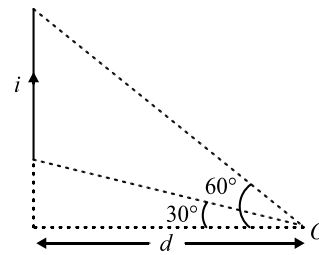
(1) $\dfrac{\mu_0 i}{4\pi d}\left[\sqrt{3}-1\right]$ (2) $\dfrac{\mu_0 i}{8\pi d}$

(3) $\dfrac{\mu_0 i}{8\pi d}\left(\sqrt{3}-1\right)$ (4) Zero

29. The ratio of magnetic length to geometrical length of a bar magnet is about

(1) 0.6   (2) 0.84
(3) 0.16   (4) 1

30. The end points of a current-carrying wire lie on the x-axis and y-axis as shown in the figure. The magnetic force on the wire is
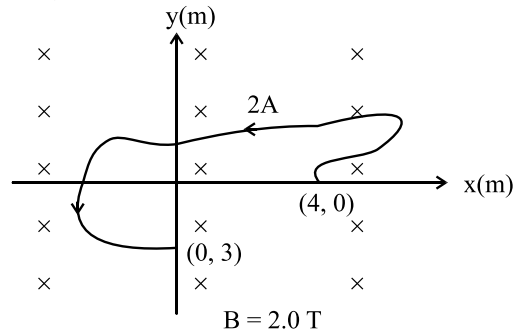
(1) 10 N   (2) 20 N
(3) 30 N   (4) Zero

31. Consider the following statements
(a) Eddy current loss is minimized by using laminated cores
(b) Self-inductance is called inertia of electricity.
Choose the correct statements.
(1) Only a   (2) Only b
(3) Both a and b   (4) Neither a nor b

32. The variation of an alternating current (I) varies with time (t) as shown in the figure. The average value of current for half cycle is
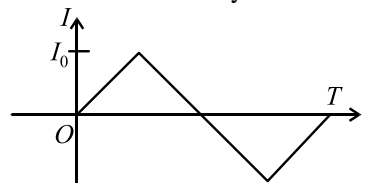
(1) Zero   (2) $\dfrac{I_0}{2}$

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

33. Which one of the following rays (or wave) has maximum speed in air?
(1) β-rays
(2) α-rays
(3) Sound wave
(4) Heat radiations

34. In compound microscope, intermediate image formed is
(1) Virtual, erect and magnified
(2) Real, erect and diminished
(3) Real, erect and magnified
(4) Virtual, erect and diminished

35. A convex mirror is dipped in a liquid whose refractive index is equal to the refractive index of material of mirror. Then its focal length will
(1) Become zero
(2) Become infinite
(3) Remain unchanged
(4) Become small but not zero

SECTION - B

36. In the double-slit experiment, what should be the width of each slit to obtain 8 maxima of the double slit pattern within the central maxima of single slit pattern with d = 3 mm?
(1) 0.6 mm
(2) 0.4 mm
(3) 0.75 mm
(4) 0.3 mm

37. The wave nature of electrons was first experimentally verified independently by
(1) Davisson and Germer
(2) Louis de Broglie
(3) Hallwachs and Lenard
(4) J.J. Thomson

38. The work function of a photosensitive surface is 3.2 eV. The wavelength of the incident radiation for which the stopping potential is 3V lies in the
(1) Visible region
(2) IR region
(3) UV region
(4) Radio wave region

39. The angular momentum of an electron in a hydrogen atom is proportional to (n is principle quantum number)
(1) n^2
(2) $\sqrt{n}$
(3) n
(4) n^3

40. 1 mg mass is equivalent to
(1) 5.66×10^{29} eV
(2) 4.2×10^{26} eV
(3) 9×10^{10} eV
(4) 5.66×10^{26} eV

41. Half -life of two radioactive substances A and B are 20 hours and 40 hours respectively. Initially the sample of A and B have equal number of nuclei. The ratio of remaining number of A to that of B nuclei after 80 hours is
(1) 1 : 2
(2) 1 : 4
(3) 1 : 8
(4) 1 : 16

42. The ratio of longest wavelengths corresponding to Lyman and Balmer series in hydrogen spectrum is
(1) $\dfrac{5}{36}$
(2) $\dfrac{5}{27}$
(3) $\dfrac{5}{9}$
(4) $\dfrac{3}{4}$

43. If a small amount of a trivalent atom is dropped with silicon crystal, then
(1) Its resistance is increased
(2) It becomes n-type semiconductor
(3) Semiconductor becomes electrically positive
(4) There will be holes in majority

44. An amplifier A with a negative feedback is shown in the diagram. Choose the correct expression for the close loop gain of the amplifier.
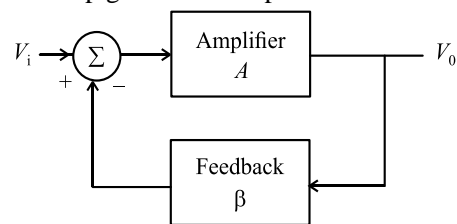
(1) $\dfrac{A}{1+A\beta}$
(2) $\dfrac{A}{1-A\beta}$
(3) $\dfrac{A\beta}{1+A\beta}$
(4) $\dfrac{A\beta}{1-A\beta}$

45. The output (X) of the logic circuit shown in the figure will be

(1) $\overline{A.B}$
(2) $\overline{A+B}$
(3) $A . B$
(4) $A + B$

46. **Assertion:** In a simple battery circuit, the point of the lowest potential is positive terminal of the battery.
Reason: The current flows towards the point of the higher potential, as it does in such a circuit from the negative to the positive terminal.
(1) If both Assertion and Reason are correct and the Reason is a correct explanation of the Assertion.
(2) If both Assertion and Reason are correct but Reason is not a correct explanation of the Assertion.
(3) If the Assertion is correct but Reason is incorrect.
(4) If both the Assertion and Reason are incorrect.

47. Assertion: In electric circuits, wires carrying currents in opposite directions are often twisted together.

Reason: If the wires are not twisted together, the combination of the wires forms a current loop, the magnetic field generated by the loop might affect adjacent circuits or components.

(1) If both Assertion and Reason are correct and the Reason is a correct explanation of the Assertion.

(2) If both Assertion and Reason are correct but Reason is not a correct explanation of the Assertion.

(3) If the Assertion is correct but Reason is incorrect.

(4) If both the Assertion and Reason are incorrect.

48. Assertion: Eddy currents are produced in any metallic conductor when magnetic flux is changed around it.

Reason: Electric potential determines the flow of charge.

(1) If both Assertion and Reason are correct and the Reason is a correct explanation of the Assertion.

(2) If both Assertion and Reason are correct but Reason is not a correct explanation of the Assertion.

(3) If the Assertion is correct but Reason is incorrect.

(4) If both the Assertion and Reason are incorrect.

49. Assertion: Choke coil is preferred over a resistor to control the current in an AC circuit.

Reason: Power factor of an ideal inductor is zero.

(1) If both Assertion and Reason are correct and the Reason is a correct explanation of the Assertion.

(2) If both Assertion and Reason are correct but Reason is not a correct explanation of the Assertion.

(3) If the Assertion is correct but Reason is incorrect.

(4) If both the Assertion and Reason are incorrect.

50. Assertion: The image of an extended object placed perpendicular to the principal axis of a mirror, will be erect if the object is real but the image is virtual.

Reason: The image of an extended object, placed perpendicular to the principal axis of a mirror, will be erect if the object is virtual but the image is real.

(1) If both Assertion and Reason are correct and the Reason is a correct explanation of the Assertion.

(2) If both Assertion and Reason are correct but Reason is not a correct explanation of the Assertion.

(3) If the Assertion is correct but Reason is incorrect.

(4) If both the Assertion and Reason are incorrect.

SECTION-II (CHEMISTRY)

SECTION - A

51. Choose the correct statement.

(1) For a real gas, C_p changes with temperature but does not change with pressure.

(2) For an ideal gas, C_p changes neither with temperature nor with pressure.

(3) For an ideal gas, C_p changes with the temperature but not with pressure.

(4) For an ideal gas, C_p changes with both temperature and pressure.

52. In a monoclinic unit cell the relation of sides and angles are respectively:

(1) $a = b \neq c$ and $\alpha = \beta = \gamma = 90°$

(2) $a \neq b \neq c$ and $\alpha = \beta = \gamma = 90°$

(3) $a \neq b \neq c$ and $\alpha = \gamma = 90° \neq \beta$

(4) $a \neq b \neq c$ and $\alpha \neq \beta \neq \gamma \neq 90°$

53. The correct decreasing rate of hydrogenation of the olefins is

(A) $Me_2C = CMe_2$ (B) $MeHC = CH_2$

(C) $CH_3CH = CHCH_3$ (D) $CH_2 = CH_2$

(1) ABCD   (2) DBCA

(3) DCAB   (4) ACBD

54. An example of a colligative property is

(1) Boiling point   (2) Freezing point

(3) Osmotic pressure (4) Vapour pressure

55. Kelvin's thermodynamic scale of temperature is based on

(1) Charles' law

(2) Joule' law

(3) Dalton's law

(4) Carnot's principle

56. Suppose that a hypothetical atom gives a red, green, blue and violet line spectrum. Which jump according to figure would give off the red spectral line.
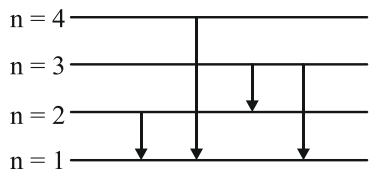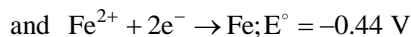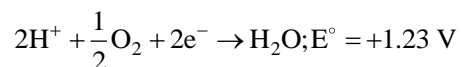

(1) $3 \to 1$ (2) $2 \to 1$

(3) $4 \to 1$ (4) $3 \to 2$

57. The reversible work done by one mole of an ideal gas when it is compressed isothermally at 300 K from 1 atm to 10 atm is

(1) 1381cal   (2) −1381 cal

(3) 270 cal   (4) 243 cal

58. Name the last radioactive element of noble gas family.

(1) Radon   (2) Xenon

(3) Oganesson   (4) Californium

59. How many neutron particles are emitted on collision of californium with calcium

(1) 2   (2) 1

(3) 3   (4) 4

60. Which of the following statement is incorrect?

(1) Og is a radioactive element with half-life of 0.7 milliseconds.

