

# NEET (2024)

## PRACTICE TEST – 03

DURATION : 200 Minutes

M. MARKS : 720

### Topics covered

<b>Physics :</b>	Current Electricity and Calculation of Magnetic Field, Motion of Charge Particle in Magnetic Field
<b>Chemistry :</b>	Haloalkanes and Haloarenes Full Chapter
<b>Biology :</b>	<b>(Botany):</b> Principle of Inheritance and Variation (Complete Chapter) <b>(Zoology):</b> Human Health and Diseases (Complete Chapter)

### General Instructions:

1. Immediately fill in the particulars on this page of the test booklet.
2. The test is of **3 hours 20 min.** 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 in each part in which you have to attempt all the 35 questions from section A and 10 questions from section B.
5. There is only one correct response for each question.
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:

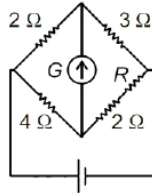
1. Use blue/black dark ballpoint pens.
2. Darken the bubbles completely. Don't put a tick mark or a cross mark where it is specified that you fill the bubbles completely. Half-filled or over-filled bubbles will not be read by the software.
3. Never use pencils to mark your answers.
4. Never use whiteners 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)

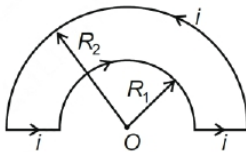
### SECTION - A

1. When a charged particle enters a uniform magnetic field
- (1) Speed of particle must increase
  - (2) Speed of particle must decrease
  - (3) Speed of particle will be constant
  - (4) Speed of particle may be decrease or increase

2. If there is no deflection in the galvanometer in the given network, then the value of resistance  $R$  is



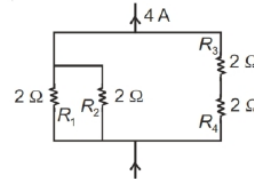
- (1)  $1 \Omega$
  - (2)  $2 \Omega$
  - (3)  $3 \Omega$
  - (4)  $4 \Omega$
3. An electron moving with constant velocity passes through a region of space without change in its velocity. If  $E$  and  $B$  represent electric and magnetic field respectively, the region of space may have
- (1)  $E = 0, B = 0$
  - (2)  $E = 0, B \neq 0$
  - (3)  $E \neq 0, B \neq 0$
  - (4) All of these
4. The magnitude of magnetic field induction at the centre  $O$  in the figure shown is:  
(Given:  $R_1 = 10 \text{ cm}$ ,  $R_2 = 20 \text{ cm}$  and  $i = 1 \text{ A}$ )



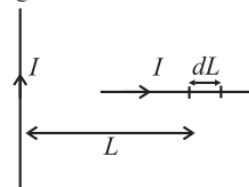
- (1)  $\pi \mu T$
  - (2)  $\frac{\pi}{2} \mu T$
  - (3)  $\frac{\pi}{3} \mu T$
  - (4)  $\frac{\pi}{6} \mu T$
5. A long straight wire of radius  $a$  carries a steady current  $I$ . The current is uniformly distributed across its cross-section. The ratio of the magnetic field at  $a/4$  inside and  $a/4$  outside from the surface of wire is
- (1)  $1 : 1$
  - (2)  $7 : 16$
  - (3)  $15 : 16$
  - (4)  $16 : 9$

6. A large solenoid of windings of 400 turns per meter carries a current 5 A. The magnetic field at the centre of the solenoid is about
- (1) 1.2 mT
  - (2) Zero
  - (3) 5.0 mT
  - (4) 2.5 mT

7. Figure shows a portion of a circuit. Value of current through  $R_1$  is

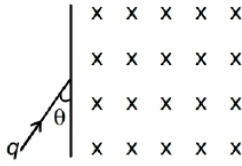


- (1)  $8/5 \text{ A}$
  - (2)  $2 \text{ A}$
  - (3)  $1 \text{ A}$
  - (4)  $3 \text{ A}$
8. An electron is moving on a circular orbit of radius  $r$  with speed  $v$ . It produces a magnetic field  $B$  at its centre, then radius of circle is proportional to
- (1)  $\frac{v}{B}$
  - (2)  $\frac{v}{B^2}$
  - (3)  $\left(\frac{v}{B}\right)^2$
  - (4)  $\left(\frac{v}{B}\right)^{\frac{1}{2}}$
9. A deuteron and an  $\alpha$ -particle with same kinetic energy enter perpendicular to uniform magnetic field. Then ratio of radii of their circular paths is
- (1)  $\sqrt{2} : 1$
  - (2)  $2 : 1$
  - (3)  $1 : 2$
  - (4)  $1 : 1$
10. A wire of length 2 m is placed in uniform magnetic field of 2 tesla. It makes  $30^\circ$  with the field. If 10 A current is flowing in the wire, then force per unit length on wire is
- (1) 1 N
  - (2) 0.5 N
  - (3) 5 N
  - (4) 10 N
11. Two long wires carrying same currents are placed perpendicular to each other. The magnetic force on a small length  $dL$  of second wire is



- (1)  $\frac{\mu_0 I}{2\pi L}(dL)$
- (2)  $\frac{\mu_0 I^2}{2\pi L}(dL)$
- (3)  $\frac{\mu_0 I}{2\pi}(dL)$
- (4)  $\frac{\mu_0 I}{2\pi L}$

12. A charged particle enters a uniform magnetic field at some angle. The particle will be deviated from its path by angle  $180^\circ$ . Value of  $\theta$  will be



- (1)  $90^\circ$                       (2)  $60^\circ$   
 (3)  $120^\circ$                     (4)  $180^\circ$

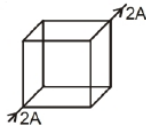
13. A proton of mass  $m$ , charge  $q$  enters a magnetic field  $B$  with a velocity  $v$  at an angle  $\theta$  with the direction of  $B$ . The radius of the resulting path is

- (1)  $\frac{mv}{qB}$                       (2)  $\frac{mv \sin\theta}{qB}$   
 (3)  $\frac{mv \cos\theta}{qB}$                     (4)  $\frac{mv}{qv \sin\theta}$

14. A current ' $I$ ' flows along the length of an infinitely long straight thin wall pipe, then

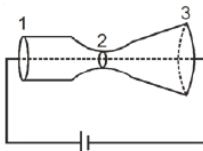
- (1) Magnetic field at any point inside the pipe is zero  
 (2) Magnetic field is zero only on axis of pipe  
 (3) Magnetic field inside the pipe is non-zero  
 (4) Magnetic field outside the pipe is zero

15. A current is flowing through the branch of a cube of side 1 m then choose incorrect statement.



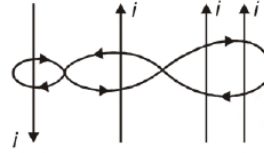
- (1) The magnetic force acting on a moving charge at the centre of the cube is zero  
 (2) The net magnetic field at the centre of cube is zero  
 (3) The magnetic force on a charge particle at rest inside the cube is zero  
 (4) The magnetic force acting between the parallel side of cube is zero

16. For given conductor the drift speed of electrons at cross section (1), (2) and (3) are  $v_1$ ,  $v_2$  and  $v_3$ , then



- (1)  $v_1 = v_2 = v_3$   
 (2)  $v_1 < v_2 < v_3$   
 (3)  $v_2 > v_1 > v_3$   
 (4)  $v_2 > v_3 > v_1$

17. Figure shows four identical currents  $i$  and an amperian loops encircling them. We shall calculate  $\oint \vec{B} \cdot d\vec{l}$  in the direction marked. The correct value is

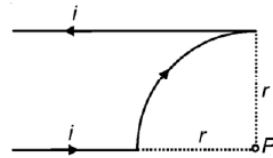


- (1)  $\oint \vec{B} \cdot d\vec{l} = 2\mu_0 i$   
 (2)  $\oint \vec{B} \cdot d\vec{l} = 0$   
 (3)  $\oint \vec{B} \cdot d\vec{l} = \mu_0 i$   
 (4)  $\oint \vec{B} \cdot d\vec{l} = 4\mu_0 i$

18. In a potentiometer, the wire has specific resistance  $\rho$ , area of cross-section  $A$  and current  $I$  is flowing in it. The potential gradient in the wire is

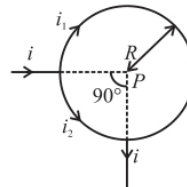
- (1)  $\frac{IA}{\rho}$                       (2)  $\frac{\rho A}{I}$   
 (3)  $\frac{A}{\rho I}$                       (4)  $\frac{I\rho}{A}$

19. A current carrying conductor is placed as shown in figure. The magnitude of magnetic field at point  $P$  will be



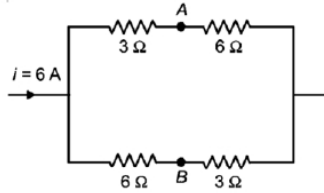
- (1)  $\frac{\mu_0}{4\pi} \frac{2i}{r} \left(\frac{\pi}{2} + 1\right)$       (2)  $\frac{\mu_0}{4\pi} \frac{2i}{r} \left(\frac{\pi}{2} - 1\right)$   
 (3)  $\frac{\mu_0}{4\pi} \frac{i}{r} \left(\frac{\pi}{2} + 1\right)$       (4)  $\frac{\mu_0}{4\pi} \frac{i}{r} \left(\frac{\pi}{2} - 1\right)$

20. A straight conductor carrying current  $i$  splits into two parts as shown in the figure. The radius of the circular loop is  $R$ . The total magnetic field at the centre  $P$  of the loop is,

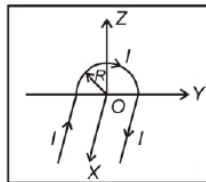


- (1)  $\frac{\mu_0 i}{2R}$ , inward  
 (2) Zero  
 (3)  $3\mu_0 i / 32R$ , outward  
 (4)  $3\mu_0 i / 32R$ , inward

21. The potential difference between points  $A$  and  $B$  is equal to



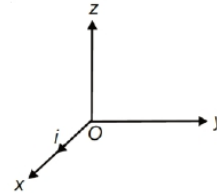
- (1) 6 V                      (2) 9 V  
 (3) -6 V                    (4) 12 V
22. A long wire carrying a steady current is bent into a circular loop of one turn. The magnetic field at the centre of the loop is  $B$ . It is then bent into a circular coil of  $n$  turns. The magnetic field at the centre of this coil of  $n$  turns will be
- (1)  $nB$                       (2)  $n^2B$   
 (3)  $2nB$                     (4)  $2n^2B$
23. A wire carrying current  $I$  has the shape as shown in adjoining figure. Linear parts of the wire are very long and parallel to X-axis while semicircular portion of radius  $R$  is lying in Y-Z plane. Magnetic field at point  $O$  is



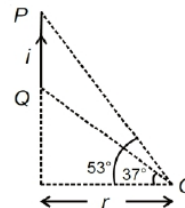
- (1)  $\vec{B} = \frac{\mu_0 I}{4\pi R} (\pi\hat{i} - 2\hat{k})$   
 (2)  $\vec{B} = \frac{\mu_0 I}{4\pi R} (\pi\hat{i} + 2\hat{k})$   
 (3)  $\vec{B} = -\frac{\mu_0 I}{4\pi R} (\pi\hat{i} - 2\hat{k})$   
 (4)  $\vec{B} = -\frac{\mu_0 I}{4\pi R} (\pi\hat{i} + 2\hat{k})$
24. When a proton is released from rest in a room, it starts with an initial acceleration  $a_0$  towards west. When it is projected towards north with a speed  $v_0$  it moves with an initial acceleration  $3a_0$  toward west. The electric and magnetic fields in the room are:

- (1)  $\frac{ma_0}{e}$  west,  $\frac{2ma_0}{ev_0}$  down  
 (2)  $\frac{ma_0}{e}$  east,  $\frac{3ma_0}{ev_0}$  up  
 (3)  $\frac{ma_0}{e}$  east,  $\frac{3ma_0}{ev_0}$  down  
 (4)  $\frac{ma_0}{e}$  west,  $\frac{2ma_0}{ev_0}$  up

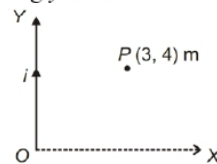
25. A charge is moving in a circular path in uniform magnetic field. The path of charge is
- (1) Uniform motion  
 (2) Uniformly accelerated motion  
 (3) Non-uniformly accelerated motion  
 (4) Both (2) & (3)
26. A thin long wire carrying current  $i$  is placed along positive  $x$ -axis. The unit vector of magnetic field at a point  $(0, a, a)$



- (1)  $\frac{\hat{j}}{\sqrt{2}} + \frac{\hat{k}}{\sqrt{2}}$                       (2)  $\frac{\hat{j}}{\sqrt{2}} - \frac{\hat{k}}{\sqrt{2}}$   
 (3)  $\frac{-\hat{j}}{\sqrt{2}} + \frac{\hat{k}}{\sqrt{2}}$                       (4)  $\frac{-\hat{j}}{\sqrt{2}} - \frac{\hat{k}}{\sqrt{2}}$
27. In case of a charged particle moving in a nonuniform magnetic field (independent of time)
- (1) Speed changes  
 (2) Kinetic energy changes  
 (3) Work is non zero  
 (4) Momentum changes
28. Magnetic field at point  $O$  due to straight conductor  $PQ$  is



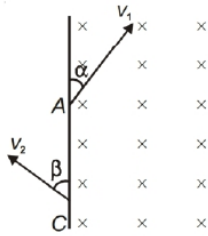
- (1)  $\frac{\mu_0 i}{5\pi r} \otimes$                       (2)  $\frac{\mu_0 i}{20\pi r} \otimes$   
 (3)  $\frac{20\mu_0 i}{\pi r} \odot$                       (4)  $\frac{\mu_0 i}{20\pi r} \odot$
29. Magnitude of magnetic field at a point  $P$  due to a current carrying wire, starting from origin and extended along  $y$ -axis is



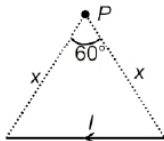
- (1)  $\frac{3\mu_0 i}{4\pi}$                       (2)  $\frac{3\mu_0 i}{16\pi}$   
 (3)  $\frac{3\mu_0 i}{20\pi}$                       (4)  $\frac{\mu_0 i}{20\pi}$



30. A particle of charge  $-q$  and mass  $m$  enters a uniform magnetic field  $\vec{B}$  at  $A$  with speed  $v_1$  at an angle  $\alpha$  and leaves the field at  $C$  with speed  $v_2$  at an angle  $\beta$  as shown. Then

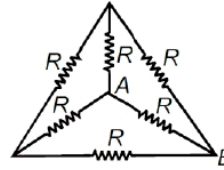


- (1)  $\alpha = \beta$   
 (2)  $v_1 = v_2$   
 (3) Particle remains in the field for time  $t = \frac{2m(\pi - \alpha)}{qB}$   
 (4) All of these
31. A straight wire of finite length carrying current  $I$  subtends an angle of  $60^\circ$  at point  $P$  as shown. The magnetic field at  $P$  is