(2) Electron gain enthalpy for noble gases is a positive value.

(3) Atomic radius of noble gases decreases down the group.

(4) Helium has the lowest boiling point of any known substance.

61. Three reactions involving $H_2PO_4^-$ are given below:

(i) $H_3PO_4 + H_2O \to H_3O^+ + H_2PO_4^-$

(ii) $H_2PO_4^- + H_2O \to HPO_4^{2-} + H_3O^+$

(iii) $H_2PO_4^- + OH^- \to H_3PO_4 + O^{2-}$

In which of the above, does $H_2PO_4^-$ act as an acid?

(1) (ii) only   (2) (i) and (ii)

(3) (iii) only   (4) (i) only

62. The reaction of potassium ferrocyanide with hydrogen peroxide gives

(1) Potassium ferricyanide

(2) potassium cyanide

(3) Potassium ferricyanide and potassium hydroxide

(4) potassium hydroxide

63. Which of the following is correct?

(A) Oxidation = addition of oxygen

(B) Oxidation = addition of electronegative element

(C) Oxidation = removal of hydrogen

(D) Oxidation = removal of electronegative element

(1) ABC   (2) BCD

(3) ACD   (4) ABCD

64. How many stereocenters are present in isobutyl chloride?

(1) 1   (2) 2

(3) 3   (4) 0

65. In common name system, gem –dihalides are called _____ and vicinal-dihalides are called ____.

(1) Alkylidene halides and alkylidene halides

(2) Alkylidene halides and alkylene halides

(3) Alkylene halides and alkylene halides

(4) Alkylene halides and alkylidene halides

66. Solubility product constant (K_{sp}) of salts of types MX, MX_2 and M_3X at temperature T are 4.0×10^{-8}, 3.2×10^{-14} and 2.7×10^{-15}, respectively. Solubilities (in mol dm^{-3}) of the salts at temperature T are in the order:

(1) $MX > MX_2 > M_3X$

(2) $M_3X > MX_2 > MX$

(3) $MX_2 > M_3X > MX$

(4) $MX > M_3X > MX_2$

67. Which of the following is correct?

(1) $CH_3F > CH_3Cl > CH_3Br > CH_3I$ (Dipole moment)

(2) $CH_2Cl_2 < CCl_4$ (density)

(3) Alkyl nitrite and nitroalkanes have C-N linkage

(4) All are correct

68. The Tyndall effect is observed only when following conditions are satisfied:

(a) The diameter of the dispersed particles is much smaller than the wavelength of the light used.

(b) The diameter of the dispersed particles is not much smaller than the wavelength of the light used

(c) The refractive indices of the dispersed phase and dispersion medium are almost similar in magnitude.

(d) The refractive indices of the dispersed phase and dispersion medium differ greatly in magnitude.

(1) (b) and (d)   (2) (a) and (c)

(3) (b) and (c)   (4) (a) and (d)

69. Which of the following statements are incorrect for XeOF₄?
   A. It has a square planar structure
   B. It has a square pyramidal structure
   C. It has pentagonal bipyramidal structure
   D. It has 2 lone pair of electrons around Xenon
   (1) ABC
   (2) BCD
   (3) ACD
   (4) ABCD

70. Which of the following is tetrabasic acid?
   (1) $H_4P_2O_7$
   (2) H_3PO_4
   (3) H_3PO_3
   (4) H_3PO_2

71. Fischer projection indicates
   (1) Horizontal substituents above the plane
   (2) Vertical substituents above the plane
   (3) Both horizontal and vertical substituents below the plane
   (4) Both horizontal and vertical substituents above the plane

72. Chlorination of toluene gives
   (1) Only meta-substituted product
   (2) Only para-substituted product
   (3) Mixture of ortho and para substituted product
   (4) Mixture of ortho and mete-substituted product

73. Table sugar is
   (1) A disaccharide of D-glucose and D-fructose
   (2) A disaccharide of D-Glucose and L-fructose
   (3) A disaccharide of L-glucose and L-fructose
   (4) A disaccharide of L-glucose and D-fructose

74. In E₂ elimination, some compounds follow Hoffmann rule which means
   (1) The double bond goes to the most substituted position
   (2) The compound is resistant to elimination
   (3) No double bond is formed
   (4) The double bond goes mainly towards the least substituted carbon

75. In pyridine the electrophilic substitution occurs at which position
   (1) 2
   (2) 3
   (3) 4
   (4) 2, 4

76. Which of the following is called solvolysis?
   (1) S_N1 reaction
   (2) S_N2 reaction
   (3) Both (1) and (2)
   (4) None of these

77. The half-cell reactions for rusting of iron are:
   $$2H^+ + \frac{1}{2}O_2 + 2e^- \rightarrow H_2O; E^\circ = +1.23 \text{ V}$$
   and $Fe^{2+} + 2e^- \rightarrow Fe; E^\circ = -0.44$ V
   ΔG° (in kJ/mol) for the overall reaction is:
   (1) −76
   (2) −322
   (3) −122
   (4) −176

78. In a galvanic cell, the salt bridge
   (1) does not participate chemically in the cell reaction.
   (2) stops the diffusion of ions from one electrode to another.
   (3) is necessary for the occurrence of the cell reaction.
   (4) ensures mixing of the two electrolytic solutions.

79. **Assertion:** Bacteria, fungi, molds and algae are viable particulates.
   Reason: Smoke particulates consist of solid or mixture of solid and liquid particles formed during combustion of organic matter.
   (1) Assertion is correct, reason is correct; reason is a correct explanation for assertion.
   (2) Assertion is correct, reason is correct; reason is not a correct explanation for assertion.
   (3) Assertion is correct, reason is incorrect
   (4) Assertion is incorrect, reason is correct

80. What is the correct designation for the following compound?
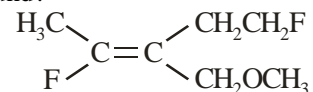
   (1) E
   (2) Z
   (3) Cis
   (4) Trans

81. Which of the following is incorrect?
   (1) Inductive effect is a permanent effect.
   (2) Inductive effect operates through pi bond.
   (3) Nitro group is an electron withdrawing group.
   (4) Hyperconjugation involves delocalization of sigma electron.

82. The following mechanism has been proposed for the reaction of NO with Br₂ to form NOBr.
   $$NO(g) + Br_2(g) \rightleftharpoons NOBr_2(g);$$
   $$NOBr_2(g) + NO(g) \rightarrow 2NOBr(g) \text{ (slow step)}$$
   If the second step is the rate determining step, the order of the reaction with respect to NO(g) is
   (1) 1
   (2) 0
   (3) 3
   (4) 2
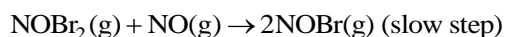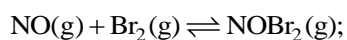
83. Higher order (>3) reactions are rare due to:
    (1) low probability of simultaneous collision of all the reacting species
    (2) increase in entropy and activation energy as more molecules are involved
    (3) shifting of equilibrium towards reactants due to elastic collisions
    (4) loss of active species on collision

84. The following statements concern elements in the periodic table. Which of the following is true?
    (1) The Group 13 elements are all metals.
    (2) All the elements in Group 17 are gases.
    (3) Elements of Group 16 have lower ionization enthalpy values compared to those of Group 15 in the corresponding periods.
    (4) For Group 15 elements, the stability of +5 oxidation state increases down the group.

85. Magnesium perchlorate absorbs _____ vapours whereas soda-lime absorbs _____ in Liebig-Pregel method to determine the quantity of carbon and hydrogen in a given organic compound.
    (1) Water and water
    (2) Water and carbon dioxide
    (3) Bromine and water
    (4) Water and carbon

SECTION - B

86. Which of the following is not method to determine either the quality of nitrogen in an organic compound?
    (1) Sodium fusion test
    (2) Dumas method
    (3) Kjeldahl method
    (4) None of these

87. Which of the following is not correct?
    (1) Methane cannot be synthesised via Wurtz method
    (2) Lithium dialkyl cuprate is known as Gilman reagent.
    (3) Soda lime is a mixture of potassium hydroxide and calcium oxide.
    (4) Wolff-Kishner reduction converts propanal to propane.

88. Alkyl boranes on reaction with acetic acid gives
    (1) Alkanes   (2) Alkenes
    (3) Alkynes   (4) All of three

89. The peroxides are known to be good free radical generators. Why?
    (1) They are cheap
    (2) They are very reactive

(3) They contain a weak oxygen-oxygen single bond which cleaves homolytically to give radicals.
(4) They absorb sunlight effectively.

90. Cortisone is a molecular substance containing 21 atoms of carbon per molecule. The mass percentage of carbon in cortisone is 69.98%. Its molar mass is:
    (1) 200.2   (2) 185.5
    (3) 280.3   (4) 360.1

91. Which of the following is bidentate ligand?
    (1) Diphos   (2) Tetrameen
    (3) tn   (4) All

92. Which is the correct hybridisation of $[Ti(H_2O)_6]^{+3}$?
    (1) sp^3 (2) sp^3d^2
    (3) d^2sp^3 (4) d^3sp^3

93. For the following reaction, the mass of water produced from 445 g of $C_{57}H_{110}O_6$ is:
$$2C_{57}H_{110}O_6(s) + 163O_2(g) \rightarrow 114CO_2(g)$$
$$+110H_2O(l)$$
    (1) 490 g   (2) 445 g
    (3) 495 g   (4) 890 g

94. Which of the following is false?
    (1) Spin-paired octahedral complex is given by strong ligands.
    (2) $[FeF_6]^{3-}$ is an inner orbital complex.
    (3) Outer-orbital complex have sp^3d^2 hybridisation.
    (4) None

95. KO_2 (potassium super oxide) is used in oxygen cylinders in space and submarines because it:
    (1) Absorbs CO_2 and increases O_2 contents
    (2) Eliminates moisture
    (3) Absorbs CO_2
    (4) Produces ozone

96. The anode mud in the electrolytic refining of silver contains:
    (1) Zn, Cu, Ag, Au (2) Zn, Ag, Au
    (3) Cu, Ag, Au   (4) Au only