- (1)  $\frac{\mu_0 I}{2\sqrt{3}\pi x}$       (2)  $\frac{\mu_0 I}{2\pi x}$   
 (3)  $\frac{\sqrt{3}\mu_0 I}{2\pi x}$       (4)  $\frac{\mu_0 I}{3\sqrt{3}\pi x}$
32. The correct relation between current density ( $\vec{J}$ ) and electric field ( $\vec{E}$ ) is  
 (Where  $\rho$  is resistivity,  $\sigma$  is conductivity and  $R$  is resistance of conductor)
- (1)  $\vec{J} = \rho\vec{E}$       (2)  $\vec{J} = \sigma\vec{E}$   
 (3)  $\vec{E} = \sigma^2\vec{J}$       (4)  $\vec{E} = R\vec{J}$
33. Charge through a cross-section of a conductor is given by  $Q = (t^2 + 2t)$  coulomb. The instantaneous current through the conductor at  $t = 1$  s is
- (1) 2 A      (2) 5 A  
 (3) 7 A      (4) 10 A
34. If the length of wire is stretched by 0.2%, then percentage increment in its resistance is
- (1) 0.2%  
 (2) 0.1%  
 (3) 0.4%  
 (4) 0.3%

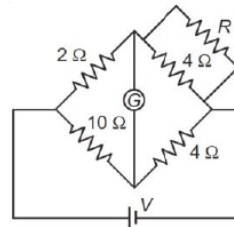
35. In given network, the resultant resistance between  $A$  and  $B$  is



- (1)  $R/2$       (2)  $2R$   
 (3)  $3R/2$       (4)  $R/4$

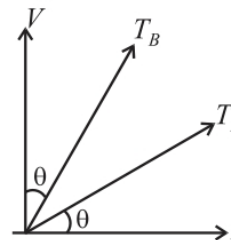
**SECTION-B**

36. The value of  $R$  for which deflection in galvanometer  $G$  is zero.



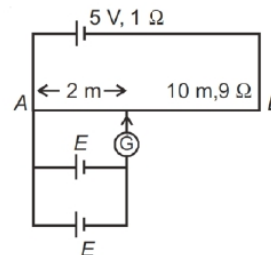
- (1)  $2 \Omega$       (2)  $1 \Omega$   
 (3)  $4 \Omega$       (4)  $8 \Omega$

37. The  $V-I$  graph of a conductor at two different temperatures is shown in figure. The ratio of temperature  $T_A$  and  $T_B$  is



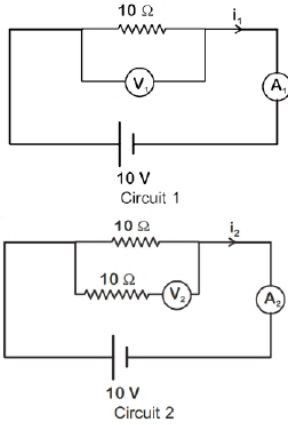
- (1)  $\tan^2 \theta$   
 (2)  $\cot^2 \theta$   
 (3)  $\sec^2 \theta$   
 (4)  $\text{cosec}^2 \theta$

38. In the given figure, if galvanometer shows null deflection then emf of each cell will be

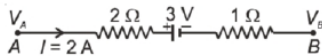


- (1) 9 V  
 (2) 0.9 V  
 (3) 4.5 V  
 (4) 1.8 V

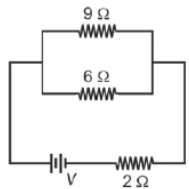
39. In the circuits shown below, the readings of voltmeters and the ammeters will be



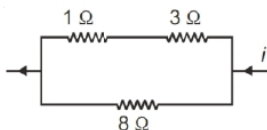
- (1)  $V_2 > V_1$  and  $i_1 = i_2$   
 (2)  $V_1 = V_2$  and  $i_1 > i_2$   
 (3)  $V_1 = V_2$  and  $i_1 = i_2$   
 (4)  $V_2 > V_1$  and  $i_1 > i_2$
40. The potential difference ( $V_A - V_B$ ) between the points  $A$  and  $B$  in the given figure is



- (1)  $-3$  V                      (2)  $+3$  V  
 (3)  $+6$  V                      (4)  $+9$  V
41. If voltage across a bulb rated  $220$  V –  $100$  W drops by  $2.5\%$  of its rated value, the percentage of the rated value by which the power would decrease is
- (1)  $5\%$                       (2)  $10\%$   
 (3)  $20\%$                       (4)  $2.5\%$
42. If power dissipated in the  $9\ \Omega$  resistor in the circuit shown is  $36$  W, the potential difference across the  $2\ \Omega$  resistor is

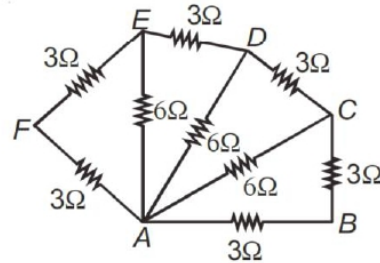


- (1)  $2$  V                      (2)  $4$  V  
 (3)  $8$  V                      (4)  $10$  V
43. Power dissipated across the  $8\ \Omega$  resistor in the circuit shown here is  $2$  W. The power dissipated in watt units across the  $3\ \Omega$  resistor is

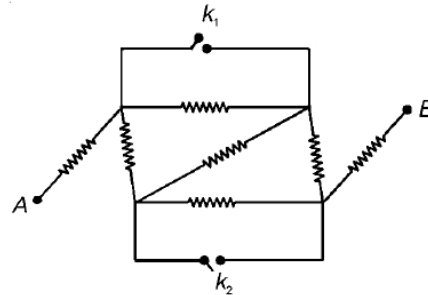


- (1)  $2$                       (2)  $1$   
 (3)  $0.5$                       (4)  $3$

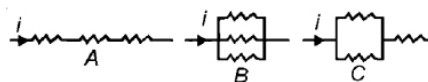
44. Six resistors of  $3\ \Omega$  each are connected along the sides of a hexagon and three resistors of  $6\ \Omega$  each are connected along  $AC$ ,  $AD$  and  $AE$  as shown in the figure. The equivalent resistance between  $A$  and  $B$  is equal to



- (1)  $2\ \Omega$   
 (2)  $6\ \Omega$   
 (3)  $3\ \Omega$   
 (4)  $9\ \Omega$
45. All the wires have same resistance and equivalent resistance between  $A$  and  $B$  is  $R_0$ . Now keys are closed, then equivalent resistance can be expressed as

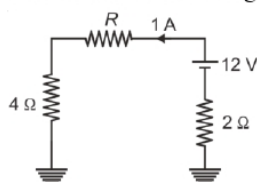


- (1)  $\frac{7R_0}{3}$   
 (2)  $\frac{7R_0}{9}$   
 (3)  $7R_0$   
 (4)  $\frac{R_0}{3}$
46. Three resistors of equal resistance ( $R = 2\ \Omega$ ) are connected in different ways as shown. They are arranged in increasing order of power dissipation, in



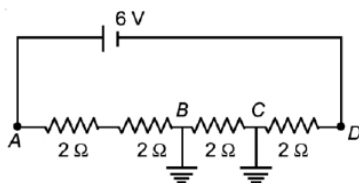
- (1)  $B < C < A$   
 (2)  $A < B < C$   
 (3)  $B = C < A$   
 (4)  $B < A < C$

47. Value of the resistance  $R$  in the figure is



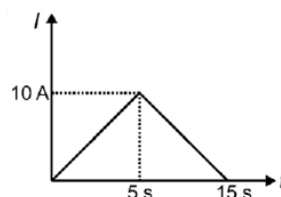
- (1)  $6\ \Omega$   
 (2)  $8\ \Omega$   
 (3)  $10\ \Omega$   
 (4)  $12\ \Omega$

48. Potential at point,  $D$  in the given circuit, is



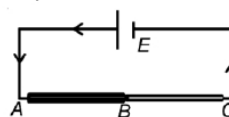
- (1)  $0\ \text{V}$   
 (2)  $2\ \text{V}$   
 (3)  $-4\ \text{V}$   
 (4)  $-2\ \text{V}$

49. Current  $I$  versus time  $t$  graph through a conductor is shown in the figure. Average current through the conductor in the interval 0 to 15 s is



- (1)  $1\ \text{A}$  (2)  $10\ \text{A}$   
 (3)  $7.5\ \text{A}$  (4)  $5\ \text{A}$

50. In the following diagram, the lengths of wires  $AB$  and  $BC$  are equal, but the radius of wire  $AB$  is double that of  $BC$ . The ratio of potential gradient on wires  $AB$  and on  $BC$  will be (wires are made of same material)



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

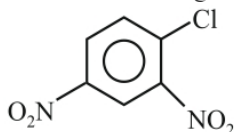
## SECTION-II (CHEMISTRY)

### SECTION - A

51. Hybridization of  $\beta$ - carbon atom in allyl halide is:

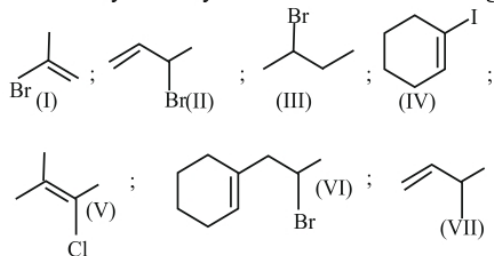
- (1)  $sp$   
 (2)  $sp^2$   
 (3)  $sp^3$   
 (4)  $sp^3d$

52. IUPAC name of the following compound is:



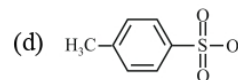
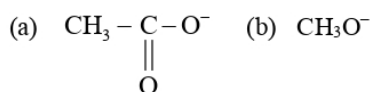
- (1) 4-Chloro-1, 3-dinitrobenzene  
 (2) 1-Chloro-2, 4-dinitrobenzene  
 (3) 1-Chloro-3, 6-dinitrobenzene  
 (4) o, p-dinitrochlorobenzene

53. How many are vinylic halides out of following?



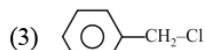
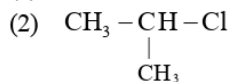
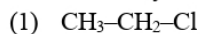
- (1) 1 (2) 2  
 (3) 3 (4) 4

54. The decreasing nucleophilicity among the nucleophiles:



- (1) (c) > (b) > (a) > (d)  
 (2) (b) > (c) > (a) > (d)  
 (3) (d) > (c) > (b) > (a)  
 (4) (a) > (b) > (c) > (d)

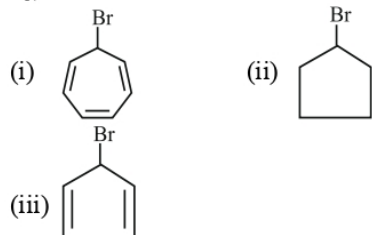
55. Which of the following undergoes nucleophilic substitution by  $\text{S}_{\text{N}}1$  mechanism at fastest rate?



56. Intermediate in  $\text{S}_{\text{N}}2$  reaction is:

- (1) Carbocation  
 (2) Carbanion  
 (3) Penta-valent carbon-atom  
 (4) None of these

57. Compare rate of reaction with  $\text{Ag}^{\oplus}\text{NO}_3^{\ominus}$  or rate of  $\text{S}_{\text{N}}1$  reaction:

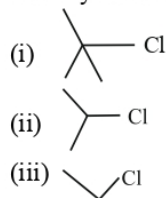


- (1) (i) > (iii) > (ii) (2) (i) > (ii) > (iii)  
 (3) (iii) > (ii) > (i) (4) (ii) > (i) > (iii)

58. Order of nucleophilicity in polar protic solvent?

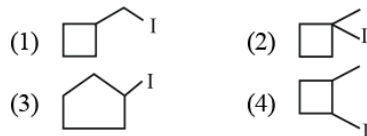
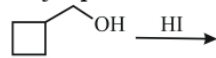
- (1)  $\text{I}^{\ominus} > \text{Br}^{\ominus} > \text{Cl}^{\ominus} > \text{F}^{\ominus}$   
 (2)  $\text{F}^{\ominus} > \text{Cl}^{\ominus} > \text{Br}^{\ominus} > \text{I}^{\ominus}$   
 (3)  $\text{I}^{\ominus} > \text{Cl}^{\ominus} > \text{Br}^{\ominus} > \text{F}^{\ominus}$   
 (4)  $\text{F}^{\ominus} > \text{I}^{\ominus} > \text{Br}^{\ominus} > \text{Cl}^{\ominus}$

59. Identify correct reactivity order for  $\text{S}_{\text{N}}2$  reaction:



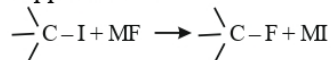
- (1) (iii) > (ii) > (i) (2) (i) > (iii) > (ii)  
 (3) (ii) > (iii) > (i) (4) (iii) > (i) > (ii)

60. Major product of the following reaction is:



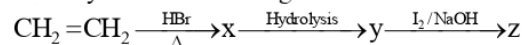
61. In the replacement reaction:

The reaction will be most favourable, if M (metal) happens to be:



- (1) Na (2) Mg  
 (3) Ag (4) Fe

62. Identify z in the following series:



- (1)  $\text{C}_2\text{H}_5\text{I}$  (2)  $\text{C}_2\text{H}_5\text{OH}$   
 (3)  $\text{CH}_3\text{I}$  (4)  $\text{CH}_3\text{CHO}$

63. Which is Finkelstein reaction?

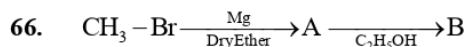
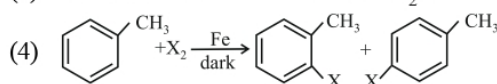
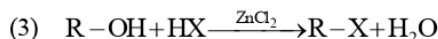
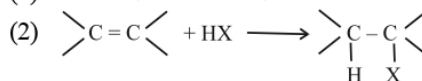
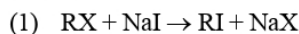
- (1)  $\text{R}-\text{X} + \text{NaI} \xrightarrow{\text{acetone}}$   
 (2)  $\text{R}-\text{X} + \text{AgF} \rightarrow$   
 (3)  $\text{R}-\text{X} + \text{NaF} \rightarrow$   
 (4)  $\text{R}-\text{X} + \text{AgCl} \rightarrow$



Product of above reaction is:

- (1) Geminal Halide (2) Vicinal Halide  
 (3) Vinyl Halide (4) Alkyl Halide

65. Which of the following is halogen exchange reaction?



What is the formula of B?