97. Calculate the total pairing energy of high spin d^7 system.
    (1) P   (2) 2P
    (3) 3P   (4) 4P

98. Which of the following gives H_2O_2 on hydrolysis?
    (1) $H_2S_2O_3$ (2) H_2SO_5
    (3) $H_2S_2O_7$ (4) $H_2S_4O_6$

99. **Assertion:** copper, silver and gold belong to the same group.
   Reason: All the three shown anomalous electronic configuration.
   (1) Assertion is correct, reason is correct; reason is a correct explanation for assertion.
   (2) Assertion is correct, reason is correct; reason is not a correct explanation for assertion.
   (3) Assertion is correct, reason is incorrect
   (4) Assertion is incorrect, reason is correct

100. **Assertion:** Transition metals are hard and brittle.
   Reason: It is because of the presence of strong metallic bonding among the atoms of these elements.
   (1) Assertion is correct, reason is correct explanation for assertion.
   (2) Assertion is correct, reason is correct; reason is not a correct explanation for assertion
   (3) Assertion is correct, reason is incorrect
   (4) Assertion is incorrect, reason is correct

SECTION-III (BOTANY)

<u>SECTION - A</u>

101. The importance of molybdenum in plant metabolism is
   (1) Breeding   (2) Carbon assimilation
   (3) Nitrate reduction (4) Synthesis of organic acids

102. Yellowing of leaves occurs by deficiency of
   (1) Fe & Ca   (2) Zn & B
   (3) B & P   (4) Fe and Mg

103. The common intermediate between carbohydrate and fat metabolism is:
   (1) PEP   (2) Pyruvate
   (3) Acetyl CoA   (4) Citric acid
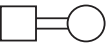
104. Organic acid which undergoes both dehydrogenation and decarboxylation during Krebs's cycle?
   (1) Citric acid   (2) α-Ketoglutaric acid
   (3) Pyruvic acid   (4) Succinic acid

105. Which of the following statement is incorrect?
   (1) Double fertilization is found in angiosperms only
   (2) Endosperm formation occurs usually prior to the zygotic division
   (3) Length of pollen tube depends on the length of styles
   (4) When pollen is shed at 2-celled stage, double fertilization does not take place

106. In a pedigree analysis ▢—◯ symbol represents–
   (1) Consanguineous mating
   (2) Affected progeny
   (3) Non-identical twins
   (4) Unrelated mating

107. In the following figure, label the parts A, B, C, D, E
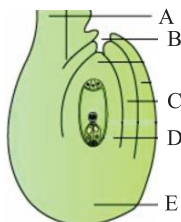
   (1) Hilum, Funicle, inner integument, nucellus, micropyle
   (2) Funicle, micropyle, inner integument, nucellus, chalazal pole
   (3) Hilum, Funicle integument, Embryo sac, chalazal pole
   (4) Funicle, Hilum, integument, Embryo sac, Micropylar pole

108. Vegetative propagation by roots occurs in which of the following plants:
   (1) Sweet potato   (2) *Dahlia*
   (3) Shisham   (4) All of these

109. Identify the correct statement:
   (1) In a test cross, F_1 generation can be crossed with one of the two parents from which it is derived
   (2) Cross of F_1 individual with either of the two parents is back cross
   (3) Cross between heterozygous F_1 hybrid and dominant homozygous parent is test cross
   (4) Test cross is used to find out phenotype of dominant plant of F_2 generation

110. The following diagram represents response of organisms to abiotic factors what do a, b, c represent:
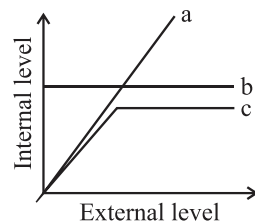
	a	b	c
(1)	Regulator	Conformer	Partial regulator
(2)	Partial regulator	Conformer	Regulator
(3)	Conformer	Partial regulator	Regulator
(4)	Conformer	Regulator	Partial regulator

111. More realistic growth curve is represented by:

(1) $\dfrac{dN}{dt} = N$ (2) $\dfrac{dN}{dt} = rN$

(3) $\dfrac{dN}{dt} = rN\left(1 - \dfrac{N}{K}\right)$ (4) $\dfrac{dN}{dt} = 1 - \dfrac{N}{K}$

112. Match the following column:

	Column-I		Column-II
A.	Commensalism	i.	Sparrow and any seed
B.	Predation	ii.	*Balanus* and *Chathamalus*
C.	Ammensalism	iii.	Fig and wasp
D.	Competition	iv.	Barnacles and whale
E.	Mutualism	v.	*Penicillium* and Bacteria

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

113. Half inferior ovary is found in:
(1) Mustard   (2) Sunflower
(3) Rose   (4) China Rose

114. Vascular tissues in angiosperms develop from:
(1) Epiblema   (2) Phellogen
(3) Plerome   (4) Dermatogen

115. As per central pollution control board, which size of particulate matter in diameter of air pollutants is causing greatest harm to human health?
(1) 1.0 mm or less   (2) 2.0 mm or more
(3) 1.5 mm or less   (4) 2.5 mm or less

116. Cell wall of which of the following is composed of cellulose:
(1) *Pseudomonas*   (2) *Neurospora*
(3) *Xanthomonas*   (4) *Chlamydomonas*

117. Select the correct statement about Mitosis
(1) Chromatids separate and move to opposite poles in Telophase
(2) Endoplasmic reticulum reforms at end of anaphase stage
(3) Centromeres lie at the equator while arms are directed towards poles in metaphase stage
(4) Spindle fibres attach to kinetochores of chromosomes in late prophase

118. Crossing over in diploid organisms is responsible for which of the following:
(1) Segregation of genes
(2) Linkage
(3) Recombination of linked genes
(4) None of these

119. Which stage is characterized by appearance of recombination nodules?
(1) Pachytene   (2) Diplotene
(3) Zygotene   (4) Metaphase

120. Structure help in cyclosis of cytoplasm and cleavage of cell are:
(1) Microfilaments
(2) Microtubules
(3) Intermediate filaments
(4) All of these

121. Choose the correct statement from the following
(1) Enzymes that convert fats into carbohydrates occur in mitochondria
(2) Starch storing plastids are called elaioplasts
(3) Microtubules are formed of mainly actin protein
(4) Lysosomal enzymes are called acid hydrolases

122. If a green plant is placed in air free of oxygen, would it live longer in light or in dark or die?
(1) It can live longer in light
(2) It can live longer in dark
(3) It can live longer in light and dark both
(4) It will die in both light and dark conditions

123. Consider the following statements:
Statement I: In C_4 pathway pyruvic acid is generated in the cells and is transferred back to mesophyll cells.
Statement II: C_3 plants are more efficient than C_4 plants due to absence of photorespiration.
(1) Both statements are correct
(2) Both statements are incorrect
(3) Only statement I is correct
(4) Only statement II is correct

124. Enzymes that degrade nucleic acids, proteins polysaccharides are located in–
(1) Lysosomes
(2) Mitochondrial matrix
(3) SER
(4) Golgi complex

125. Consider the following statements:
   (1) CO_2 acceptor in C_3 plants is Ribulose 1, 5 diphosphate.
   (2) Oxaloacetate is first stable product of C_4 plant.
   (3) In C_3 plants, all cells participating in photosynthesis have one type of chloroplasts.
   (4) All are correct statements.

126. Identify the wrong pair:
   (1) Glycolysis   -   EMP pathway
   (2) TCA cycle   -   Kreb's cycle
   (3) Cyclic   -   PS II
       photophosphorylation
   (4) Yeast   -   Fermentation

127. Falling of leaves occurs when the amount of
   (1) Abscisic acid increases
   (2) Cytokinin decreases
   (3) Auxin decreases
   (4) Gibberellin decreases

128. Assertion (A): Rolling of leaves of grasses in dry weather occur due to Collapsing of Bulliform cells on surface of leaves.
   Reason (R): Bulliform cells occurs in monocots and assist to roll leaves to avoid water loss.
   (1) Both A and R are correct and R is the correct explanation of A.
   (2) Both A and R are correct but R is not the correct explanation of A.
   (3) A is correct but R is incorrect.
   (4) A is incorrect but R is correct.

129. Which phytohormone break seed dormancy and promote their germination?
   (1) Ethylene   (2) Gibberellin
   (3) Auxin   (4) Cytokinin

130. Assertion (A): When plant cells are placed in highly concentrated sugar solution, they become turgid.
   Reason (R): Highly concentrated sugar solution acts as hypertonic solution which leads to exosmosis.
   (1) Both A and R are correct and R is the correct explanation of A.
   (2) Both A and R are correct but R is not the correct explanation of A.
   (3) A is correct but R is incorrect.
   (4) A is incorrect but R is correct.

131. Wilting of plants occurs when:
   (1) Humidity increases
   (2) Temperature increases
   (3) Heavy rainfall
   (4) All of these

132. The first step in taxonomy is:
   (1) Identification   (2) Description
   (3) Classification   (4) Nomenclature

133. Which of the following disease is not caused by virus?
   (1) Herpes
   (2) Mumps
   (3) Small pox
   (4) Syphilis

134. The given diagram represents which of the following plant species:
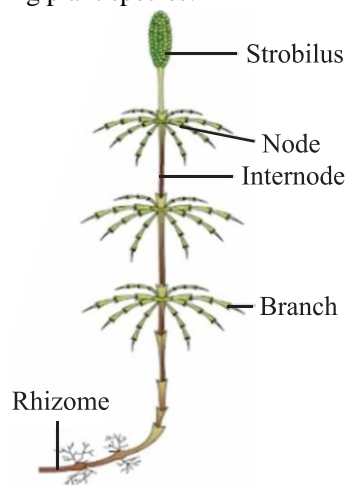
   (1) *Selaginella*   (2) *Equisetum*
   (3) *Funaria*   (4) *Salvinia*

135. Consider the following statements and choose the correct answer:
   Statement I: Sexual reproduction is of oogamous type in Bryophyta.
   Statement II: *Selaginella* bears two types of spores hence it is heterosporous.
   (1) Both statements are correct.
   (2) Both statements are incorrect.
   (3) Only statement I is correct.
   (4) Only statement II is correct.