- (1)  $\text{CH}_3-\text{OC}_2\text{H}_5$   
 (2)  $\text{CH}_4$   
 (3)  $\text{CH}_3-\text{CH}_2-\text{CH}_3$   
 (4)  $\text{CH}_3-\text{OH}$

67. Which of the following is not organometallic compound?

- (1)  $\text{RMgX}$  (2)  $\text{R}_2\text{Zn}$   
 (3)  $\text{RONa}$  (4)  $\text{R}_2\text{Hg}$

68. Which is the best leaving group in a substitution reaction of an alkali halide?

- (1)  $\text{Cl}^-$  (2)  $\text{Br}^-$   
 (3)  $\text{I}^-$  (4)  $\text{F}^-$

69. 2-Chlorobutane on treatment with alcoholic  $\text{KOH}/\Delta$  gives mainly:

- (1) 2-Butene (2) 1-Butene  
 (3) 2-Butanol (4) 1-Butyne

70. The reagent used for Friedel-Craft's reaction is:

- (1) Dry ether (2)  $\text{AlCl}_3$   
 (3) Anhydrous  $\text{AlCl}_3$  (4)  $\text{P}_2\text{O}_5$

71. Elimination reaction generally occurs with the formation of:

- (1) One sigma bond  
 (2) One pi bond  
 (3) One sigma and one pi bond  
 (4) None of the above

72. Aryl halides are less reactive towards nucleophilic substitution reaction as compared to alkyl halides due to:

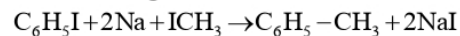
- (1) The formation of less stable carbanion  
 (2) Resonance stabilization of aryl halides  
 (3) Longer-carbon halogen bond  
 (4) Inductive effect



73. Haloarenes are ortho and para directing due to:

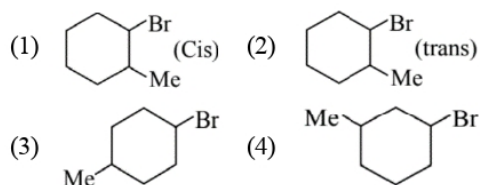
- (1) Resonance in aryl halide
- (2) -I effect of halogen atom
- (3) +I effect of halogen atom
- (4) Both (1) and (2)

74. The reaction given below is known as:



- (1) Wurtz reaction
- (2) Fittig reaction
- (3) Wurtz-Fittig reaction
- (4) Ullmann reaction

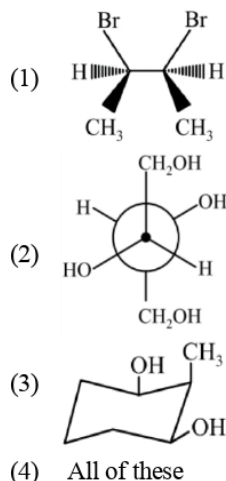
75. Which of the following will undergo fastest elimination reaction with alcoholic KOH?



76. The Reagent used in the Gattermann reaction for the preparation of aryl halide:

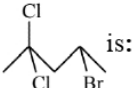
- (1)  $CCl_4$
- (2)  $BF_3$
- (3)  $Cu/HCl$
- (4)  $HNO_2$

77. Which of the following are meso compound?

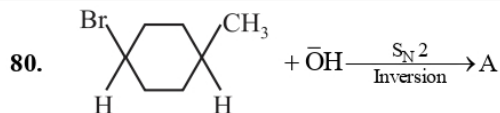


78. Chloroform on reaction with acetone gives:

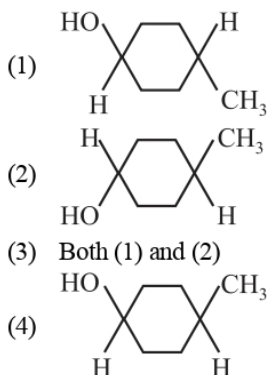
- (1) Acetylene
- (2) Chloroacetone
- (3) Nitrochloroform
- (4) Chloroacetone

79. Correct IUPAC name of  is:

- (1) 2-Bromo-4, 4-dichloropentane
- (2) 4-Bromo-2, 2-dichloropentane
- (3) 2, 2-Dichloro-4-bromopentane
- (4) 2, 4, 4-Bromodichloropentane



What is structure of A is:

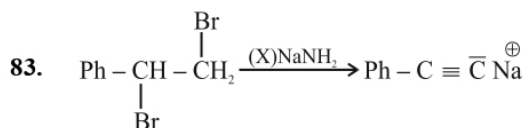


81. In  $S_N1$  reaction, the order of reactivity of halides is:

- (1)  $3^\circ > 2^\circ > 1^\circ > \text{methyl}$
- (2)  $\text{Methyl} > 3^\circ > 2^\circ > 1^\circ$
- (3)  $3^\circ > 2^\circ = 1^\circ > \text{methyl}$
- (4)  $2^\circ > 1^\circ > \text{methyl} > 3^\circ$

82. Which of the following haloalkanes is most reactive?

- (1) 1 - Chloropropane
- (2) 1 - Bromopropane
- (3) 2 - Chloropropane
- (4) 2 - Bromopropane



(X = No. of moles of  $\text{NaNH}_2$ ) Value of X is:

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

84. The reaction of  $C_6H_5N_2^+Cl^-$  with  $CuCl$  gives:

- (1)  $C_6H_5Cl$
- (2)  $C_6H_6$
- (3)  $C_6H_5-C_6H_5$
- (4)  $C_6H_4C_2$

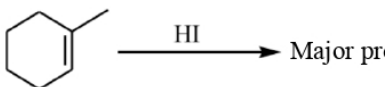
85. A mixture of equal amounts of two enantiomers \_\_\_\_\_.


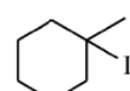
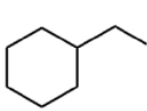
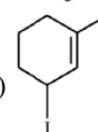
- (1) Is called a racemic mixture
- (2) Is optically inactive
- (3) Implies the enantiomers are meso forms
- (4) Both (1) and (2)

**SECTION – B**

86. Which of the following is the correct order of decreasing  $S_N2$  reactivity? (X = halogen)

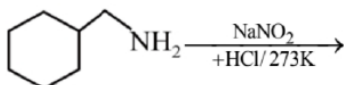
- (1)  $RCH_2X > R_3CX > R_2CHX$
- (2)  $RCH_2X > R_2CHX > R_3CX$
- (3)  $R_3CX > R_2CHX > RCH_2X$
- (4)  $R_2CHX > R_3CX > RCH_2X$

87.  Major product is:

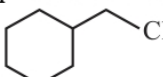
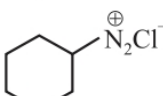
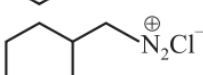
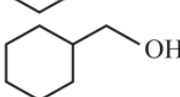
- (1) 
- (2) 
- (3) 
- (4) 

88. In Gattermann reaction, a diazonium group is replaced by X using Y. The X and Y are:

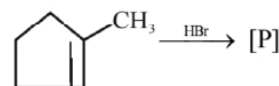
	X	Y
(1)	$Cl^\ominus$	Cu/HCl
(2)	$Cl^\oplus$	$CuCl_2/HCl$
(3)	$Cl^\ominus$	$CuCl_2/HCl$
(4)	$Cl_2$	$Cu_2O/HCl$

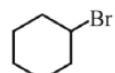
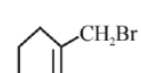
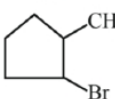

89. 

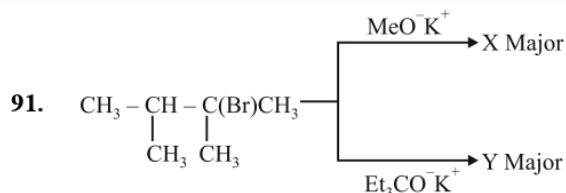
The product of reaction is:

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

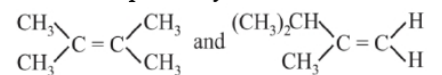
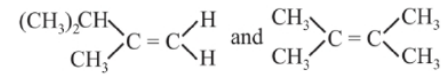
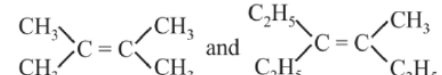
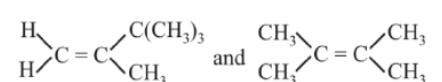
90. What is the major product of the following Reaction?

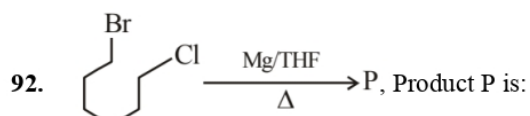



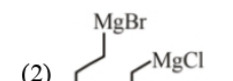

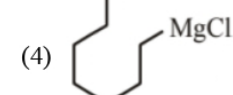
- (1) 
- (2) 
- (3) 
- (4) 

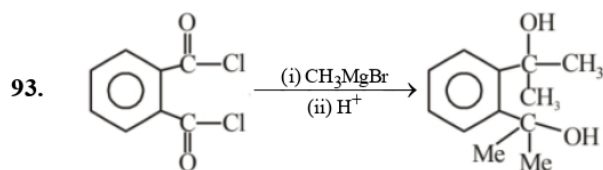


X and Y are respectively:

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



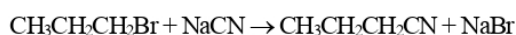
- (1) 
- (2) 
- (3) 
- (4) 



Number of moles of  $CH_3MgBr$  consumed in above reaction is:

- (1) 2
- (2) 4
- (3) 6
- (4) 8

94. Consider the reaction:



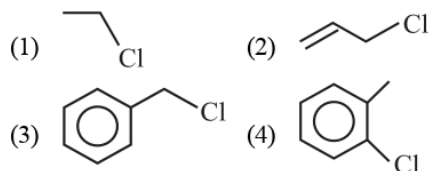
This reaction will be the fastest in:

- (1) Ethanol
- (2) Methanol
- (3) N, N'-dimethylformamide (DMF)
- (4) Water

95. Chlorobenzene is?

- (1) More reactive than ethyl bromide
- (2) More reactive than isopropyl chloride
- (3) As reactive as methyl chloride
- (4) Less reactive than benzyl chloride

96. In which of the following, replacement of  $\text{Cl}^-$  is most difficult?

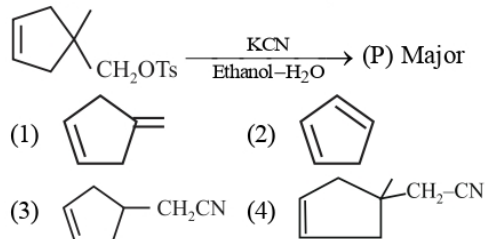


97. Match the organisms in column I with column II and mark the appropriate choice?

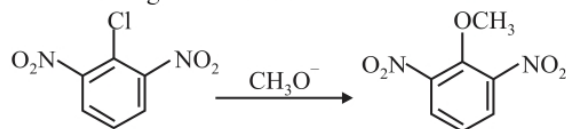
	Column-I		Column-II
A.	$\text{CH}_3\text{CH}_2\text{CHCl}_2$	i.	Vinyl halide
B.	$\text{CH}_2\text{ClCH}_2\text{Cl}$	ii.	Alkylidene halide
C.	$\text{CHCl}=\text{CH}_2$	iii.	Alkylene dihalide
D.	$\text{ClCH}_2-\text{CH}=\text{CH}_2$	iv.	Allyl halide

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

98. The produce P of the following reaction is:

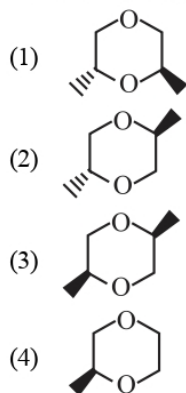


99. The reaction most likely occurs by which of the following mechanism?



- (1) Addition-elimination  
 (2) Addition only  
 (3) Elimination-addition  
 (4) None of these

100. Which of the following compound is achiral?



## SECTION-III (BOTANY)

### SECTION - A

101. **Statement I:** Mendel studied seven pairs of contrasting traits in pea plants and proposed the law of inheritance.

**Statement II:** Seven characters examined by Mendel in his experiment on pea plants were seed shape and colour, flower colour, pod shape and colour, flower position and stem height.

In the light of the above statements, choose the **correct** answer from the options given below.

- (1) Both statement I and statement II are incorrect.  
 (2) Statement I is correct, but statement II is incorrect.  
 (3) Statement I is incorrect but statement II is correct.  
 (4) Both statement I and statement II are correct.

102. The number of contrasting characters studied by Mendel for his experiments was

- (1) 14 (2) 4  
 (3) 2 (4) 7

103. Among the following characters, which one was not considered by Mendel in his experiments on pea?

- (1) Stem - Tall or Dwarf  
 (2) Trichomes - Glandular or Non-glandular  
 (3) Seed - Green or Yellow  
 (4) Pod - Inflated or Constricted

104. Which of the following traits of garden pea studied by Mendel was a recessive feature?

- (1) Green pod colour  
 (2) Round seed shape  
 (3) Axial flower position  
 (4) Green seed colour

105. Which contribute to the success of Mendel?

- (1) Qualitative analysis of data  
 (2) Observation of distinct inherited traits  
 (3) His knowledge of biology  
 (4) Consideration of one character at one time

**106.** Identify the **incorrect** statement with reference to the gene 'I' that controls ABO blood groups.

- (1) A person will have only two of the three alleles
- (2) When  $I^A$  and  $I^B$  are present together, they express same type of sugar
- (3) Allele 'i' does not produce any sugar
- (4) The gene (I) has three alleles

**107.** The human females with only X chromosome in their cells

- (1) Have normal secondary sexual characters
- (2) Are fertile but do not have normal secondary sexual characters
- (3) Are sterile
- (4) Lack ovaries

**108.** The genotypes of husband and wife are  $I^A I^B$  and  $I^A i$ . Among the blood types of their children, how many different genotypes and phenotypes are possible?

- (1) 3 genotypes; 3 phenotypes
- (2) 3 genotypes; 4 phenotypes
- (3) 4 genotypes; 3 phenotypes
- (4) 4 genotypes; 4 phenotypes

**109.** A gene showing codominance has

- (1) One allele dominant on the other
- (2) Alleles tightly linked on the same chromosome
- (3) Alleles that are recessive to each other
- (4) Both alleles independently expressed in the heterozygote

**110.** Match the column I with column II **correctly**.

	Column-I		Column-II
<b>A.</b>	Phenylketonuria	<b>i.</b>	Autosomal trisomy associated with mongolism
<b>B.</b>	Down's syndrome	<b>ii.</b>	Gynaecomastia
<b>C.</b>	Klinefelter's syndrome	<b>iii.</b>	Autosomal recessive trait associated with mental retardation
<b>D.</b>	Turner's syndrome	<b>iv.</b>	Sterile females with rudimentary ovaries

- |     | <b>A</b> | <b>B</b> | <b>C</b> | <b>D</b> |
|-----|----------|----------|----------|----------|
| (1) | iii      | i        | iv       | ii       |
| (2) | ii       | iii      | i        | iv       |
| (3) | ii       | i        | iii      | iv       |
| (4) | iii      | i        | ii       | iv       |

**111.** Which of the following cannot be explained on the basis of Mendel's Law of Dominance?

- (1) The discrete unit controlling a particular character is called a factor
- (2) Out of one pair of factors one is dominant, and the other recessive
- (3) Alleles do not show any blending and both the characters recover as such in  $F_2$ -generation
- (4) Factors occur in pairs

**112.** In pea plants, yellow seeds are dominant to green. If a heterozygous yellow seeded plant is crossed with a green seeded plant, what ratio of yellow and green seeded plants would you expect in  $F_1$ -generation?

- |           |           |
|-----------|-----------|
| (1) 1 : 1 | (2) 9 : 1 |
| (3) 1 : 3 | (4) 3 : 1 |

**113.** Phenotypes of an organism is the result of

- (1) Mutations and linkages
- (2) Cytoplasmic effects and nutrition
- (3) Environmental changes and sexual dimorphism
- (4) Genotype and environmental interactions

**114.** Which among the following do **not** follow independent assortment?

- (1) Genes on non-homologous chromosomes and absence of linkage
- (2) Genes on homologous chromosomes
- (3) Linked genes on same chromosome
- (4) Unlinked genes on same chromosome

**115.** Frequency of recombination between gene pairs on same chromosome in a measure of the distance between genes to map their position on chromosome, was used for the first time by

- (1) Sutton and Boveri
- (2) Alfred Sturtevant
- (3) Henking
- (4) Thomas Hunt Morgan

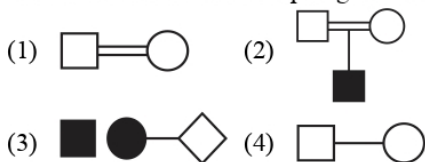
**116.** Which of the following statement are **correct** about Klinefelter's syndrome?

- A.** This disorder was first described by Langdon Down (1866).
  - B.** Such an individual has overall masculine development. However, the feminine development is also expressed.
  - C.** The affected individual is short statured.
  - D.** Physical, psychomotor and mental development is retarded.
  - E.** Such individuals are sterile.
- |                  |                  |
|------------------|------------------|
| (1) Only C and D | (2) Only B and E |
| (3) Only A and E | (4) Only A and B |



117. Broad palm with single palm crease is visible in person suffering from
- (1) Turner's syndrome
  - (2) Klinefelter's syndrome
  - (3) Thalassemia
  - (4) Down's syndrome

118. Which of the following symbols represent mating between relative in human pedigree analysis?



119. Which of the following statements is **not** true for two genes that show 50% recombination frequency?

- (1) The genes may be on different chromosomes
- (2) The genes are tightly linked
- (3) The genes show independent assortment
- (4) If the genes are present on the same chromosome, they undergo more than one crossovers in every meiosis.

120. Select the **correct** statement related w.r.t. dihybrid cross.

- (1) Tightly linked genes on the same chromosome show higher recombinations
- (2) Genes far apart on the same chromosome show very few recombinations
- (3) Genes loosely linked on the same chromosome show similar recombination as the tightly linked one
- (4) Tightly linked genes on the same chromosome show very few recombinations

121. A polygenic inheritance in human beings is

- (1) Skin colour
- (2) Phenylketonuria
- (3) Colour blindness
- (4) Sickle-cell anaemia

122. In Morgan's experiment on *Drosophila*, it was found that parental type combinations for body colour, eye colour and wing size was much more than recombinant types. This gives the conclusion that

- (1) The responsible alleles are autosomal
- (2) The responsible alleles are present on the same chromosome
- (3) Only one gene controls all the given characters
- (4) Two of the responsible genes are present on X-chromosome and the third one is present on Y-chromosome

123. In order to find out the different types of gametes produced by a pea plant having the genotype AaBb, it should be crossed to a plant with the genotype

- (1) aaBB
- (2) AaBb
- (3) AaBB
- (4) aabb

124. Genetic map is one that

- (1) Shows the stages during the cell division
- (2) Shows the distribution of various species in a region
- (3) Establishes sites of the genes on a chromosome
- (4) Establishes the various stages in gene evolution

125. Heterozygous round and yellow seeded pea plants were selfed and total 800 seeds are collected. What is the total number of seeds with first dominant and second recessive traits?

- (1) 950
- (2) 300
- (3) 200
- (4) 150

126. In which of the following condition, both alleles will **not** be expressed together?

- (1)  $I^A I^B$
- (2) Aa
- (3)  $Hb^A Hb^S$
- (4) Both (1) and (3)

127. Which of the following pairs is **incorrectly** matched?

- (1) XX-XO type sex determination : Grasshopper
- (2) ABO blood grouping : Codominance
- (3) Starch synthesis in pea : Multiple alleles
- (4) TH Morgan : Linkage

128. Calculate number of the phenotypes in  $F_2$  generation if a character is controlled by 3 pairs of polygenes.

- (1) 7
- (2) 8
- (3) 27
- (4) 14

129. Point mutation involves

- (1) Insertion
- (2) Change in single base pair
- (3) Duplication
- (4) Deletion

130. Mark the **incorrect** statement related to chromosomal theory of inheritance.

- (1) Both chromosomes and genes retain their number and individuality throughout the life of an organism
- (2) Chromosome are carrier of Mendelian factors which segregate and assort independently during meiosis
- (3) The two alleles of gene pair are located on homologous site of non-homologous chromosomes
- (4) A gamete carries only one chromosome of a type and one of two alleles of a trait.

131. The chromosome compliments of egg and sperm whose union results Klinefelter's syndrome is

- (1)  $(22 + XX) + (22 + Y)$
- (2)  $(23 + X) + (22 + Y)$
- (3)  $(22 + X) + (22 + O)$
- (4)  $(23 + X) + (22 + X)$

132. **Statement I:** A man with enlarged breasts, spars body hair & XXY chromosome complement is suffering from Klinefelter's syndrome.

**Statement II:** Honey Bee = Male haploid, female diploid.

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

133. Sickle cell anaemia induces due to:

- (1) Change of Amino acid in  $\alpha$ -chain of haemoglobin
- (2) Change of Amino acid in  $\beta$ -chain of haemoglobin
- (3) Change of Amino acid in both  $\alpha$  and  $\beta$  chain of haemoglobin
- (4) Change of Amino acid either  $\alpha$  or  $\beta$  chain of haemoglobin

134. Match the following:

	Column-I		Column-II
<b>I.</b>	Removal of anther	<b>A.</b>	Human blood group
<b>II.</b>	Laws of inheritance	<b>B.</b>	Emasculation
<b>III.</b>	Multiple allelism	<b>C.</b>	Blood group O
<b>IV.</b>	Universal donor	<b>D.</b>	Mendel

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

135. Percentage of AABB progeny in  $F_1$  generation in a Mendelian dihybrid test cross is

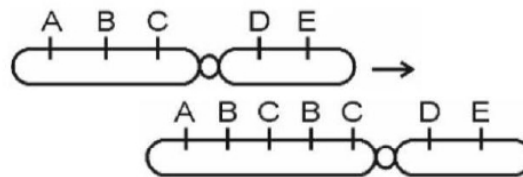
- (1) 50%
- (2) 25%
- (3) 12.5%
- (4) 0%

### SECTION - B

136. How many chromosomes does the male honey bee possess?

- (1) 32
- (2) 16
- (3) 8
- (4) 64

137. Which type of chromosomal aberration is shown in the given representation?



- (1) Deletion
- (2) Duplication
- (3) Translocation
- (4) Inversion

138. Match the columns and select the correct option.

<b>A.</b>	$2n - 1$	<b>i.</b>	Nullisomic condition
<b>B.</b>	$2n - 2$	<b>ii.</b>	Trisomic condition
<b>C.</b>	$2n + 1$	<b>iii.</b>	Tetrasomic condition
<b>D.</b>	$2n + 2$	<b>iv.</b>	Monosomic condition

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

139. Pick out the correct statements.

- I.** Haemophilia is a sex-linked recessive disease.
- II.** Down's syndrome is due to aneuploidy.
- III.** Phenylketonuria is an autosomal recessive gene disorder.
- IV.** Sickle-cell anaemia is an X-linked recessive gene disorder.

- (1) II and III
- (2) I, III and IV
- (3) I, II and III
- (4) I and IV

140. Substitution of purine base with a pyrimidine base or vice-versa is called

- (1) Transition
- (2) Transversion
- (3) Deletion
- (4) Inversion

141. In Morgan's experiment which of the following combinations of traits in *Drosophila* represent(s) recombinant type?

- |                       |   |                |
|-----------------------|---|----------------|
| <b>(i)</b> White eye  | : | Miniature wing |
| <b>(ii)</b> Red eye   | : | Brown body     |
| <b>(iii)</b> Red eye  | : | Miniature wing |
| <b>(iv)</b> White eye | : | Brown body     |
- (1) (iii) and (iv)
  - (2) (iv) only
  - (3) (i) and (ii)
  - (4) (ii) and (iii)

142. Select the incorrect statement w.r.t. phenylketonuria.

- (1) It is an autosomal recessive trait
- (2) The affected individuals lack enzyme phenylalanine hydroxylase
- (3) In the affected individual, phenylalanine is converted into tyrosine
- (4) Affected individuals experience mental retardation

143. *Drosophila* is suitable as experimental material in genetics, because
- (1) It cannot be easily grown in laboratory
  - (2) It has life span of 2 years
  - (3) These are very tiny flies and cannot be seen through low power microscope
  - (4) It produces hundreds of offspring in single mating
144. Down's syndrome is caused by an extra copy of chromosome number 21. What percentage of offspring produced by an affected mother and a normal father would be affected by this disorder?
- (1) 50%
  - (2) 25%
  - (3) 100%
  - (4) 75%
145. Pleiotropic gene is
- (1) Haemophilia
  - (2) Thalassemia
  - (3) Phenylketonuria
  - (4) Colour blindness
146. \_\_\_(i)\_\_\_ coined the term \_\_\_(ii)\_\_\_ to describe the physical association of genes on same chromosome. Select the **correct** option to fill in the blanks (i) and (ii).
- (1) (i) Sutton, (ii) recombination
  - (2) (i) Carl Correns, (ii) Allele
  - (3) (i) Tschermak, (ii) epistasis
  - (4) (i) Morgan, (ii) linkage
147. A colourblind girl is rare because she will be born only when
- (1) Her mother and maternal grandfather were colourblind
  - (2) Her father and maternal grandfather were colourblind
  - (3) Her mother is colour blind and father has normal vision
  - (4) Parents have normal vision but grandparents were colourblind

148. Match the following:

	Column-I		Column-II
I.	Nondisjunction	A.	Pea
II.	Mendel	B.	<i>Drosophila</i>
III.	Morgan	C.	Genome
IV.	Set of chromosomes	D.	Aneuploidy

- |     | I | II | III | IV |
|-----|---|----|-----|----|
| (1) | B | A  | D   | C  |
| (2) | D | A  | B   | C  |
| (3) | D | B  | A   | C  |
| (4) | B | C  | D   | A  |
149. In garden pea, gene controlling starch synthesis is related to all of the given phenomenon, except
- (1) Pleiotropy
  - (2) Incomplete dominance
  - (3) Codominance
  - (4) Complete dominance
150. **Assertion:** The unmodified allele, which represents the original phenotype is the dominant allele and the modified allele is generally the recessive allele.  
**Reason:** The modified allele could be responsible for production of non-functional enzyme or no enzyme at all.
- (1) Both Assertion and Reason are true and the Reason is the correct explanation of the Assertion.
  - (2) Both Assertion and Reason are true but the Reason is not the correct explanation of the Assertion.
  - (3) Assertion is true but Reason is false.
  - (4) Both Assertion and Reason are false.

## SECTION-IV (ZOOLOGY)

### SECTION - A

151. Drug called 'Heroin' is synthesised by –
- (1) Glycosylation of morphine
  - (2) Nitration of morphine
  - (3) Methylation of morphine
  - (4) Acetylation of morphine
152. Which of the following is not a property of cancer cells?
- (1) They compete with normal cells for vital nutrients.
  - (2) They do not remain confined in the area of formation.
  - (3) They divide in an uncontrolled manner.
  - (4) They show contact inhibition.
153. Interferon is a protein that –
- (1) Kills a virus.
  - (2) Protects non-infected cells from virus.
  - (3) Prevents viruses from taking over the cellular machinery.
  - (4) Prevents the bacterial infections.
154. An addictive compound obtained from *Cannabis sativa*, which is known to affect cardiovascular system is:
- (1) Heroin
  - (2) Charas
  - (3) Coke
  - (4) Smack

155. Method/technique utilising X-rays to generate three dimensional image of the internal organs of an object is:  
 (1) MRI  
 (2) PCR  
 (3) Computed tomography  
 (4) Biopsy
156. Which of the following is the common feature shared by benzodiazepines and barbiturates?  
 (1) Stimulants (2) Anti-depressant  
 (3) Hallucinogenic (4) Sedatives
157. Hepatitis B vaccines produced using recombinant DNA technology has allowed its large scale production. Which host is used for this preparation?  
 (1) *E.coli* (2) Yeast  
 (3) *Drosophila* (4) *Mycoplasma*
158. Given below are two statements; one is labelled as Assertion (A) and the other is labelled as Reason (R).  
**Assertion (A):** Most parasites are pathogens as they cause harm to the host by living in (or on) them.  
**Reason (R):** The pathogen can enter our body by various means, multiply and therefore interfere with normal vital activities.  
 In the light of the above statements, choose the correct answer from the options given below :  
 (1) Both (A) & (R) are correct but (R) is not the correct explanation of (A).  
 (2) (A) is correct but (R) is not correct.  
 (3) (A) is not correct but (R) is correct.  
 (4) Both (A) & (R) are correct and (R) is the correct explanation of (A).
159. Choose the incorrect statement about *Entamoeba histolytica*:  
 (a) Parasite of large intestine  
 (b) Causes dysentery  
 (c) Spread through contaminated food and water.  
 (d) Symptoms include constipation, abdominal pain and cramps.  
 (1) a only (2) c only  
 (3) a and c (4) All are correct
160. *Aedes* mosquitoes play an important role in transmission of disease:  
 (1) Malaria (2) Chikungunya  
 (3) Dengue (4) Both (2) and (3)
161. Opioids are the drugs, which bind to specific opioids receptors present in:  
 (1) CNS (2) GIT  
 (3) Spleen (4) Both (1) and (2)
162. Consider the given statements and select the correct option.  
**Statement A:** The immediate adverse effects of drugs and alcohol abuse are manifested in the form of reckless behaviours, vandalism and violence.  
**Statement B:** Excessive doses of drugs may lead to coma and death due to respiratory failure, heart failure or cerebral hemorrhage.  
 (1) Only statement A is correct  
 (2) Only statement B is correct  
 (3) Both statements are correct  
 (4) Both statements are incorrect
163. Appearance of dry, scaly lesions on various parts of body such as skin, nails and scalp indicate infection by all except:  
 (1) *Microsporum*  
 (2) *Trichophyton*  
 (3) *Haemophilus influenzae*  
 (4) *Epidermophyton*
164. Toxin \_\_\_\_\_ is responsible for chill and high fever during malaria.  
 (1) Haematin (2) Haemoglobin  
 (3) Haemozoin (4) Heam
165. Cirrhosis of liver is caused by the chronic intake of:  
 (1) Tobacco (Chewing)  
 (2) Antibiotics  
 (3) Cigarettes  
 (4) Alcohol
166. Read the following sentences (A - D):  
 (A) In our body, cell growth and differentiation is highly controlled and regulated. In cancer cells, there is breakdown of these regulatory mechanisms.  
 (B) Malignant tumors grow very rapidly, invading and damaging the surrounding normal tissue.  
 (C) Metastasis is the most feared property of malignant tumors.  
 (D) Proto-oncogene when activated under certain conditions, could lead to oncogenic transformation of cells.  
 How many of the above statements is/are true?  
 (1) 3 (2) 4  
 (3) 2 (4) 1



167. Choose the incorrect statement w.r.t smack:
- (1) It is chemically diacetylmorphine.
  - (2) It is a white, odourless, bitter, crystalline compound.
  - (3) It is generally taken by snorting or injection.
  - (4) It is known for their effects on cardiovascular system of the body.