SECTION - B

136. Assertion (A): DNA replication is followed by cell division in Eukaryotes.
   Reason (R): Cell expansion and polyploidy occurs if cell do not divide after DNA replication.
   (1) Both A and R are correct and R is the correct explanation of A.
   (2) Both A and R are correct but R is not the correct explanation of A.
   (3) A is correct but R is incorrect.
   (4) A is incorrect but R is correct.

137. If percentage of Adenine is 18%, then percentage of cytosine will be:
   (1) 64%   (2) 32%
   (3) 18%   (4) 24%

138. The main aim of human genome project is:
    (1) To identify and sequence all the genes present in human DNA.
    (2) To remove disease causing genes from human DNA.
    (3) To eliminate all the diseases occurring in humans.
    (4) All of these

139. Consider the following statements:
    (a) Methyl guanosine triphosphate is added to 5' end of *hn*RNA.
    (b) A segment of DNA coding for polypeptide is Intron.
    (c) *r*RNA provides template for synthesis of proteins.
    (d) RNA polymerase I transcribes *r*RNA
    (e) Rho factor binds to RNA polymerase to terminate transcription.
    (1) (a) and (c) are correct.
    (2) (a) and (b) are correct.
    (3) (a), (d) and (e) are correct.
    (4) (b), (c) and (e) are correct.

140. In DNA fingerprinting, the term probe refers to:
    (1) A single stranded RNA sequence tagged with a radioactive molecule.
    (2) A single stranded DNA sequence tagged with a radioactive molecule.
    (3) A double stranded DNA sequence tagged with a radioactive molecule.
    (4) A double stranded RNA sequence tagged with a radioactive molecule.

141. Test cross is a cross between
    (1) Hybrid X dominant parent
    (2) Hybrid X recessive parent
    (3) Hybrid X Hybrid parent
    (4) Two closely related species

142. Which is not true for translation?
    (1) *t*RNA is present in the cytoplasm and help in bringing activated amino acids to Ribosomes.
    (2) Translation begins when small subunit of Ribosomes encounters an *m*RNA.
    (3) Untranslated regions are present in between start and stop codon.
    (4) The hydrolysis of GTP provide energy during initiation, elongation and termination of peptide chain.

143. A women having blood group O married with a man having blood group AB. Which blood group may be expected in their progenies?
    (1) A   (2) B
    (3) AB   (4) Both (1) and (2)

144. What percent of gymnosperm species in the world facing the threat of extinction?
    (1) 12%   (2) 23%
    (3) 31%   (4) 33%

145. Match the items in column I with suitable terms in column II.

	Column I		Column II
A.	IR-8	i.	*Abelmoschus esculentus*
B.	Prabhani Kranti	ii.	Okra
C.	Pusa A-4	iii.	*Brassica*
D.	Pusa swarnim	iv.	*Oryza sativa*

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

146. Identify the incorrect statement about Breeding?
    (1) To evolve a pureline in any animal, inbreeding is necessary.
    (2) A single outcross often helps to overcome inbreeding depression.
    (3) Superior males of one breed are mated with superior females of another breed is out-breeding method.
    (4) Continuous inbreeding especially close inbreeding reduces fertility and productivity.

147. Which of the following converts nitrites to nitrates?
    (1) *Nitrobacter*   (2) *Nitrosomonas*
    (3) *Azotobacter*   (4) *Clostridium*

148. Cyclosporin-A is used as
    (1) To treat respiratory diseases
    (2) Blood-cholesterol lowering agent
    (3) Immunosuppressive agent
    (4) Regulate blood pressure

149. The Biomass available for consumption by herbivores and decomposers is called as
    (1) NPP   (2) Secondary productivity
    (3) Standing crop   (4) GPP

150. Which of the following greenhouse gases contributes about 14% to global warming?
    (1) CO_2 (2) CFCs
    (3) CH_4 (4) N_2O

SECTION - A

151. How many germ layers are present in the embryonic stages of phylum platyhelminthes?
(1) One   (2) Two
(3) Three   (4) Four

152. Arthropoda is best characterised by
(1) Triploblastic, bilateral symmetry and abdominal appendages
(2) Bilateral symmetry and two pairs of wings
(3) Acoelomate and radial symmetry
(4) Exoskeleton, metameric segmentation and jointed appendages

153. In which of the following animals is the notochord replaced by bony vertebral columns in adult?
(1) *Ascidia*   (2) *Branchiostoma*
(3) *Petromyzon*   (4) *Labeo*

154. Identify a character that is not desirable in a cloning vector:
(1) An inactive promoter
(2) An origin of replication site
(3) Selectable markers such as genes for antibiotic resistance
(4) One or more unique restriction endonuclease site

155. Match column I with column II:

Column I (Animals)		Column II (Characters)	
a.	*Torpedo*	i.	Presence of a poisonous sting
b.	*Trygon*	ii.	Presence of electric organs
c.	*Pila*	iii.	Presence of swim bladder
d.	*Labeo*	iv.	Presence of radula

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

156. In cockroach the wings that help in flying are
(1) Fore wings
(2) Mesothoracic wings
(3) The hind wings which are transparent and membranous
(4) Tegmina

157. Muscle is connected to bone by
(1) Tendon   (2) Ligament
(3) Adipose tissue   (4) Areolar tissue

158. The stem cells which have potency to give rise to all tissues and organs are formed from
(1) Trophoblast   (2) Umblical cord
(3) Inner cell mass   (4) Placenta

159. Collagen is
(1) Hormone
(2) Enzyme
(3) Transporter
(4) Intercellular ground substance

160. Casein of milk is a
(1) Nucleoprotein   (2) Metalloprotein
(3) Phosphoprotein   (4) Chromoportein

161. **Statement I:** If the total amount of adenine in eukaryotic dsDNA is 30% then total pyrimidine content is 50%.
Statement II: Nitrogenous bases donot form parts of backbone in DNA
Select the correct option
(1) Statement I is incorrect
(2) Statement II is incorrect
(3) Both statement I and II are incorrect
(4) Both statement I and II are correct

162. Oxytocin helps in
(1) Ovulation
(2) Lactation and Childbirth
(3) Lactation but not child birth
(4) Childbirth but not Lactation

163. Which of the following factors affecting enzyme activity is depicted in the given graph?
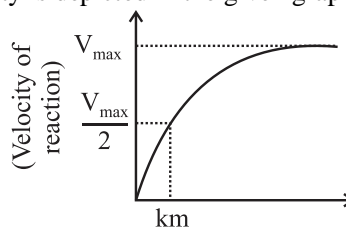
(1) pH
(2) Temperature
(3) Product concentration
(4) Substrate concentration

164. Cholesterol is a
(1) Wax   (2) Triglyceride
(3) Steroid   (4) Phospholipid

165. **Assertion (A):** All enzymes are proteinaceous in nature.
Reason (R): Ribozymes are not proteinaceous in nature.
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)

166. Secretion of parietal cells does not include
(1) Pepsinogen and mucous
(2) HCl
(3) Castle's intrinsic factor
(4) Both (2) and (3)

167. The optimum pH for the action of ptyalin is
(1) 1.8   (2) 6.8
(3) 7.8   (4) 9.8

168. Jaundice is a disorder of
(1) Skin and eyes
(2) Digestive system
(3) Excretory system
(4) Respiratory system

169. Respiratory organ of *Columba livia* is
(1) Lungs   (2) Gills
(3) Skin   (4) All of these

170. The maximum volume of air a person can breathe in after a forced expiration
(1) Vital capacity   (2) ERV + TV + IRV
(3) TLC – RV   (4) All of these

171. Choose the incorrect match.
(1) P wave   – Depolarisation of atria
(2) Q wave   – Excitation of atria
(3) QRS complex – Depolarisation of ventricle
(4) T wave   – Repolarisation of ventricle

172. Rate of heart beat and cardiac output can be increased by
(1) Neural signals through the sympathetic nerves
(2) Parasympathetic neural signals
(3) Adrenal medullary hormones
(4) Both (1) and (3)

173. **Assertion (A):** Lubb sound is produced by closing of AV valves during ventricular systole
Reason (R): It is low pitched and of longer duration
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 (B) 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)

174. Nearly all of the essential nutrients and 70-80% of electrolytes and water are reabsorbed in which segment of nephron?
(1) PCT
(2) Ascending limb of loop of Henle
(3) Descending limb of loop of Henle
(4) DCT

175. Amount of CO_2 removed by our lungs per minute is
(1) 200 ml   (2) 300 ml
(3) 100 ml   (4) 500 ml

176. Ball and socket joint is found in
(1) Shoulder joint
(2) Hip joint
(3) Between atlas and axis
(4) Both (1) and (2)

177. Globular regulatory protein of skeletal muscle fibres is
(1) Tropomyosin   (2) Troponin
(3) Actin   (4) Myosin

178. Receptor sites for neurotransmitters are present on
(1) Membrane of synaptic vesicles
(2) Pre-synaptic membrane
(3) Tips of axon
(4) Post synaptic membrane

179. Which of the following is not a part of knee jerk reflex?
(1) Afferent pathway
(2) Muscle spindle
(3) Efferent pathway
(4) Interneuron

180. **Statement I:** Thymus is a soft-bilobed structure where two lobes lie side-by-side and are joined in the middle by connective tissues
Statement II: Thymus size is maximum at about 15 years of age.
Choose the appropriate answer.
(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

181. Innermost layer of adrenal cortex secrete mainly
(1) Aldosterone
(2) Cortisol
(3) Androgenic steroids
(4) Epinephrine

182. Ovary is connected to pelvic wall by
(1) Tendons   (2) Ligaments
(3) Muscles   (4) Bones

183. The layer which undergoes cyclical changes during menstrual cycle is
(1) Perimetrium   (2) Myometrium
(3) Endometrium   (4) Both (2) and (3)

184. Which of the following STD is transmitted by bacteria?
(1) AIDS   (2) Chlamydiasis
(3) Genital herpes   (4) Genital warts

185. Genetic drift operates in
(1) Small isolated population
(2) Large isolated population
(3) Non-reproductive population
(4) Slow reproductive population

SECTION - B

186. Gene pool is
(1) Genotype of an individual in a population
(2) Different genes of all individuals of a species found in an area
(3) Pool of artificially synthesised genes
(4) Genes of a genus

187. Choose the incorrect option
(1) Life began in water
(2) Invertebrates evolve around 500 mya
(3) Lobefins are thought to be evolved into first amphibians
(4) Fishes are the first water organisms

188. Due to continental drift, South American mammals were overridden by
(1) Australia mammals
(2) North America flora
(3) South America flora
(4) North-America fauna

189. Disease caused by helminthes is/are :
(1) Ascariasis   (2) Filariasis
(3) Ringworm   (4) Both (1) and (2)

190. Example of physiological barriers are
(1) PMNL   (2) Saliva in mouth
(3) Interferons   (4) Skin

191. AIDS disease was first reported in
(1) USA   (2) France
(3) Russia   (4) Germany

192. Assertion (A): Filariasis is caused by *Wuchereria*.
Reason (R): Filariasis is commonly called as Elephantiasis
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 the (R) is not the correct explanation of (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

193. The best breeding method for animals that are below average in productivity in milk production would be:
(1) Inbreeding
(2) Out-crossing
(3) Cross-breeding
(4) Interspecific hybridisation

194. rDNA is
(1) Chimeric DNA
(2) Hybrid DNA-RNA
(3) Recombination of vector DNA and desired gene
(4) Both (1) and (3)

195. In case of BamHI, H represents
(1) Genus
(2) Species
(3) Name of scientist
(4) Strain

196. Agrose gel is extracted from
(1) Sea water   (2) Sea-weeds
(3) Sea-animals   (4) Sea-gooseberry

197. In bacteria, plasmid is
(1) Extra chromosomal material
(2) Main DNA
(3) Non-functional DNA
(4) Repetitive DNA

198. Transgenic animals are produced for
(1) Medicine   (2) Agriculture
(3) Industry   (4) All of these

199. Silencing of mRNA has been used in producing transgenic plants resistant to
(1) White rusts   (2) Bacterial blights
(3) Boll worm   (4) Nematodes

200. The first transgenic plant is
(1) Tomato   (2) Tobacco
(3) Rice   (4) Soyabean

Test Series (2023)

Mock Test-05

NEET

ANSWER KEY

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

SECTION – I (PHYSICS)

1. **(2)**

$[Qt] = [M^0L^0T^0]$

$\Rightarrow [Q] = [M^0L^0T^{-1}]$

$\dfrac{[P]}{[Q]} = \left[M^0LT^0\right]$

$[P] = [M^0LT^0][M^0L^0T^{-1}]$

$\Rightarrow [PQ] = [M^0LT^{-1}][M^0L^0T^{-1}]$

$[PQ] = [M^0LT^{-2}]$

2. **(1)**

$\dfrac{\Delta t}{t} = \dfrac{\Delta T}{T} = \dfrac{0.2}{50}$

$\dfrac{\Delta t}{t} \times 100 = \dfrac{0.2}{50} \times 100 = 0.4\%$

3. **(4)**

Given $\sqrt{\dfrac{2h}{g}} - \sqrt{\dfrac{2\left(\dfrac{h}{2}\right)}{g}} = \sqrt{2} - 1$

$\sqrt{\dfrac{h}{g}}\left[\sqrt{2} - 1\right] = \sqrt{2} - 1$

$\Rightarrow h = 10$ m

$\Rightarrow u = \sqrt{2gh} = \sqrt{2 \times 10 \times 10}$

$u = 10\sqrt{2}$ m/s

4. **(1)**

$R_{max} = \dfrac{u^2}{g} = 50\,m$

$H_{max} = \dfrac{u^2}{2g} = \dfrac{50}{2} = 25$ m

5. **(4)**

$\vec{A} + \vec{B} = \left(2\hat{i} + 3\hat{j}\right) + \left(3\hat{i} + 3\hat{j} + 2\hat{k}\right)$
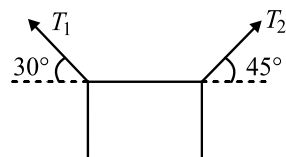
$= 5\hat{i} + 6\hat{j} + 2\hat{k}$

$\dfrac{\vec{A} + \vec{B}}{\left|\vec{A} + \vec{B}\right|} = \dfrac{5\hat{i} + 6\hat{j} + 2\hat{k}}{\sqrt{5^2 + 6^2 + 2^2}}$

$= \dfrac{5\hat{i} + 6\hat{j} + 2\hat{k}}{\sqrt{65}}$

6. **(2)**

From *F.B.D* of block

$T_1 \cos 30° = T_2 \cos 45°$

$\dfrac{T_1\sqrt{3}}{2} - \dfrac{T_2}{\sqrt{2}} = 0$

$\sqrt{3}T_1 - \sqrt{2}T_2 = 0$

7. **(4)**

$(f_{lim})_B = 4 \times 10 \times 0.5 = 20$ N

Since $(f_{lim})_B > F_{applied}$

$\Rightarrow$ Block *B* will not move and tension in the will be zero and block *A* have no pulling for have no tendency to move.

Hence $f_A = 0$

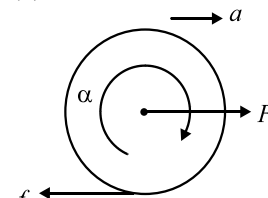**8.** **(1)**

$W = \vec{F} \cdot \Delta \vec{r}$

$W = \left(\hat{i} + 2\hat{j} + 3\hat{k}\right) \cdot \left(3\hat{i} + 4\hat{j} + 5\hat{k}\right)$

$= 3 + 8 + 15 = 26$ J

9. **(1)**

Kinetic energy of a moving particle is always positive and it is a scalar quantity.

10. **(4)**

$F - f = ma$ ……… (1)

$f \cdot R = \dfrac{2}{5}mR^2 \cdot \alpha$ ……… (2)

$a = R\alpha$ ………. (3)

$f = \dfrac{2}{5}ma$

From equation (1), (2) and (3)

$F - f = ma$

$\Rightarrow F - \dfrac{2}{5}ma = ma$

$\Rightarrow F = \dfrac{7}{5}ma$

$\Rightarrow ma = \dfrac{5}{7}F$

$f = \dfrac{2}{5}ma = \dfrac{5}{7}F \times \dfrac{2}{5} = \dfrac{2}{7}F$

11. **(4)**

Mass of the body remains same while weight varies from place to place.

12. **(4)**

$|\vec{F}_D| = 0$ and for points *A*, *B* and *C* force of interaction is repulsive and for point *E*, Force is attraction is repulsive and for point *E*, force is attractive in nature. Hence $\vec{F}_C.\vec{F}_E < 0$ because both are in opposite direction.

13. **(2)**

Within elastic limit, elongation is proportional to load because stress $\propto$ strain.

14. **(4)**

For soap bubble, $\Delta P = \dfrac{4T}{R}$

$\dfrac{\Delta P_1}{\Delta P_2} = \dfrac{R_2}{R_1} \Rightarrow \dfrac{R_2}{R_1} = \dfrac{0.01}{0.02}$

$\dfrac{R_1}{R_2} = 2$

$\dfrac{S_1}{S_2} = \left(\dfrac{R_1}{R_2}\right)^2 = 4:1$

15. **(2)**

when temperature of liquid increases then coefficient of viscosity decreases.

16. **(3)**

For anisotropic material

$\gamma = \alpha_x + \alpha_y + \alpha_z$

$= \alpha + 2\alpha + 2\alpha = 5\alpha$

17. **(1)**

Area under the curve for black body spectrum is directly proportional to T^4

Hence $\dfrac{A_1}{A_2} = \left(\dfrac{T_1}{T_2}\right)^4 = \left(\dfrac{T}{2T}\right)^4$

$\dfrac{A_1}{A_2} = \dfrac{1}{16}$

18. **(2)**

Heat is supplied in process *DA* and *AB*

$Q_{in} = n = \left(\dfrac{5R}{2}\right)1000 + n\left(\dfrac{7R}{2}\right)2000$

$= \left(\dfrac{19000}{2}\right)nR$

$Q_{rejected} = -n\left(\dfrac{5R}{2}\right)2000 - n\left(\dfrac{7R}{2}\right)\times 1000$

$= -\left(\dfrac{17000}{2}\right)nR$

$W = Q \text{ in} + Q \text{ rejected}$

$= \dfrac{19000}{2}nR - \dfrac{17000}{2}nR = \left(\dfrac{2000}{2}\right)nR$

Now, efficiency $\eta = \dfrac{W}{Q_{in}} \Rightarrow \eta = \dfrac{(2000)\dfrac{nR}{2}}{19000\left(\dfrac{nR}{2}\right)}$

$\eta = \dfrac{2}{19}$

19. **(4)**

Given,

$v_{rms} = v$ for diatomic gas

Temperature $= T$

$v_{rms}^1 = 2v$ for monoatomic gas

Let $M =$ molar mass of diatomic gas. Then, as it dissociates into atoms (monoatomic gas), new molar mass $M' = \dfrac{M}{2}$. Let T' be the required temperature.

Now,

rms speed v_{rms} is given as:

$v_{rms} = \sqrt{\dfrac{3RT}{M}}$

So, $v = \sqrt{\dfrac{3RT}{M}}; 2v = \sqrt{\dfrac{3RT'}{\dfrac{M}{2}}}$

or, $\boxed{v^2 = \dfrac{3RT}{M}}; \boxed{4v^2 = \dfrac{3RT' \times 2}{M}}$

So, $\dfrac{4v^2}{v^2} = \dfrac{6RT'}{M} \times \dfrac{M}{3RT}$

$4 = \dfrac{2T'}{T}$

$\Rightarrow \boxed{T' = 2T}$

20. **(3)**

When a string is compressed then it does not provide any restoring force.