168. The presence of typhoid fever in a person can be confirmed by –
- (1) ELISA test
  - (2) Widal test
  - (3) Biopsy
  - (4) Histopathological studies

169. Which is not a correct statement?
- (1) Repeated use of drugs decreases tolerance level of receptors.
  - (2) Those who take drugs intravenously are much more likely to acquire serious infections like AIDS.
  - (3) Chronic use of drugs and alcohol damages nervous system and liver.
  - (4) Adolescence period of human is between 12-18 years of age.

170. Match the column I and column II and choose the correct option:

	Column I (Disease)		Column II (Symptoms)
(a)	Filariasis	(i)	High fever, stomach pain, constipation
(b)	Ascariasis	(ii)	Chronic inflammation of lower limbs and genital organs.
(c)	Pneumonia	(iii)	Internal bleeding, muscular pain, blockage of intestinal passage
(d)	Typhoid	(iv)	Fever, chills, cough, headache

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

171. Consider the given statements and select the correct option:

**Statement A:** Smoking increases carbon monoxide (CO) content in blood.

**Statement B:** This reduces the concentration of haembound oxygen and cause oxygen deficiency in the body.

- (1) Only statement A is correct.
- (2) Only statement B is correct.
- (3) Both statements are correct.
- (4) Both statements are incorrect.

172. The side effects of the use of anabolic steroids in females include:

- (1) Masculinisation
- (2) Increased aggressiveness
- (3) Mood swings and depression
- (4) All of the above

173. Below are some statements related to life cycle of *Plasmodium*. Which of the following is correct?

- (1) Gametocytes stage infects human body.
- (2) Parasites multiplies sexually in human liver.
- (3) Human WBCs are ruptured causing cycles of fever and other symptoms.
- (4) Fertilisation and development take place in the mosquito's gut.

174. The   A   provide the sites for interaction of lymphocytes with the antigen, which then proliferate to become   B  .

- (1) Secondary lymphoid organs and effector cells.
- (2) Primary lymphoid organs and receptor cells.
- (3) Lymph nodes and mature lymphocytes.
- (4) Thymus and memory cells.

175. If the regular use of drugs/alcohol is abruptly discontinued, there will be occurrence of withdrawal symptoms that include all of the following except:

- (1) Anxiety
- (2) Shaking/trembling
- (3) Nausea and sweating
- (4) Feeling of well being

176. Which of the following can cause DNA damage leading to neoplastic transformation?

- I. X-rays                      II. Gamma rays  
III. UV rays
- (1) I only                      (2) II only
  - (3) I and II only            (4) I, II and III

177. Given below are two statements; one is labelled as Assertion (A) and the other is labelled as Reason (R).

**Assertion (A):** An anamnestic response is highly intensified.

**Reason (R):** It occurs when there is subsequent encounter of the same pathogen and our body appears to have memory of the first encounter.

In the light of the above statements, choose the correct answer from the options given below :

- (1) Both (A) & (R) are correct but (R) is not the correct explanation of (A).
- (2) (A) is correct but (R) is not correct.
- (3) (A) is not correct but (R) is correct.
- (4) Both (A) & (R) are correct and (R) is the correct explanation of (A).

178. Select the correct statement:

- (1) Morphine is extracted from the leaves of *Cannabis sativa*.
- (2) *Gambusia* fish feeds on protozoans.
- (3) There is always a time lag between the infection and appearance of AIDS symptoms, which may vary from a few months to many years (usually 5-10 years).
- (4) Maintenance of personal and public hygiene is not important for prevention and control of diseases.

179. Select the incorrect match:

(1)	Acid in stomach	–	Physiological barrier
(2)	Natural killer cells	–	Cellular barrier
(3)	IgA in colostrum	–	Passive immunity
(4)	Anti-venom injections	–	Active immunity

180. Drastic decline in number of which cells is a major cause of AIDS?

- (1) Cytotoxic T cells
- (2) Helper T cells
- (3) Plasma cells
- (4) Macrophages

181. How many of the following given in the box below is/are primary lymphoid organs?

Lymph nodes, Spleen, Thymus, Tonsils, Peyer's patches

- (1) One
- (2) Two
- (3) Three
- (4) Four

182. The plant given in the below diagram is known for its-



- (1) Sedative nature
- (2) Effect on cardiovascular system
- (3) Hallucinogenic properties
- (4) Painkiller

183. Match column I with column II and choose the correct option:

	Column I		Column II
(a)	Incubation period	(i)	Biological response modifiers
(b)	Contact inhibition	(ii)	Ionising and non-ionising radiations
(c)	Carcinogens	(iii)	Time lag between infection and appearance of AIDS symptoms
(d)	$\alpha$ -interferons	(iv)	By virtue of which contact with other cells inhibits their uncontrolled growth

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

184. Find out the incorrect statement regarding AIDS.

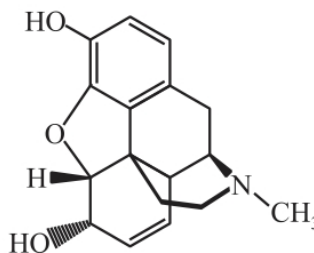
- (1) Macrophages act as HIV factory.
- (2) Infection of *Mycobacterium*, viruses, fungi and *Toxoplasma* are common.
- (3) Count of T lymphocytes decreases.
- (4) Anti retroviral drugs are completely effective.

185. Cancer causing viruses are called A and have genes called B.

- | A                     | B                  |
|-----------------------|--------------------|
| (1) HIV               | Cellular oncogenes |
| (2) Oncogenic viruses | Viral oncogenes    |
| (3) Rhino viruses     | Proto oncogenes    |
| (4) Hepatitis virus   | C-onc.             |

### SECTION-B

186. The given diagram shows the chemical structure of:



- (1) Morphine molecule
- (2) Cannabinoid molecule
- (3)  $\alpha$ -interferon
- (4) Coca alkaloid

187. Mosquitoes are not involved in the spread of disease caused by –
- (1) *Salmonella typhi*
  - (2) *Chikungunya virus*
  - (3) *Wuchereria bancrofti*
  - (4) *Plasmodium*
188. Which disease is one of the most dreaded non-infectious disease?
- (1) Plague
  - (2) AIDS
  - (3) Cancer
  - (4) Diphtheria
189. Transmission of HIV infection does not occur by:
- (1) Sexual contact with infected person.
  - (2) Transfusion of contaminated blood and blood product.
  - (3) Sharing food.
  - (4) Infected mothers to her child through placenta.
190. Metastasis is:
- (1) Part of regeneration.
  - (2) Transfer of cancer cells from one part of the body to another.
  - (3) Fast mitosis in cancer cells.
  - (4) All of the above
191. Early detection of cancers is essential as it allows the disease to be treated successfully in many cases. Choose the incorrect statement about cancer detection from the following:
- (1) Antibodies against cancer-specific antigens are also used for detection of certain cancers.
  - (2) Blood and bone marrow tests for increased cell counts are used in the case of leukemias.
  - (3) MRI uses strong magnetic fields and ionising radiations to accurately detect pathological and physiological changes in the living tissue.
  - (4) Cancer detection is based on biopsy and histopathological studies of the tissue.
192. Tobacco contains a large number of chemical substances including nicotine. How it effects our body?
- (1) It is very effective painkiller.
  - (2) It stimulates adrenal gland to release adrenaline and nor adrenaline into blood circulation.
  - (3) It increase blood pressure and heart rate
  - (4) Both (2) and (3)

193. The plant with hallucinogenic properties is:

- (1) *Papaver somniferum*
- (2) *Atropa belladonna*
- (3) *Erythroxylum coca*
- (4) Both (2) and (3)

194. Match column I with column II and choose the correct option:

	Column I (drugs)		Column II (use)
(a)	Morphine	(i)	Effect on cardiovascular system
(b)	Cocaine	(ii)	Treats insomnia
(c)	Marijuana	(iii)	As sedative and painkiller
(d)	Amphetamines	(iv)	As stimulant

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

195. Each immunoglobulin has two heavy chains and two light chains. The antigen binding site is found in:

- (1) Variable region of heavy chain
- (2) Variable region of light chain
- (3) Constant region of light chain
- (4) Variable region of both heavy and light chain

196. Consider the given statements and select the correct option:

**Statement A:** Balanced diet, personal hygiene and regular exercise are very important to maintain good health.

**Statement B:** Yoga has been practised to achieve physical & mental illness.

- (1) Only statement A is correct.
- (2) Only statement B is correct.
- (3) Both statements are correct.
- (4) Both statements are incorrect.

197. Cases of people suffering from acquired immunodeficiency syndrome were first reported in:

- (1) 1983
- (2) 1981
- (3) 1951
- (4) 1971

**198.** Given below are two statements; one is labelled as Assertion (A) and the other is labelled as Reason (R).

**Assertion (A):** Most cancers are treated by combination of surgery, radiotherapy and chemotherapy.

**Reason (R):** Tumor cells have been shown to avoid detection and destruction by immune system.

In the light of the above statements, choose the correct answer from the options given below :

- (1) Both (A) & (R) are correct but (R) is not the correct explanation of (A).
- (2) (A) is correct but (R) is not correct.
- (3) (A) is not correct but (R) is correct.
- (4) Both (A) & (R) are correct and (R) is the correct explanation of (A).

**199.** Immunisation is based on:

- (1) Memory of individuals
- (2) Pathogenicity
- (3) Phagocytosis
- (4) Memory of immune system

**200.** Read the features given below w.r.t. common cold.

- A. Caused by Rhino viruses.
- B. Affects the complete respiratory passage including lungs.
- C. Usually lasts for 3-7 days.
- D. Non-infectious human disease.

Select the option including only correct features:

- (1) A and B
- (2) A and C
- (3) A, B and C
- (4) A, B, C and D

# Lakshya NEET (2024)

## PRACTICE TEST – 03 SOLUTION

DURATION : 200 Minutes

M. MARKS : 720

### ANSWER KEY

#### PHYSICS

1. (3)
2. (4)
3. (4)
4. (2)
5. (3)
6. (4)
7. (1)
8. (4)
9. (1)
10. (4)
11. (2)
12. (1)
13. (2)
14. (1)
15. (4)
16. (3)
17. (2)
18. (4)
19. (4)
20. (2)
21. (2)
22. (2)
23. (4)
24. (1)
25. (3)
26. (3)
27. (4)
28. (2)
29. (3)
30. (4)
31. (1)
32. (2)
33. (3)
34. (3)
35. (1)
36. (2)
37. (1)
38. (2)
39. (3)
40. (4)
41. (1)
42. (4)
43. (4)
44. (1)
45. (2)
46. (1)
47. (1)
48. (4)
49. (4)
50. (2)

#### CHEMISTRY

51. (2)
52. (2)
53. (3)
54. (1)
55. (3)
56. (4)
57. (2)
58. (1)
59. (1)
60. (3)
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95. (4)
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97. (2)
98. (4)
99. (1)
100. (3)

#### BOTANY

101. (4)
102. (4)
103. (2)
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150. (1)

#### ZOOLOGY

151. (4)
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184. (4)
185. (2)
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187. (1)
188. (3)
189. (3)
190. (2)
191. (3)
192. (4)
193. (4)
194. (2)
195. (4)
196. (1)
197. (2)
198. (4)
199. (4)
200. (2)



## SECTION – I (PHYSICS)

1. (3)  
Since  $F$  is always perpendicular to velocity.  
Hence speed remains constant.

2. (4)  
For no deflection

$$\frac{2}{4} = \frac{3}{2+R}$$

$$2+R=6$$

$$R=4\Omega$$

3. (4)  
 $\vec{F} = q(\vec{E} + \vec{v} \times \vec{B})$

4. (2)  
$$B_{\text{centre}} = \frac{\mu_0 i}{4} \left( \frac{1}{R_1} - \frac{1}{R_2} \right)$$

5. (3)  
 $\frac{a}{4}$  inside the surface =  $\frac{3a}{4}$  from axis.

$$B_{\frac{a}{4} \text{ inside}} = \frac{\mu_0 I}{2\pi a^2} \times \left( \frac{3a}{4} \right)$$

$$B_{\frac{a}{4} \text{ outside}} = \frac{\mu_0 I}{2\pi \left( \frac{5a}{4} \right)}$$

6. (4)  
 $B = \mu_0 nI$   
 $B = 4\pi \times 10^{-7} \times 400 \times 5 = 2.5 \text{ mT}$

7. (1)  
 $V = 4 \times \left( \frac{4 \times 1}{4+1} \right) = \frac{16}{5}$   
 $I_1 = \frac{v}{R_1} = \left( \frac{16}{5} \right) = \frac{8}{5} \text{ A}$

8. (4)  
 $\therefore B = \frac{\mu_0}{4\pi} \cdot \frac{qv}{r^2}$   
So,  $r^2 \propto \frac{v}{B}$   
 $r \propto \sqrt{\frac{v}{B}}$

9. (1)  
 $r = \frac{\sqrt{2mk}}{Bq}$

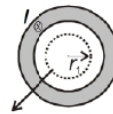
10. (4)  
 $F = ILB \sin \theta$   
 $= 10 \times 1 \times 2 \sin 30^\circ = 10 \text{ N}$

11. (2)  
 $F = iB(dL) = i \frac{\mu_0}{2\pi L} i dL = \frac{\mu_0}{2\pi L} i^2 dL$

12. (1)

13. (2)  
 $r = \frac{mv_{\perp}}{qB} = \frac{mv \sin \theta}{qB}$

14. (1)



No current enclosed by curve  $i_{\text{in}} = 0$   
So,  $B = 0$

15. (4)  
Force between two parallel sides is attractive.