Hence $T = \dfrac{T_1}{2} + \dfrac{T_2}{2}$

$T = \dfrac{2\pi}{2}\sqrt{\dfrac{m}{2k}} + \dfrac{2\pi}{2}\sqrt{\dfrac{m}{k}} = \pi\sqrt{\dfrac{m}{k}}\left[\dfrac{1}{\sqrt{2}} + 1\right]$

$= (\sqrt{2}+1)\pi\sqrt{\dfrac{m}{2k}}$

21. **(2)**

$f = \dfrac{v}{2L} = \dfrac{1}{2L}\sqrt{\dfrac{T}{\mu}}$

$f \propto \sqrt{T}$

$f^2 \propto T$

22. **(1)**

$$\frac{5V}{2L_B} = \frac{3V}{4L_C} = f$$

$$L_B = \frac{10L_C}{3}$$

$$= \frac{10 \times 18}{3} = 60\,cm$$

23. **(2)**

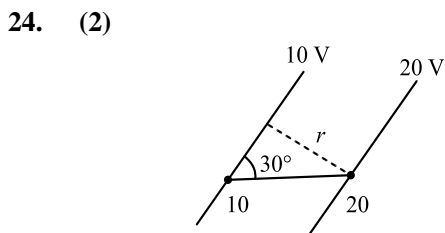$$E_{origin} = k\left[\frac{Q_1}{r_1^2} + \frac{Q_2}{r_2^2} + \ldots\right]$$

$$= 9 \times 10^9 \times 10^{-6}\left[1 + \frac{1}{2^2} + \frac{1}{4^2} + \ldots\right]$$

$$= 9 \times 10^3 \times \frac{1}{1 - \frac{1}{4}}$$

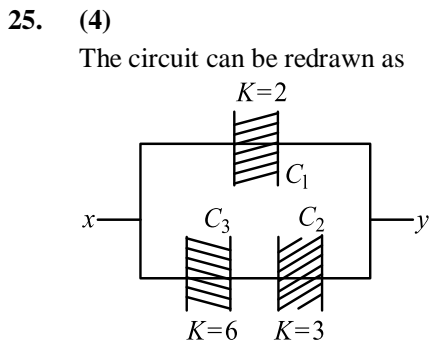$$= 9 \times \frac{4}{3} \times 10^4 = 12000 \ N/C$$

$$F = qE = 2 \times 12000$$

$$= 24000 \text{ N}$$

24. **(2)**

Let any two equipotential surfaces.

Then $E = \dfrac{\Delta V}{r} = \dfrac{20 - 10}{(0.10\sin 30°)} = 200$ V/m

Since electric field is normal to equipotential surface and electric field pointed from high potential to low potential.

25. **(4)**

The circuit can be redrawn as

$$C_{xy} = C_1 + \frac{C_1 C_3}{C_2 + C_3}$$

$$= \frac{2\varepsilon_0 A}{d} + \frac{\dfrac{3\varepsilon_0 A}{d} \times \dfrac{6\varepsilon_0 A}{d}}{\dfrac{9\varepsilon_0 A}{d}}$$

$$= \frac{2\varepsilon_0 A}{d} + \frac{2\varepsilon_0 A}{d}$$

$$C_{xy} = \frac{4\varepsilon_0 A}{d}$$

26. **(3)**

$$R_{eq} = 2 + \frac{2 \times 2}{2 + 2} + 1 = 4\Omega$$

Since no current will flow through 4Ω resistor.

Hence $V_{PQ} = \dfrac{1}{4} \times 12 = 3V$

27. **(4)**

In region BC, current l is decreasing with increase in voltage. Hence this showing the negative resistance region.

28. **(3)**

$$B = \frac{\mu_0 i}{4\pi d}\left[\sin\theta_1 + \sin\theta_2\right]$$

$$= \frac{\mu_0 i}{4\pi d}\left[\sin\theta_1 + \sin\theta_2\right]$$

$$= \frac{\mu_0 i}{8\pi d}\left(\sqrt{3} - 1\right)$$

29. **(2)**

Magnetic length of a bar magnet is about 0.84 times the geometrical length

30. **(2)**

$$F = i\, l_{eff}.B$$

$$= 2 \times 5 \times 2 = 20 \text{ N}$$

31. **(3)**

Eddy current can be minimized by using laminated thin strips of core.

Inductor opposes the current change in the electrical circuit. Hence it is called as inertia of the electricity.
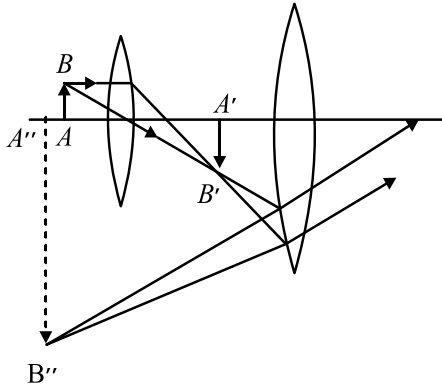
32. **(2)**

$$\text{Average current} = \frac{\text{Area under curve}}{\text{Time interval}}$$

$$l_{avg} = \frac{\dfrac{1}{2} \times I_0 \times \dfrac{T}{2}}{\dfrac{T}{2}} = \frac{I_0}{2}$$

33. **(4)**

Heat radiations are infrared rays i.e. *EM* wave. it moves with speed of light in air.

34. **(3)**

B″

As shown in the ray diagram, intermediate image is real inverted and magnified.

35. **(3)**

Focal length of convex mirror, $f = \dfrac{R}{2}$, it does not depend on the medium in which it is placed.

36. **(3)**

$$\frac{8\lambda D}{d} = \frac{2\lambda D}{a}$$

$$a = \frac{d}{4} = \frac{3}{4} mm$$

$$a = 0.75 \text{ mm}$$

37. **(1)**

The wave nature of electrons was first experimentally verified by Davisson and Germer in 1927.

38. **(3)**

$$eV = \frac{hv}{\lambda} - \phi$$

$$\frac{hc}{\lambda} = 3eV + 3.2\,eV$$

$$= 6.2 \text{ eV}$$

$$\lambda = \frac{12400}{6.2} \overset{\circ}{A}$$

$$\lambda = 2000\, \overset{\circ}{A}$$

Hence $\lambda = 2000\, \overset{\circ}{A}$ lies in UV region.

39. **(3)**

$$L = \frac{nh}{2\pi}$$

$$L \propto n$$

40. **(1)**

$$E = mc^2$$

$$= \frac{10^{-6} \times \left(3 \times 10^8\right)^2}{1.6 \times 10^{-19}} ev = 5.66 \times 10^{29}\, ev$$

41. **(2)**

$$N_A = N_0 e^{-\lambda_A t}$$

$$N_B = N_0 e^{-\lambda_B t}$$

$$\frac{N_A}{N_B} = e^{(\lambda_B - \lambda_A)t}$$

$$t_{1/2} = \frac{\ln 2}{\lambda}$$

$$\lambda = \frac{\ln 2}{t_{1/2}}$$

For sample A

$$\lambda_A = \frac{\ln 2}{20}$$

For sample B

$$\lambda_B = \frac{\ln 2}{40}$$

$$\therefore \lambda_B - \lambda_A = \frac{\ell n2}{40} - \frac{\ell n2}{20}$$

$$\lambda_B - \lambda_A = -\frac{\ell n2}{40}$$

$$\therefore \frac{N_A}{N_B} = e^{-\frac{\ell n2}{40} \times 80}$$

$$= e^{-2\ell n 2}$$

$$= e^{-\ell n4}$$

$$\frac{N_A}{N_B} = \frac{1}{4}$$

42. **(2)**

For Lyman series

$$\frac{1}{\lambda_L} = R\left(\frac{1}{1} - \frac{1}{n^2}\right)$$

For longest wavelength n = 2

$$\frac{1}{\lambda_{L,\max}} = R\left(\frac{1}{1} - \frac{1}{2^2}\right)$$

$$\frac{1}{\lambda_{L,\max}} = \frac{3R}{4}$$

For Balmer series

$$\frac{1}{\lambda_B} = R\left(\frac{1}{2^2} - \frac{1}{n^2}\right)$$

For longest wavelength n = 3

$$\frac{1}{\lambda_{B,\max}} = R\left(\frac{1}{2^2} - \frac{1}{3^2}\right)$$

$$\frac{1}{\lambda_{B,\max}} = \frac{5R}{36}$$

$$\frac{\lambda_{L,\max}}{\lambda_{B,\max}} = \frac{5R}{36} \times \frac{4}{3R} = \frac{5}{27}$$

$$\frac{\lambda_{L,\max}}{\lambda_{B,\max}} = \frac{5}{27}$$

43. (4)

By doping with trivalent atom, semiconductor becomes of p-types i.e. $n_h > n_e$ All types of semiconductor is electrically neutral.

44. (1)

$V_0 = (V_i - \beta V_0) A$

$V_0 = AV_i - A\beta V_0$

$V_0(1 + A\beta) = A.V_i$

$A_{CL} = \dfrac{V_0}{V_i} = \dfrac{A}{1 + A\beta}$

45. (2)

$X = \overline{\left(\overline{\overline{A+B}}\right) + \left(\overline{\overline{A+B}}\right)} = \overline{(A+B)}$

SECTION – II (CHEMISTRY)

51. (3)

For ideal gases, C_V is independent of volume, and C_P is independent of pressure.

52. (3)

In a monoclinic system, all three axes are unequal in length and any two axes are perpendicular to each other and the third is inclined between them forming an oblique angle.

53. (2)

Rate of dehydrogenation of olefin is inversely proportional to number of α hydrogen.

So the correct order will be D > B > C > A.

54. (1, 2, 3, 4)

Osmotic pressure is an example of colligative property.

55. (1)

Kelvin's thermodynamics scale of temperature is based on Charles' law.

56. (4)

Only Balmer series possess the visible lines, For Balmer series n_{lower} will be 2.

57. (1)

$w = -nRT\ln\dfrac{V_2}{V_1} = -nRT\ln\dfrac{P_1}{P_2}$

$w = -1 \times 2 \times 300\ln\dfrac{1}{10}$

$w = 1 \times 2 \times 300\ln 10$

$w = 2 \times 300 \times 2.303 = 1381.8\,\text{cal}$

46. (4) Fact based

47. (1) Fact based

48. (2) Fact based

49. (2) Fact based

50. (1) Fact based

58. (3)

Oganesson is the last radioactive element of the noble gas family.

59. (3)

$^{249}_{98}\text{Cf} + ^{48}_{20}\text{Ca} \rightarrow ^{294}_{118}\text{Og} + 3^{1}_{0}\text{n}$

60. (3)

Atomic radius of noble gases increases down the group as the number of shells increases down the group.

61. (1)

Only in reaction (II) $H_2PO_4^-$, gives H^+ to H_2O, thus behaves as an acid.