16. (3)  
 $v_d \propto \frac{1}{A}$  for  $i = \text{constant}$

17. (2)  
 $i_{\text{in}} = 0 \quad \oint \vec{B} \cdot d\vec{l} = \mu_0 i_{\text{in}} = 0$

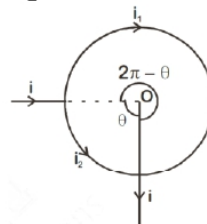
18. (4)  
 $\phi = \frac{V_{AC}}{L} = \frac{IR_{AC}}{L}$

$$= \frac{I \left( \rho \frac{L}{A} \right)}{L}$$

$$\phi = \frac{I\rho}{A} \text{ V/m}$$

19. (4)

20. (2)  
Net magnetic field at point 'P'  
 $B_{\text{net}} = \vec{B}_1 + \vec{B}_2$



Here  $\vec{B}_1$  and  $\vec{B}_2$  are equal in magnitude and opposite in direction.

Hence,  $B_{\text{net}} = B_1 - B_2$

$$B_1 = \frac{\mu_0 i_1}{2R} \left( \frac{2\pi - \theta}{2\pi} \right)$$

$$B_2 = \frac{\mu_0 i_2}{2R} \left( \frac{\theta}{2\pi} \right)$$

$$B_{\text{net}} = B_1 - B_2 = 0$$

21. (2)

22. (2)

$$B = \frac{\mu_0 I}{2r}, \text{ when made } n \text{ turns radius becomes } r'$$

$$n \times 2\pi r' = 2\pi r \Rightarrow r' = \frac{r}{n}$$

$$\text{Now, } B' = \frac{\mu_0 n I}{2r'} = n^2 \frac{\mu_0 I}{2r} = n^2 B$$

23. (4)

$$\vec{B} = \frac{\mu_0 I}{4\pi R} (-2\hat{k}) + \frac{\mu_0 I}{4\pi R} \pi (-\hat{i}) = \frac{-\mu_0 I}{4\pi R} [\pi \hat{i} + 2\hat{k}]$$

24. (1)

Case-I



Case-II



$$\text{Now, } \vec{a}_0 = \frac{e\vec{E}}{m} \text{ west}$$

$$\vec{E} = \frac{ma_0}{e} \text{ west}$$

$$\text{Now, } F_B = m(2a_0) = ev_0 B$$

$$B = \frac{2ma_0}{ev_0} \otimes$$

25. (3)

26. (3)

$$i d\vec{l} \times (a\hat{j} + a\hat{k}) = ai(\hat{k} - \hat{j})$$

27. (4)

28. (2)

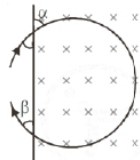
$$B_0 = \frac{\mu_0 i}{4\pi r} [\sin 53^\circ - \sin 37^\circ] = \frac{\mu_0 i}{20\pi r} \otimes$$

29. (3)

$$B = \frac{\mu_0 i}{4\pi R} [\sin \alpha + \sin \beta]$$

$$\sin \alpha = \frac{4}{5} \text{ and } \sin \beta = 1$$

30. (4)

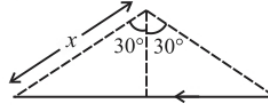


$$\beta = \alpha$$

$$v_1 = v_2 (\because F_m \perp v)$$

$$T = \frac{2(\pi - \alpha)m}{qB}$$

31. (1)



$$B = \frac{\mu_0 I}{4\pi x \cos 30^\circ} [\sin 30^\circ + \sin 30^\circ]$$

$$B = \frac{\mu_0 I}{4\pi x \left(\frac{\sqrt{3}}{2}\right)} \left(\frac{1}{2} + \frac{1}{2}\right) = \frac{\mu_0 i}{2\sqrt{3}\pi x}$$

32. (2)

33. (3)

$$I = \frac{dQ}{dt} = 5t^4 + 2$$

$$\Rightarrow i = 5 \times 1^4 + 2$$

$$\Rightarrow i = 7 \text{ A}$$

34. (3)

$$\frac{\Delta R}{R} = \frac{2\Delta I}{I} = 2 \times 0.2 = 0.4\%$$

35. (1)

36. (2)

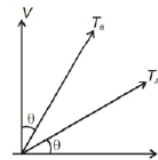
For balanced Wheatstone bridge,

$$\frac{R_1}{R_2} = \frac{R_3}{R_4}, \frac{2}{10} = \frac{R_{\text{eff}}}{4}, R_{\text{eff}} = 0.8\Omega, \frac{1}{0.8} = \frac{1}{4} + \frac{1}{R}$$

On solving  $R = 1\Omega$

37. (1)

$$\therefore R \propto T$$



For A

$$m = \tan \theta = \frac{V}{I} = R_A$$

$$R_A = \tan \theta$$

$$\text{or } T_A \propto \tan \theta \quad \dots(1)$$

For B

$$\tan \theta = \frac{I}{V} = \frac{1}{R_B}$$

$$R_B = \cot \theta$$

$$T_B \propto \cot \theta$$

$$\text{then } \frac{T_A}{T_B} = \frac{\tan \theta}{\cot \theta} = \tan^2 \theta$$

38. (2)

$$\varepsilon = \phi I$$

$$\begin{aligned} \varepsilon &= \left( \frac{IR_{AB}}{L} \right) \times l \\ &= \left( \frac{5}{1+9} \right) \times \frac{9}{10} \times 2 \\ &= 0.9 \text{ V} \end{aligned}$$

39. (3)

For ideal voltmeter, resistance is infinite and for the ideal ammeter, resistance is zero.

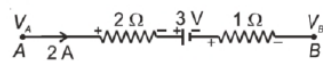
$$V_1 = i_1 \times 10 = \frac{10}{10} \times 10 = 10 \text{ volt}$$

$$V_2 = i_2 \times 10 = \frac{10}{10} \times 10 = 10 \text{ volt}$$

$$V_1 = V_2$$

$$i_1 = i_2 = \frac{10 \text{ V}}{10 \Omega} = 1 \text{ A}$$

40. (4)



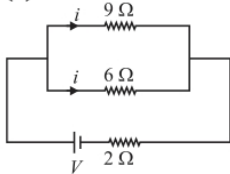
$$\begin{aligned} V_A - V_B &= (2 \times 2) + 3 + (2 \times 1) \\ &= 4 + 3 + 2 = 9 \text{ V} \end{aligned}$$

41. (1)

$$P = \frac{V^2}{R}$$

$$\frac{\Delta P}{P} = 2 \frac{\Delta V}{V} = 5\%$$

42. (4)



$$36 = i^2 (9)$$

$$i^2 = 4$$

$$i = 2$$

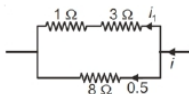
$$\frac{2}{i_1} = \frac{6}{9}$$

$$i_1 = 3$$

$$i_1 = 3$$

$$V_{2\Omega} = (5)(2) = 10 \text{ V}$$

43. (4)



$$2 = i'^2 8$$

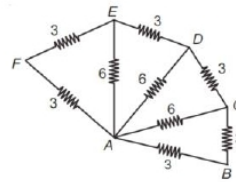
$$i' = \frac{1}{2} \text{ A} = 0.5 \text{ A}$$

$$\frac{0.5}{i_1} = \frac{4}{8}$$

$$i_1 = 1 \text{ A}$$

$$P = 3 \text{ W}$$

44. (1)



$$R_{\text{net}} = 2 \Omega$$

45. (2)

Let  $R$  be the resistance of each resistor.

$$R_0 = 3R$$

$R'$  be the resistance after closing switch.

$$R' = \frac{7R}{3}$$

$$R' = \frac{7}{3} \times \frac{R_0}{3} = \frac{7R_0}{9}$$

46. (1)

47. (1)

$$0 - 2(1) + 12 - 1(R) - 4(1) = 0$$

$$6 - R = 0$$

$$R = 6 \Omega$$

48. (4)

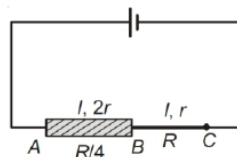
49. (4)

$$\Delta q = \text{Area}(I/t)$$

$$\Delta q = \frac{1}{2} \cdot 10 \times 15 = 75 \text{ C}$$

$$i_{\text{avg}} = \frac{75}{15} = 5 \text{ A}$$

50. (2)



$$R_{BC} = R, \quad R_{AB} = \frac{R}{4}$$

$$R_{\text{eff}} = R_{AB} + R_{BC} = \frac{R}{4} + R = \frac{5R}{4}$$

$$i = \frac{E}{R_{\text{eff}}} = \frac{4E}{5R}$$

$$V_{AB} = iR_{AB} = \frac{E}{5}$$

$$V_{BC} = iR_{BC} = \frac{4E}{5}$$

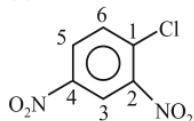
$$K_{AB} : K_{BC} = 1 : 4$$

## SECTION – II (CHEMISTRY)

51. (2)



52. (2)



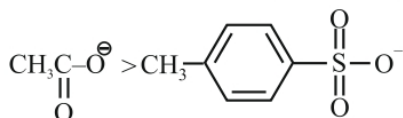
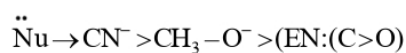
53. (3)

I, IV & V are vinylic halides.

54. (1)

Nucleophilicity (tendency to donate  $e^-$ )  $\propto \frac{1}{\text{EN}}$

$$\propto \frac{1}{\text{stability}}$$



Both are Resonance Stabilized

55. (3)

$\text{S}_{\text{N}}1$  reactivity  $\propto$  stability of carbocation.

56. (4)

$\text{S}_{\text{N}}2$  reaction is one step reaction without any intermediate being formed.

57. (2)

After removing the  $\text{Br}^-$ , we will see the stability of carbocation.

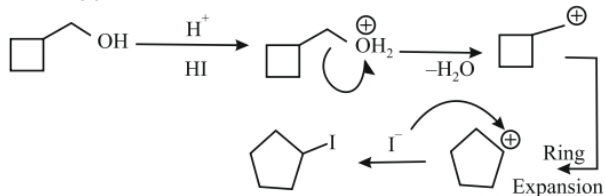
58. (1)

In polar aprotic solvent, the strength of nucleophile increases down the group.

59. (1)

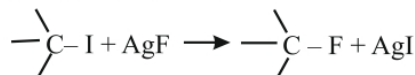
$\text{S}_{\text{N}}2$  reactivity  $\propto \frac{1}{\text{Steric hindrance}}$

60. (3)

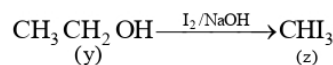
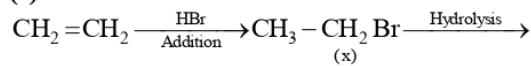


61. (3)

Swarts reaction is best method to obtain fluorinated alkanes.



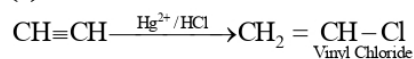
62. (3)



63. (1)

Halogen exchange to prepare R-I is called Finkelstein reaction.

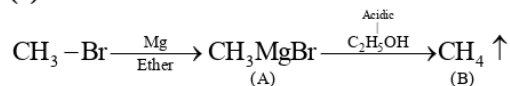
64. (3)



65. (1)

Halogen exchange reaction is one halogen gets change by another halogen.

66. (2)



67. (3)

Organometallic compounds are chemical compounds which contains at least one bond between a metallic element and a carbon atom belonging to an organic molecule.

So, R - ONa is not organometallic compound.

68. (3)

Due to size of the halide ions.

69. (1)

Elimination reaction will be done here.

70. (3)

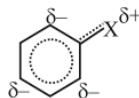
We will use anhydrous Lewis acid here.

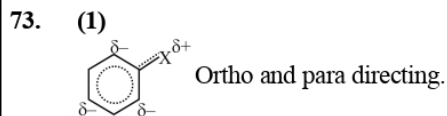
71. (2)

After elimination pi Bond forms generally.

72. (2)

Due to resonance, halides have partial double bond character which makes them more stable and less reactive.



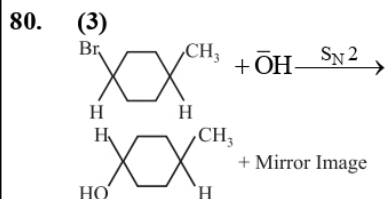
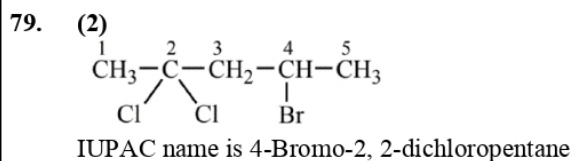
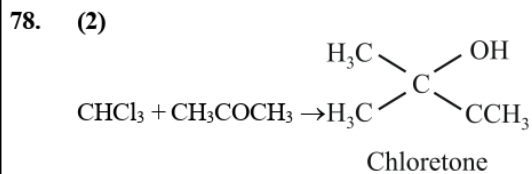


74. (3) Given reaction is known as Wurtz-fittig reaction.

75. (1) For elimination Br and Hydrogen must be trans.

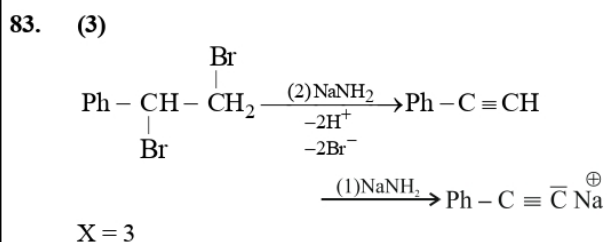
76. (3) In the Gattermann reaction we use Cu/HCl reagent.

77. (4) A meso compound is a stereoisomer with two or more chiral centres but no optical activity due to an internal plane of symmetry.



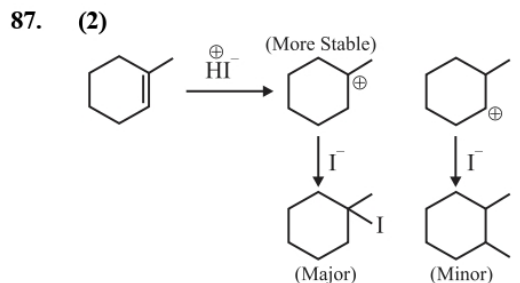
81. (1) 3° carbocation is more favourable for  $S_N1$  reaction.

82. (4) The alkyl halides are highly reactive, the order of reactivity is:  
Iodide > Bromide > Chloride (nature of the halogen atom).

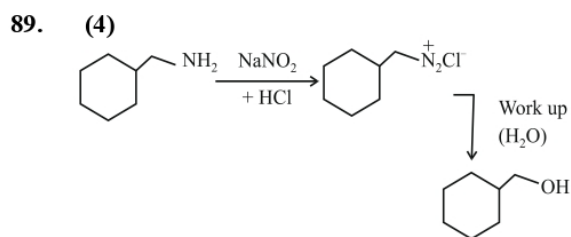


84. (1)  
85. (4) Definition based question.

86. (2) 
$$S_N2 \propto \frac{1}{\text{Steric Hinderance}}$$
  
$$\text{RCH}_2\text{X} > \text{R}_2\text{CHX} > \text{R}_3\text{CX}$$
  
1°                      2°                      3°



88. (1) Reagent based question.



90. (4) Addition of HBr will take place here.

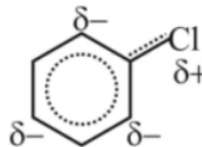
91. (1) Bulky base like  $\text{Et}_3\text{CO}^-\text{K}^+$  favours Hoffmann's product.

92. (3) Mg will insert in C - Br Bond.

93. (2) Grignard Reagent will do direct attack on the carbonyl group.

94. (3) Polar aprotic solvent increase the speed of  $S_N2$  reactions.

95. (4) Due to partial double bond character, chlorobenzene is less reactive than benzyl chloride.



96. (4)  
Aryl halide will be more stable due to double bond character.

97. (2)  
Nomenclature based question.

98. (4)  
S<sub>N</sub>2 reaction will be done here.

99. (1)  
Addition elimination reaction will be done here.

100. (3)  
Achiral compound are superimposable, it can be superimposed on its mirror image.

### SECTION – III (BOTANY)

101. (4)  
Both statement I and statement II are correct.  
Class 12<sup>th</sup> NCERT (Page No. 54)

102. (4)  
Mendel conducted breeding experiments on garden pea by selecting seven pairs of contrasting characters. The seven pairs of contrasting characters in pea plant were as follows

Characters of pea plant		
Character	Contrasting Trait	
	Dominant	Recessive
Stem height	Tall	Dwarf
Flower colour	Violet	White
Flower position	Axial	Terminal
Pod shape	Full	Constricted
Pod colour	Green	Yellow
Seed shape	Round	Wrinkled
Seed colour	Yellow	Green

Class 12<sup>th</sup> NCERT (Page No. 54)

103. (2)  
Trichomes was not amongst the seven characters of pea, which Mendel selected for his hybridisation experiments.  
Class 12<sup>th</sup> NCERT (Page No. 54-55)

104. (4)  
Green seed colour was a recessive character in Mendel's experiment.  
Class 12<sup>th</sup> NCERT (Page No. 54-55)

105. (4)  
Mendel considered one trait at a time for his experiments, this contributed a lot to his success.  
Class 12<sup>th</sup> NCERT (Page No. 53-55)

106. (2)  
Statement in option (2) is wrong statement with reference to the gene 'I' that controls ABO blood group because I<sup>A</sup> and I<sup>B</sup> are completely dominant over I<sup>O</sup>, but when I<sup>A</sup> and I<sup>B</sup> are present together, they both express their own types of sugar and thus behaving as codominant alleles.  
Class 12<sup>th</sup> NCERT (Page No. 61)

107. (3)  
The human females with only X chromosome in their cells are sterile.  
Class 12<sup>th</sup> NCERT (Page No. 76)

108. (3)  
A cross between two individuals, one with AB blood group and other with a blood group A will produce four genotypes and three phenotypes.

Parents	Male	Female
Phenotype	AB	A
Genotype	I <sup>A</sup> I <sup>B</sup>	I <sup>A</sup> i
Gametes	I <sup>A</sup> , I <sup>B</sup>	I <sup>A</sup> , i
	I <sup>A</sup>	I <sup>B</sup>
I <sup>A</sup>	I <sup>A</sup> I <sup>B</sup> (A)	I <sup>A</sup> i (AB)
i	I <sup>A</sup> i (A)	I <sup>B</sup> i (B)

**Offsprings Genotypes**

4(I<sup>A</sup>I<sup>A</sup>, I<sup>A</sup>I<sup>B</sup>, I<sup>A</sup>i, I<sup>B</sup>i)

**Phenotypes** 3 (A, B, AB)

Class 12<sup>th</sup> NCERT (Page No. 61)

109. (4)  
A gene shows codominance when both alleles in heterozygous condition, express their traits independently instead of showing dominant-recessive relationship. Such alleles are called codominant alleles.

Class 12<sup>th</sup> NCERT (Page No. 61 to 62)

110. (4)

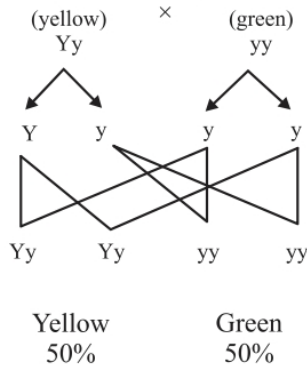
A.	Phenylketonuria	iii.	Autosomal recessive trait associated with mental retardation
B.	Down's syndrome	i.	Sterile females with rudimentary ovaries
C.	Klinefelter's syndrome	ii.	Gynaecomastia
D.	Turner's syndrome	iv.	Sterile females with rudimentary ovaries

Class 12<sup>th</sup> NCERT (Page No. 75-76)



**111. (3)**  
Option (3) is related with law of segregation of Mendel.  
Class 12<sup>th</sup> NCERT (Page No. 59)

**112. (1)**  
In the given cross the ratio is 50 : 50 i.e. 1 : 1 of yellow and green seeded plants in F<sub>1</sub>-generation.



Class 12<sup>th</sup> NCERT (Page No. 62-63)

**113. (4)**  
Phenotype is the observable characteristics or the total appearance of an organism. It is determined by its genes, the relationships between the alleles and by the interaction during development between its genetic constitution (genotype) and the environment.  
Class 12<sup>th</sup> NCERT (Page No. 59)

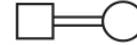
**114. (3)**  
Genes which are 'linked' and are situated on same chromosome, cannot 'separate' during gametes formation and hence, cannot assort independently.  
Class 12<sup>th</sup> NCERT (Page No. 64, 67)

**115. (2)**  
Frequency of recombination between gene pairs on same chromosome as a measure of the distance between genes to map their position on the chromosome was used for the first time by Alfred Sturtevant.  
Class 12<sup>th</sup> NCERT (Page No. 67-68)

**116. (2)**  
Statement B and E are correct whereas, A, C, D are incorrect.  
Class 12<sup>th</sup> NCERT (Page No. 76)

**117. (4)**  
A broad palm with a single palm crease is a common physical feature seen in individuals with Down's syndrome.  
Class 12<sup>th</sup> NCERT (Page No. 76)

**118. (1)**  
Among the given options (1) is correct.



This symbol shows consanguineous mating (marriage of blood relatives).  
Class 12<sup>th</sup> NCERT (Page No. 72)

**119. (2)**  
Out of the given statements (2) is incorrect because the tightly linked genes on chromosomes shows 100% parental types and 0% recombinants.  
Class 12<sup>th</sup> NCERT (Page No. 67-68)

**120. (4)**  
Higher number of the parental types formed when RRYy and rryy genotypes are hybridised giving the condition that R and Y genes are closely linked.  
Class 12<sup>th</sup> NCERT (Page No. 62-68)

**121. (1)**  
Human skin colour is controlled by polygenic effect atleast by three separate genes.  
Class 12<sup>th</sup> NCERT (Page No. 69)

**122. (2)**  
The given responsible alleles are present on the same chromosome in *Drosophila* according to Morgan.  
Class 12<sup>th</sup> NCERT (Page No. 67-68)

**123. (4)**  
In the given question AaBb should be crossed with aabb. Scientists perform test cross to find out the different types of gametes or the genotype of an unknown individual.  
Class 12<sup>th</sup> NCERT (Page No. 58)

**124. (3)**  
Genetic map is a diagram which shows the relative position of genes on a chromosome. Sturtevant in 1911 prepared the first genetic map of two chromosomes of fruit fly.  
Class 12<sup>th</sup> NCERT (Page No. 67)

**125. (4)**  
Out of 800 seeds, 9/16 will have round and yellow seeds which is  $\frac{9}{16} \times 800 = 450$  seeds out of 800 seeds, 3/16 will have round green seeds which is  $\frac{3}{16} \times 800 = 150$  seeds.  
Class 12<sup>th</sup> NCERT (Page No. 62-63)

**126. (2)**  
Aa in this condition only dominant allele will express itself.  
Class 12<sup>th</sup> NCERT (Page No. 61)

**127. (3)**  
In the given pairs, option (3) is wrongly matched. Starch synthesis in pea is an example of pleiotropy.  
Class 12<sup>th</sup> NCERT (Page No. 62)

**128. (1)**  
Number of phenotype for polygenes =  $2n + 1$   
 $n$  = pair of polygenes  
 $2 \times 3 + 1 = 6 + 1 = 7$   
Class 12<sup>th</sup> NCERT (Page No. 69)

**129. (2)**  
The point mutations involve alternations in the structure of gene by altering the structure of DNA, i.e. change in single base pair.  
Class 12<sup>th</sup> NCERT (Page No. 72)

**130. (3)**  
Two alleles of a gene pair are located on homologous sites on homologous chromosomes.  
Class 12<sup>th</sup> NCERT (Page No. 64-67)

**131. (1)**  
The chromosome compliments of egg and sperm is  $(22 + XX) + (22 + Y)$  in Klinefelter's syndrome.  
Class 12<sup>th</sup> NCERT (Page No. 76)

**132. (1)**  
Both the statements are correct.  
Class 12<sup>th</sup> NCERT (Page No. 76, 71)

**133. (2)**  
Sickle cell anaemia induces due to change of amino acid in  $\beta$ -chain of haemoglobin.  
Class 12<sup>th</sup> NCERT (Page No. 74-75)

**134. (1)**

I.	Removal of anther	B.	Emasculation
II.	Laws of inheritance	D.	Mendel
III.	Multiple allelism	A.	Human blood group
IV.	Universal donor	C.	Blood group O

Class 12<sup>th</sup> NCERT (Page No. 55, 59-64)

**135. (4)**  
0% AABB progeny is obtained in a Mendelian dihybrid test cross.  
Class 12<sup>th</sup> NCERT (Page No. 58-63)

**136. (2)**  
A male honeybee has 16 chromosomes whereas its female has 32 chromosomes.  
Class 12<sup>th</sup> NCERT (Page No. 71)

**137. (2)**  
Duplication is shown in the given representation.  
Class 12<sup>th</sup> NCERT (Page No. 72)

**138. (1)**

A.	$2n - 1$	iv.	Monosomic condition
B.	$2n - 2$	ii.	Nullisomic condition
C.	$2n + 1$	i.	Trisomic condition
D.	$2n + 2$	iii.	Tetrasomic condition

Class 12<sup>th</sup> NCERT (Page No. 72)

**139. (3)**  
Statement I, II and III are correct. Statement IV is incorrect and can be corrected as Sickle-cell anaemia is an autosomal recessive gene disorder in which sickle-shaped RBCs are formed instead of normal ones.  
Class 12<sup>th</sup> NCERT (Page No. 73-76)

**140. (2)**  
Substitution of purine base with a pyrimidine base or vice versa is called transversion.  
Class 12<sup>th</sup> NCERT (Page No. 72)

**141. (1)**  
(iii) and (iv) represents recombinant type.  
Class 12<sup>th</sup> NCERT (Page No. 67-68)

**142. (3)**  
Person affected with phenylketonuria lack an enzyme that converts amino acid phenylalanine into tyrosine.  
Class 12<sup>th</sup> NCERT (Page No. 75)

**143. (4)**  
*Drosophila* is suitable in experimental genetics because it produces hundreds of offspring in single mating.  
Class 12<sup>th</sup> NCERT (Page No. 67)

**144. (1)**  
In a given question 50% of offsprings would be affected by this disorder because Down's syndrome is the result of trisomy, in which chromosome pair number 21<sup>st</sup> contains an extra copy of chromosome ( $2A + 1$ ). Affected mother will produce 50% normal egg cells and rest 50% eggs are of abnormal type.  
Class 12<sup>th</sup> NCERT (Page No. 76)

145. (3)  
Pleiotropic gene is related with disease phenylketonuria. This manifests itself through phenotypic expression characterised by mental retardation and a reduction in hair and skin pigmentation.

Class 12<sup>th</sup> NCERT (Page No. 69)

146. (4)  
(i) Morgan  
(ii) Linkage

Class 12<sup>th</sup> NCERT (Page No. 67)

147. (2)  
For a girl to be colourblind, the genotype of her father should be  $X^cY$  and of her mother either  $X^cX$  or  $X^cX^c$ , where  $X^c$  represents colourblind gene.

In the given options this is only possible when her father and maternal grandfather were colour blind.

Class 12<sup>th</sup> NCERT (Page No. 73-74)

148. (2)

I.	Nondisjunction	D.	Aneuploidy
II.	Mendel	A.	Pea
III.	Morgan	B.	<i>Drosophila</i>
IV.	Set of chromosomes	C.	Genome

Class 12<sup>th</sup> NCERT (Page No. 75, 67, 54, 56)

149. (3)  
Gene controlling starch synthesis is not related with co-dominance.

Class 12<sup>th</sup> NCERT (Page No. 61, 60, 69)

150. (1)  
Both Assertion and Reason are true and the Reason is the correct explanation of the Assertion.

Class 12<sup>th</sup> NCERT (Page No. 61)

## SECTION – IV (ZOOLOGY)

151. (4)  
NCERT 12<sup>th</sup> Page 158

Heroin, commonly called smack is chemically diacetylmorphine which is a white, odourless, bitter crystalline compound. This is obtained by acetylation of morphine.

152. (4)  
NCERT 12<sup>th</sup> Page 157

In our body, cell growth and differentiation is highly controlled and regulated. In cancer cells, there is breakdown of these regulatory mechanisms. Normal cells show a property called contact inhibition by virtue of which contact with other cells inhibits their uncontrolled growth. Cancer cells appears to have lost this property. As a result of this, cancerous cells just continue to divide giving rise to masses of cells called tumors.

153. (2)  
NCERT 12<sup>th</sup> Page 151

Virus-infected cells secrete proteins called interferons which protect non-infected cells from further viral infection.

154. (2)  
NCERT 12<sup>th</sup> Page 159

- Heroin is commonly called as smack which is an opioid.

- Natural cannabinoids are obtained from the inflorescences of the plant *Cannabis sativa*. The flower tops, leaves and the resin of cannabis plant are used in various combinations to produce marijuana, hashish, charas and ganja. Generally taken by inhalation and oral ingestion, these are known for their effects on cardiovascular system of the body.
- Cocaine is commonly called as coke.

155. (3)  
NCERT 12<sup>th</sup> Page 157

- Techniques like radiography (use of X-rays), CT (computed tomography) and MRI (magnetic resonance imaging) are very useful to detect cancers of the internal organs. Computed tomography uses X-rays to generate a three-dimensional image of the internals of an object.
- MRI uses strong magnetic fields and non-ionising radiations to accurately detect pathological and physiological changes in the living tissue.
- PCR (Polymerase chain reaction) is used for early detection of several diseases.
- Histopathological studies include study of tissues.