62. (3)

$2K_4[\text{Fe(CN)}_6](aq) + H_2O_2\,(aq) \rightarrow 2K_3[\text{Fe(CN)}_6]$
$(aq) + 2KOH\,(aq)$

63. (1)

Oxidation = removal of electropositive element

64. (4)

There is no carbon with all four different groups.

65. (2)

The di halogen compounds in which both the halogen atoms are attached to the same carbon are called geminal dihalides. Their common name is Alkylidene dihalide. Vicinal dihalides are hydrocarbons containing dihalides on adjacent carbons of a hydrocarbon. It is also known as Alkylene dihalide.

66. **(4)**

$$MX : K_{sp} = S^2 = 4 \times 10^{-8}$$

$$\Rightarrow \quad S = 2 \times 10^{-4}$$

$$MX_2 : K_{sp} = 4\ S^3 = 3.2 \times 10^{-14}$$

$$\Rightarrow \quad S = 2 \times 10^{-5}$$

$$M_3X : K_{sp} = 27\ S^4 = 2.7 \times 10^{-15}$$

$$\Rightarrow \quad S = 10^{-4}$$

67. **(2)**

CCl_4 has higher density than $CHCl_3$.

68. **(1)**

The Tyndall effect is due to the fact that colloidal particles scatter light in all directions in space. This scattering of light illuminates the path of the beam in the colloidal dispersion. Tyndall effect is observed only when the following two conditions are satisfied.

The diameter of the dispersed particles is not much smaller than the wavelength of the light used.

The refractive indices of the dispersed phase and the dispersion medium differ greatly in magnitude.

69. **(3)**

By steric number, hybridization of $XeOF_4$ will be sp^3d^2, its electron geometry will be octahedral and its shape will be square pyramidal.

70. **(1)**

Draw the structure and check the number of hydrogen which can undergo ionization.

71. **(1)**

Fischer projections are for illustration of optical isomers. Groups present behind the plane of paper are represented by vertical line while groups present above the plane are placed on horizontal axis.

72. **(3)**

Methyl group in toluene is ortho and para-directing group.

73. **(1)**

Table sugar is made of α-D glucose and β-D fructose.

74. **(4)**

Hoffmann eliminations are the elimination reaction of quaternary ammonium salts. The ability of Hofmann eliminations to form the less-substituted double bond isomer is generally called the Hoffmann Rule.

In E_2 elimination certain compounds obeys Hoffmann's rule. This describes that the double bond majorly goes in the direction of the least substituted carbon.

75. **(2)**

Electronegative nitrogen pulls the rings electron density towards itself and makes the position 2 and 4 electron-deficient which means 3rd position is electron rich.

76. **(1)**

In these reaction, solvent molecule acts as nucleophile and does the substitution and perceived as solvolysis.

77. **(2)**

$$\Delta G^\circ = -nFE^o_{cell}$$

78. **(1, 3)**

In a galvanic cell, the salt bridge does not participate chemically in the cell reaction. The ions of the electrolyte present in the salt bridge neither react with the ions of the electrode solutions, neither get oxidized nor get reduced at the electrodes.

79. **(2)**

Fact based question.

80. **(2)**

Apply CIP rule.

81. **(2)**

Inductive effect operates through sigma bond.

82. **(4)**

$$Rate = K[NOBr_2][NO]$$
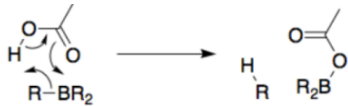
….(1)

But $NOBr_2$ is in equilibrium.

$$K_{eq} = \frac{[NOBr_2]}{[NO][Br_2]}$$

$$[NOBr_2] = K_{eq}[NO][Br_2] \qquad …(2)$$

Putting the $[NOBr_2]$ in (1)

$$Rate = K \cdot K_{eq}[NO][Br_2][NO]$$

Hence $Rate = K \cdot K_{eq}[NO]^2 [Br_2]$

$$Rate = K'[NO]^2 [Br_2]$$

where $K' = K \cdot K_{eq}$.

83. (1)

For higher order (> 3) reactions to occur, 3 or more molecules (having energy equal to or greater than activation energy) must simultaneously collide with proper orientation.

The probability for such collisions is very low. Hence these reactions are rare.

84. (3)

Group 16 elements have less ionization enthalpy than Group 15 elements due to half-filled configurations of Group 15 elements. This half-filled electronic configuration gives extra stability to group 15 elements and due to which their ionization enthalpy increases.

85. (2)

Second group metal salts in the anhydrous state can be used in desiccator during Liebig's method for estimation of carbon and hydrogen, as they have high hydration energy and can absorb moisture readily. So, it absorbs water and soda lime will absorb carbon dioxide.

86. (4)

87. (3)

Soda lime is a mixture of sodium hydroxide and calcium oxide.

88. (1)

89. (3)

Oxygen-oxygen linkage is weak due to small size of oxygen experience electronic repulsion.

90. (4)

Mass % of C

= (Mass of C/Total mass of molecule) × 100
69.98 = (252/Total mass of molecule) × 100;
Total mass of molecule = 360.1 u;
Molar mass (in grams) = 360.1 g/mol.

91. (4)

Diphos means ethylene diphosphine, tetrameen means tetramethyl ethylene diamine, tn means trimethylene diamine. In all the three ligands either both N or P are donor ligands.

92. (3)

Due to weak field ligand, inner d-orbitals are used for hybridisation.

93. (3)

Molecular mass of $C_{57}H_{110}O_6 = 890$ g

Mole of $C_{57}H_{110}O_6$ is (weight/molecular weight)

$= \dfrac{445}{890} = 0.5$ mole

From the equation, we can see that 2 mole $C_{57}H_{110}O_6$ produces 110 moles of H_2O

Apply stoichiometry,

0.5 mole produces $\dfrac{110}{2} \times 0.5 = 27.5$

The molecular weight of H_2O is 18

The mass of water = $27.5 \times 18 = 495$ gm.

94. (2)

Fluoro is weak field ligand, does not cause pairing of electron of Fe.

95. (1)

Potassium superoxide is used in oxygen cylinders in space and submarines because it absorbs CO_2 and increases O_2 concentration according to the following reaction

$4KO_2 + 2CO_2 \rightarrow 2\,K_2CO_3 + 3O_2$

96. (4)

Au is less reactive than Ag. Hence, it remains in the anode mud. Metals which are more reactive than Ag, will be in electrolytic solution. The anode mud in the electrolyte refining of silver contains Au.

97. (2)

In high spin d^7 system 2 paired electrons are present.

98. (2)

H_2SO_5 on hydrolysis give sulphuric acid and H_2O_2.
$H_2SO_5 + H_2O \rightarrow H_2SO_4 + H_2O_2$

99. (2)

Check the valance shell electronic configuration.

100. (1)

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

SECTION – III (BOTANY)

101. (3)
Plants obtain molybdenum in the form of molybdate ions (MoO_2^{2+}).
It is a component of several enzymes, including nitrogenase and nitrate reductase, hence participate in nitrogen metabolism.

102. (4)
Fe is essential for formation of chlorophyll and Mg is main constituent of ring structure of chlorophyll. Yellowing of leaves caused by lack of chlorophyll called chlorosis hence deficiency of Fe and Mg causes chlorosis.

103. (3)
Acetyl-CoA is link between carbohydrate and fat metabolism, Glucose molecule is broken down into two molecules of pyruvic acid, which enters mitochondrial matrix and undergoes oxidative decarboxylation by a complete set of reactions catalysed by pyruvic dehydrogenase Acetyl-CoA thus formed is fed into Krebs's cycle.

104. (2)
α-ketoglutaric acid which is a 5C compound undergoes both decarboxylation and dehydrogenation during Krebs's cycle.
Decarboxylation (Removal of CO_2) and dehydrogenation (Removal of H_2) occurs when Isocitrate is converted to α-ketoglutaric acid and α-ketoglutaric acid is converted to Succinate, hence, in both α-ketoglutaric acid is common.
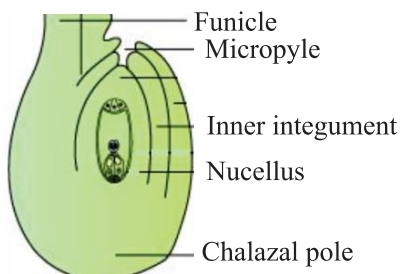
105. (4)
In over 60% of angiosperms, pollen grains shed at 2-called stage. In these plants, generative cell divides and form two male gametes during growth of pollen tube in the stigma.

106. (1)

The symbol used in human pedigree analysis is showing mating between relatives called consanguineous mating.

107. (2)
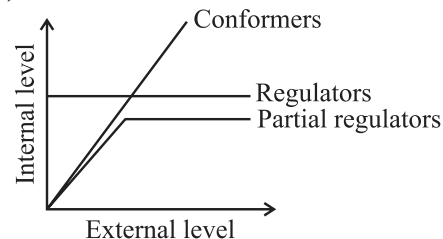

The given figure showing a typical anatropous ovule.

108. (4)
Vegetative propagation by roots occurs in *Dahlia*, Shisham, Sweet potato.

109. (2)
In a test cross, F_1 generation is crossed with a recessive parent to determine its genotype.
While cross of F_1 hybrid with either of its parents is back cross.

110. (4)

The given graph showing organisms response to abiotic factors.
Some organisms able to maintain homeostasis, they are regulators. Organisms whose body temperature changes with ambient temperature are conformers.
Organisms who can regulate their body temperature to a large extent of external environment are partial regulators.

111. (3)
The more realistic growth model is logistic growth model in which responses limits the growth. It comes out to be sigmoid growth curve and represented by:
$$\frac{dN}{dt} = rN\left(\frac{K-N}{K}\right)$$

112. (1)

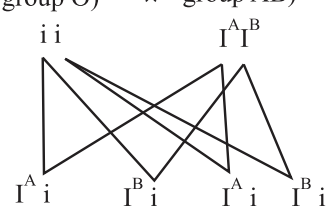|		
Commensalism	–	Barnacles and whale
Predation	–	Sparrow and any seed
Ammensalism	–	*Penicillium* and Bacteria
Competition	–	*Balanus* and *Chathamalus*
Mutualism	–	Fig and wasp

113. (3)
Half inferior ovary is found is plum, rose, peach etc. In this ovary is situated in the centre and other floral parts are located on rim of thalamus almost at the same level.