156. (2)  
**NCERT 12<sup>th</sup> Page 159**  
 Drugs like barbiturates, amphetamines, benzodiazepines, and other similar drugs, that are normally used as medicines to help patients cope with mental illnesses like depression and insomnia.
157. (2)  
**NCERT 12<sup>th</sup> Page 152**  
 Recombinant DNA technology has allowed the production of antigenic polypeptides of pathogen in bacteria or yeast. Vaccines produced using this approach allow large scale production and hence greater availability for immunisation, e.g., hepatitis B vaccine produced from yeast.
158. (4)  
**NCERT 12<sup>th</sup> Page 146**  
 A wide range of organisms belonging to bacteria, viruses, fungi, protozoans, helminths, etc., could cause diseases in man. Such disease causing organisms are called pathogens. Most parasites are therefore pathogens as they cause harm to the host by living in (or on) them. The pathogens can enter our body by various means, multiply and interfere with normal vital activities, resulting in morphological and functional damage.
159. (4)  
**NCERT 12<sup>th</sup> Page 148**  
*Entamoeba histolytica* is a protozoan parasite in the large intestine of human which causes amoebiasis (amoebic dysentery). Symptoms of this disease include constipation, abdominal pain and cramps, stools with excess mucous and blood clots. Houseflies act as mechanical carriers and serve to transmit the parasite from faeces of infected person to food and food products.
160. (4)  
**NCERT 12<sup>th</sup> Page 150**  
*Aedes* mosquito helps in transmitting dengue and chikungunya.
161. (4)  
**NCERT 12<sup>th</sup> Page 158**  
 Opioids are the drugs, which bind to specific opioid receptors present in our central nervous system and gastrointestinal tract. Heroin, commonly called *smack* is chemically diacetylmorphine which is a white, odourless, bitter crystalline compound. This is obtained by acetylation of morphine.
162. (3)  
**NCERT 12<sup>th</sup> Page 161**  
 The immediate adverse effects of drugs and alcohol abuse are manifested in the form of reckless behaviour, vandalism and violence. Excessive doses of drugs may lead to coma and death due to respiratory failure, heart failure or cerebral hemorrhage.
163. (3)  
**NCERT 12<sup>th</sup> Page 149**
  - *Microsporium*, *Trichophyton* and *Epidermophyton* are responsible for ringworms which is one of the most common infectious diseases in man. Appearance of dry, scaly lesions on various parts of the body such as skin, nails and scalp are the main symptoms of the disease.
  - *Haemophilus influenzae* causes pneumoniae.
164. (3)  
**NCERT 12<sup>th</sup> Page 147**  
*Plasmodium* enters the human body as sporozoites (infectious form) through the bite of infected female *Anopheles* mosquito. The parasites initially multiply within the liver cells and then attack the red blood cells (RBCs) resulting in their rupture. The rupture of RBCs is associated with release of a toxic substance, haemozoin, which is responsible for the chill and high fever recurring every three to four days.
165. (4)  
**NCERT 12<sup>th</sup> Page 162**  
 The use of alcohol during adolescence may also have long-term effects. It could lead to heavy drinking in adulthood. The chronic use of drugs and alcohol damages nervous system and liver (cirrhosis).
166. (2)  
**NCERT 12<sup>th</sup> Page 157**
  - In our body, cell growth and differentiation is highly controlled and regulated. In cancer cells, there is breakdown of these regulatory mechanisms.
  - Benign tumors normally remain confined to their original location and do not spread to other parts of the body and cause little damage. The malignant tumors, on the other hand are a mass of proliferating cells called neoplastic or tumor cells. These cells grow very rapidly, invading and damaging the surrounding normal tissues. As these cells actively divide and grow they also starve the normal cells by competing for vital nutrients.

- Proto oncogenes have been identified in normal cells which, when activated under certain conditions, could lead to oncogenic transformation of the cells.

167. (4)

**NCERT 12<sup>th</sup> Page 158**

Opioids are the drugs, which bind to specific opioid receptors present in our central nervous system and gastrointestinal tract. Heroin commonly called *smack* is chemically diacetylmorphine which is a white, odourless, bitter crystalline compound. This is obtained by acetylation of morphine. Heroin is depressant and slows down body functions.

168. (2)

**NCERT 12<sup>th</sup> Page 147, 156, 157**

- ELISA – AIDS detection
- Widal – Typhoid detection
- Biopsy and histopathological studies – For cancer detection.

169. (1)

**NCERT 12<sup>th</sup> Page 161**

With repeated use of drugs, the tolerance level of the receptors present in our body increases. Consequently the receptors respond only to higher doses of drugs or alcohol leading to greater intake and addiction.

170. (3)

**NCERT 12<sup>th</sup> Page 151**

- Filariasis: Chronic inflammation of lower limbs and genital organs.
- Ascariasis: Internal bleeding, muscular pain, blockage of intestinal passage.
- Pneumonia: Fever, chills, cough, headache.
- Typhoid: High fever, stomach pain, constipation.

171. (3)

**NCERT 12<sup>th</sup> Page 160**

Smoking is associated with increased incidence of cancers of lung, urinary bladder and throat, bronchitis, emphysema, coronary heart disease, gastric ulcer, etc. Tobacco chewing is associated with increased risk of cancer of the oral cavity. Smoking increases carbon monoxide (CO) content in blood and reduces the concentration of haembound oxygen. This causes oxygen deficiency in the body.

172. (4)

**NCERT 12<sup>th</sup> Page 162**

The side-effects of the use of anabolic steroids in females include masculinisation (features like males), increased aggressiveness, mood swings, depression, abnormal menstrual cycles, excessive hair growth on the face and body, enlargement of clitoris, deepening of voice.

173. (4)

**NCERT 12<sup>th</sup> Page 148**

Sporozoite stage is an infective stage for humans. Parasites reproduce asexually in red blood cells, bursting the red blood cells and causing cycles of fever and other symptoms.

174. (1)

**NCERT 12<sup>th</sup> Page 154**

The secondary lymphoid organs provide the sites for interaction of lymphocytes with the antigen, which then proliferate to become effector cells.

175. (4)

**NCERT 12<sup>th</sup> Page 161**

Dependence is the tendency of the body to manifest a characteristic and unpleasant withdrawal syndrome if regular dose of drugs/alcohol is abruptly discontinued. This is characterised by anxiety, shakiness, nausea and sweating, which may be relieved when use is resumed again. In some cases, withdrawal symptoms can be severe and even life threatening and the person may need medical supervision.

176. (4)

**NCERT 12<sup>th</sup> Page 157**

Transformation of normal cells into cancerous neoplastic cells may be induced by physical, chemical or biological agents. These agents are called carcinogens. Ionising radiations like X-rays and gamma rays and non-ionizing radiations like UV cause DNA damage leading to neoplastic transformation.

177. (4)

**NCERT 12<sup>th</sup> Page 151**

Acquired immunity is pathogen specific. It is characterised by memory. This means that when our body encounters a pathogen for the first time it produces a response called primary response which is of low intensity. Subsequent encounter with the same pathogen elicits a highly intensified secondary or anamnestic response. This is ascribed to the fact that our body appears to have memory of the first encounter.

178. (3)  
NCERT 12<sup>th</sup> Page 149, 150, 159
- Morphine is extracted from the plant, *Papaver somniferum*.
  - *Gambusia* feeds on mosquito larvae.
  - Maintenance of personal and public hygiene is very important for prevention and control of diseases.

179. (4)  
NCERT 12<sup>th</sup> Page 152

If a person is infected with some deadly microbes to which quick immune response is required as in tetanus, we need to directly inject the preformed antibodies, or antitoxin (a preparation containing antibodies to the toxin). Even in cases of snakebites, the injection which is given to the patients, contain preformed antibodies against the snake venom. This type of immunisation is called passive immunisation.

180. (2)  
NCERT 12<sup>th</sup> Page 156

The macrophages continue to produce virus and in this way acts like a HIV factory. Simultaneously, HIV enters into helper T-lymphocytes, replicates and produce progeny viruses. The progeny viruses released in the blood attack other helper T-lymphocytes. This is repeated leading to a progressive decrease in the number of helper T-lymphocytes in the body of the infected person.

181. (1)  
NCERT 12<sup>th</sup> Page 153, 154

The primary lymphoid organs are bone marrow and thymus where immature lymphocytes differentiate into antigen-sensitive lymphocytes. After maturation the lymphocytes migrate to secondary lymphoid organs like spleen, lymph nodes, tonsils, Peyer's patches of small intestine and appendix. The secondary lymphoid organs provide the sites for interaction of lymphocytes with the antigen, which then proliferate to become effector cells.

182. (3)  
NCERT 12<sup>th</sup> Page 159



*Datura* is known for its hallucinogenic properties.

183. (3)  
NCERT 12<sup>th</sup> Page 155, 157, 158
- Incubation period: Time lag between infection and appearance of AIDS symptoms.
  - Contact inhibition: By virtue of which contact with other cells inhibits their uncontrolled growth.
  - Carcinogens: Ionising and non-ionising radiations are cancer causing agents.
  - $\alpha$ -interferons: Biological response modifiers

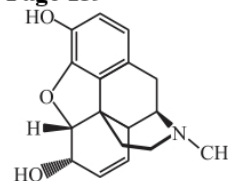
184. (4)  
NCERT 12<sup>th</sup> Page 156

The macrophages continue to produce virus and in this way acts like a HIV factory. Simultaneously, HIV enters into helper T-lymphocytes ( $T_H$ ), replicates and produce progeny viruses. The progeny viruses released in the blood attack other helper T-lymphocytes. This is repeated leading in the blood attack other helper T-lymphocytes. This is repeated leading to a progressive decrease in the number of helper T-lymphocytes in the body of the infected person. Treatment of AIDS with anti-retroviral drugs is only partially effective. They can only prolong the life of the patient but cannot prevent death, which is inevitable.

185. (2)  
NCERT 12<sup>th</sup> Page 157

Cancer causing viruses called oncogenic viruses have genes called viral oncogenes. Furthermore, several genes called cellular oncogenes (*c-onc*) or proto-oncogenes have been identified in normal cells which, when activated under certain conditions, could lead to oncogenic transformation of the cells.

186. (1)  
NCERT 12<sup>th</sup> Page 159



Chemical structure of morphine.

187. (1)  
NCERT 12<sup>th</sup> Page 146

*Salmonella typhi* is a pathogenic bacterium which causes typhoid fever in human beings. These pathogens generally enter the small intestine through food and water contaminated with them and migrate to other organs through blood. Sustained high fever ( $39^\circ$  to  $40^\circ$  C), weakness, stomach pain, constipation, headache and loss of appetite are some of the common symptoms of this disease. Intestinal perforation and death may occur in severe cases.



188. (3)  
**NCERT 12<sup>th</sup> Page 146, 156, 157**
- Diseases which are easily transmitted from one person to another, are called infectious diseases eg:- Plague, AIDS, diphtheria.
  - Cancer is one of the most dreaded, non-infectious diseases of human beings and is a major cause of death all over the globe. Cancer cells appears to lost contact inhibition property. As a result of this, cancerous cells just continue to divide giving rise to masses of cells called tumors.

189. (3)  
**NCERT 12<sup>th</sup> Page 154**
- Transmission of HIV-infection generally occurs by (a) sexual contact with infected person, (b) by transfusion of contaminated blood and blood products, (c) by sharing infected needles as in the case of intravenous drug abusers and (d) from infected mother to her child through placenta.

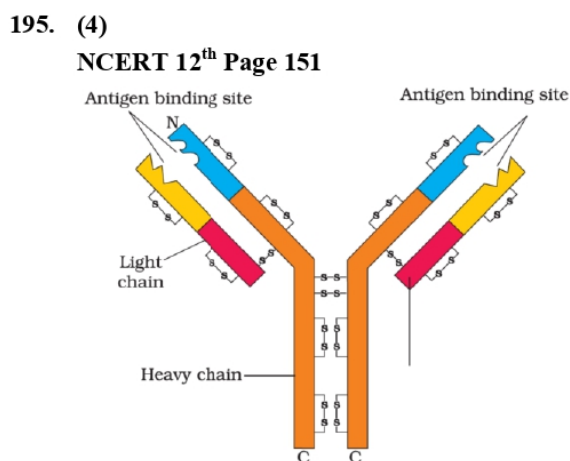
190. (2)  
**NCERT 12<sup>th</sup> Page 157**
- The malignant tumors, on the other hand are a mass of proliferating cells called neoplastic or tumor cells. These cells grow very rapidly, invading and damaging the surrounding normal tissues. As these cells actively divide and grow they also starve the normal cells by competing for vital nutrients. Cells slough from such tumors reach distant sites through blood, and wherever they get lodged in the body, they start a new tumor there. This property called metastasis is the most feared property of malignant tumors.

191. (3)  
**NCERT 12<sup>th</sup> Page 157**
- MRI uses strong magnetic fields and non-ionising radiations to accurately detect pathological and physiological changes in the living tissue.

192. (4)  
**NCERT 12<sup>th</sup> Page 160**
- Tobacco contains a large number of chemical substances including nicotine, an alkaloid. Nicotine stimulates adrenal gland to release adrenaline and nor-adrenaline into blood circulation, both of which raise blood pressure and increase heart rate.

193. (4)  
**NCERT 12<sup>th</sup> Page 159**
- Plants with hallucinogenic properties are *Atropa belladonna* and *Datura*.
  - Excessive dosage of cocaine causes hallucinations.

194. (2)  
**NCERT 12<sup>th</sup> Page 159**
- Morphine: It used as sedative and painkiller
  - Cocaine: It has a potent stimulating action on CNS.
  - Marijuana: It effects on cardiovascular system of body.
  - Amphetamines: It is used as medicines to treat depression and insomnia.



Structure of an antibody molecule.

196. (1)  
**NCERT 12<sup>th</sup> Page 146**
- Balanced diet, personal hygiene and regular exercise are very important to maintain good health. Yoga has been practised since time immemorial to achieve physical and mental health.

197. (2)  
**NCERT 12<sup>th</sup> Page 154**
- The word AIDS stands for Acquired Immuno Deficiency Syndrome. This means deficiency of immune system, acquired during the lifetime of an individual indicating that it is not a congenital disease. 'Syndrome' means a group of symptoms. AIDS was first reported in 1981 and in the last twenty-five years or so, it has spread all over the world killing more than 25 million persons.

**198. (4)**

**NCERT 12<sup>th</sup> Page 158**

Majority of drugs have side effects like hair loss, anemia, etc. Most cancers are treated by combination of surgery, radiotherapy and chemotherapy. Tumor cells have been shown to avoid detection and destruction by immune system. Therefore, the patients are given substances called biological response modifiers such as  $\alpha$ -interferon which activates their immune system and helps in destroying the tumor.

**199. (4)**

**NCERT 12<sup>th</sup> Page 152**

The principle of immunisation or vaccination is based on the property of 'memory' of the immune system.

**200. (2)**

**NCERT 12<sup>th</sup> Page 147**

Rhino viruses represent one such group of viruses which cause one of the most infectious human ailments - the common cold. They infect the nose and respiratory passage but not the lungs. The common cold is characterised by nasal congestion and discharge, sore throat, hoarseness, cough, headache, tiredness, etc., which usually last for 3-7 days. Droplets resulting from cough or sneezes of an infected person are either inhaled directly or transmitted through contaminated objects such as pens, books, cups, doorknobs, computer keyboard or mouse, etc., and cause infection in a healthy person.