114. (3)
Shoot apex has 3 zones called histogens, outermost (Dermatogen) give rise to epidermis, middle layer (Periblem) give rise to cortex and innermost layer i.e. (Plerome) give rise to vascular tissues. This histogen theory given by Hanstein.

115. (4)
As per CPCB, particulate matter of size 2.5 micrometers or less in diameter are responsible for causing greatest harm to human health.

116. (4)
Pseudomonas, Xanthomonas are bacteria while *Neurospora* is a fungus whose cell walls are made up of peptidoglycans and chitin respectively, which *Chlamydomonas* is a alga whose cell wall is made up of cellulose.

117. (3)
Chromatids separate and more to opposite poles in Anaphase stage. Nucleolus, ER, golgi complex reform at telophase stage.
Spindle fibres attaché to kinetochores of chromosome in metaphase stage.

118. (3)
Crossing over leads to recombination of linked genes. It results in chromosomal exchange.

119. (1)
In prophase I of meiosis I, during Pachytene stage, recombination nodules are appeared, the sites at which crossing over takes place between non-sister chromatids of homologous chromosomes.

120. (1)
Microfilaments called actin filaments made up of protein found in cytoplasm of eukaryotic cells that form part of the cytoskeleton. It help in cyclosis of cytoplasm and cleavage of cell.

121. (4)
Enzymes that convert fats into carbohydrates occurs in glyoxysomes. They contain enzymes of fatty acid oxidation and glyoxylate pathway.
Starch storing plastids called amyloplasts.
Microtubules are formed of tubulin proteins.

122. (1)
If a green plant is placed in air free of O_2 in light, it can live longer because the shortage of O_2 is fulfilled by O_2 released during photosynthesis. If it is in dark, it will die because in dark O_2 in not released due to absence of photophosphorylation phase of photosynthesis.

123. (3)
C_3 plants are less efficient then C_4 plants due to presence of a process called photorespiration.

124. (1)
Lysosomes are membrane enclosed organelles that contain an array of enzymes capable of breaking down all type of biological polymers i.e. proteins nucleic acids, polysaccharides, lipids etc.

125. (4)
CO_2 acceptor in C_3 plants is ribulose 1, 5 diphosphate while in C_4 plants it is phosphenot pyruvate. First stable product of C_3 plants is phosphoglyceric acid while of C_4 plants is oxaloacetate.
C_4 plants leaves have knanz anatomy.

126. (3)
Cyclic photophosphorylation happens only in photosystem I but non-cyclic photophosphorylation occurs in both photosystem I and II. Only ATP is produced in cyclic photophosphorylation.

127. (3)
Leaf fall occurs when amount of auxin decreases. Auxin are growth regulating phytohormones. Auxin prevent the abscission of leaves and fruits.

128. (1)
In dry weather, to prevent water loss by transpiration, leaves curl inwards due to flaccidity of bulliform cells. Bulliform cells are found in leaves of monocots.

129. (4)
Cytokinin are photohormones which promote cell divisions. They break the dormancy of many seeds and promote this germination.

130. (4)
When plant cells are placed in high concentrated sugar or salt solution, the plants cells become plasmolysed because exosmosis occurs and water moves out of plant cells.

131. (2)
When temperature is high and warm, more water in lost by transpiration causing the plant witting.

132. (1)
First step in taxonomy is Identification of the organisms.

133. (4)

Syphilis is a sexually transmitted disease and is caused by bacteria *Treponema*.

134. (2)

The given diagram showing pteridophyte *Equisetum* bearing strobili.

135. (1)

In oogamous type of sexual reproduction, there is a non-motile large egg cell and a motile small sized male gamete.

In genera like *Selaginella* and *Salvinia*, two types of spores are produced macro (large) and micro (small) hence they are heterosporous.

136. (1)

DNA replication is followed by cell division in eukaryotes because if it is not followed so, it will increase in whole set of chromosomes in organisms which leads to polyploidy and cell expansion.

137. (2)

As per Chargaff's rule, DNA molecule should have equal ratio of purine and pyrimidine.

i.e. % A = % T

% G = & C

If adenine = 18%

Then thymine = 18%

A + T + G + C = 100%

18 + 18 + G + C = 100%

G + C = 100% − 36%

G + C = 64%

G = 32%, C = 32%

138. (1)

The main aim of human genome project is to identify and sequence all the genes present in human DNA.

139. (3)

A segment of DNA coding for polypeptide is called exons. Introns are non-coding sequences which are removed by splicing r-RNA performs structural and catalytic role during translation.

140. (2)

Probe used in genetic fingerprinting is a single stranded DNA tagged with a radioactive molecule.

141. (2)

Test cross is a cross done between F_1 generation hybrid individual and its recessive parent to determine the genotype of the F_1 individual.

142. (3)

(UTRs) are present at both 5' end (before start codon) and at 3' end (after stop codon). They are required for efficient translation process.

143. (4)

Woman (Blood group O) × Man (Blood group AB)

So, progenies will have A and B blood group.

144. (3)

Data based.

145. (1)

IR-8	– Rice (*Oryza sativa*)
Prabhani Kranti	– *Abelmoschus esculentus*
Pusa A-4	– Okra (Bhindi)
Pusa swarnim	– *Brassica*

146. (3)

Superior male of one breed are mated with superior females of another breed is cross breeding. It allows the desirable qualities of two different breeds to be combined.

e.g. *Hisardale* developed in Punjab, it is a new breed of sheep by crossing Bikaneri ewes and marino rams.

147. (1)

Nitrobacter converts nitrites into nitrates.

$NO_2^- \rightarrow NO_3^-$ by *Nitrobacter*.

Nitrate is a plant nutrient.

148. (3)

Cyclosporine-A is a bioactive molecule produced by fungus *Trichoderma*. It is used as an Immuoppressive agent in organ transplant patients.

149. (1)

Net primary productivity is the available biomass for consumption by heterotrophs (Herbivores and decomposers).

150. (2)

Chlorofluorocarbons (CFCs) contributes 14% to total global warming. It is emitted commonly by refrigerators and ACs.

151. (3)

Platyhelminthes are triploblastic having 3-germ layers outer (ectoderm), middle (mesoderm) and inner (endoderm).

152. (4)

Arthropoda is best characterised by exoskeleton, metameric segmentation and jointed appendages.

153. (4)

Notochord is replaced by bony vertebral column in *Labeo* (bony fish).

154. (1)

The character that is not desirable in a cloning vector is an inactive promoter.

155. (4)

Torpedo   – Presence of electric organ
Trygon   – Presence of poisonous sting
Pila   – Presence of radula
Labeo   – Presence of swim bladder

156. (3)

The hind wings which are transparent and membranous help in flying.

157. (1)

Skeletal muscle is connected to bone by tendons, ligaments connect bone to bone.

158. (3)

The stem cells which have potency to give rise to all tissues and organs are formed from inner cell mass.

159. (4)

Collagen is intercellular ground substance.

160. (3)

Casein of milk is a phosphoprotein.

161. (4)

If total amount of adenine in eukaryotic dsDNA is 30%. Then total pyrimidine content is 50% nitrogenous bases do not form part of backbone. Besides this, sugar and phosphate form part of backbone.

162. (2)

Oxytocin help in lactation and childbirth.

163. (4)

The factor affecting enzyme activity in graph given is substrate concentration.

164. (3)

Cholesterol is steroid.

165. (2)

All enzymes are proteinaceous in nature except ribozymes which are non-proteinaceous.

166. (1)

Secretion of parietal cell does not include pepsinogen and mucous.

167. (2)

The optimum pH for action of ptyaline is 6.8.

168. (2)

Jaundice is a disorder of digestive system.

169. (1)

Respiratory organ of pigeon is lungs.

170. (4)

The maximum volume of air a person can breathe in after forced expiration is vital capacity, ERV + TV + IRV and TLC – RV.

171. (2)

Q wave represents early ventricular depolarisation.

172. (4)

Rate of heart beat and cardiac output can be increased by neural signals through the sympathetic nerves and also by adrenal medullary hormones.

173. (4)

Lubb sound is produced by closing of AV valves during ventricular systole. It is low pitched and of long duration.

174. (1)

Nearly all of the essential nutrients and 70-80% of electrolytes and water are reabsorbed in PCT segment of nephron.

175. (1)

Amount of CO_2 removed by our lungs is 200 ml/min.

176. (4)

Ball and socket joint is found in shoulder and hip joint.

177. (2)
Globular regulatory protein of skeletal muscle fibre is troponin.

178. (4)
Receptor sites for neurotransmitters are present in post synaptic membrane.

179. (4)
Interneuron is not a part of knee-jerk reflex.

180. (3)
Thymus is a soft bilobed where two lobes lie side by side and are joined in the middle by connective tissue. Thymus size is maximum at about 15 years of age.

181. (3)
Innermost layer of adrenal cortex secrete mainly androgenic steroids.

182. (2)
Ovary is connected to pelvic wall by ligaments.

183. (3)
Endometrium is the layer which undergoes cyclical changes during menstrual cycle.

184. (2)
Chlamydiais is STD that is transmitted by bacteria.

185. (1)
Genetic drift operate in small isolated population.

186. (2)
Gene pool is the sum of different genes of all individuals of a species found in an area.

187. (4)
First water organisms are heterotrophic anaerobic bacteria.

188. (4)
Due to continental drift South American mammals were overridden by North America fauna.

189. (4)
Ascariasis and filariasis are the diseases caused by helminthes.

190. (2)
Saliva in mouth is the example of physiological barriers.

191. (1)
AIDS disease was first reported in USA.

192. (2)
Filariasis is caused by Wuchereria. Filariasis is commonly called elephantiasis.

193. (2)
The best breeding method for animals that are below average in productivity in milk production would be out-crossing.

194. (4)
rDNA is chimeric DNA or recombination of vector and desired gene.

195. (4)
In case of BamHI, H-represents strain.

196. (2)
Agrose gel is extracted from sea-weeds.

197. (1)
In bacteria, plasmid is extra-chromosomal material.

198. (4)
Transgenic animals are produced for medicine, agriculture and industry.

199. (4)
Silencing of mRNA has been used in producing transgenic plants resistant to nematodes.

200. (2)
The first transgenic plant is tobacco.