KIIT HIGHER SECONDARY SCHOOL
Entrance Wings
Minor Test-02
One Year Achiever-2025-26

Date: 21/08/2025

Do not open this Test Booklet until you are asked to do so.

Important Instructions:

01. The answer sheet is inside this Test Booklet. When you are directed to open the Test Booklet, taken out the answer sheet and fill in the particulars on OFFICE Copy carefully with **blue/black** ball point pen only.

02. The test is of 3 hrs. duration and the Test Booklet contains **180** multiple-choice questions (four options with a single correct answer) from **Physics, Chemistry & Biology (Botany & Zoology)**. 45 questions in each subject and all questions are compulsory

03. Each question carries 4 marks. For each correct response, the candidate will get 4 marks. For each incorrect response, **one mark** will be deducted from the total score. The maximum marks are **720.**

04. Use Blue/Black Ball Point Pen only for writing particulars on this page/making responses on Answer Sheet.

05. Rough work is to be done on the space provided for this purpose in the Test Booklet only.

06. **On completion of the test, the candidate must hand over the Answer sheet (ORIGINAL and OFFICE Copy) to the invigilator before leaving the Room/Hall. The candidates are allowed to take away this Test Booklet with them.**

07. **The CODE for this Booklet is MT-01. Make sure that the CODE printed on the Original Copy of the Answer Sheet is the same as that on this Test Booklet.** In case of discrepancy, the candidate should immediately report the matter to the invigilator for replacement of both the Test Booklet and the Answer Sheet.

08. The candidates should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet. Do not write your Roll No. anywhere else except in the specified space in the Test Booklet/Answer Sheet.

09. Use of white fluid for correction in NOT permissible on the Answer Sheet.

10. Each candidate must show on-demand his/her Admit Card to the Invigilator.

11. No candidate, without special permission of the centre Superintendent or Invigilator, would leave his/her seat.

12. The candidates should not leave the Examination Hall without handing over their Answer Sheet to the Invigilator on duty and sign (with time) the Attendance Sheet twice. **Cases, where a candidate has not signed the Attendance Sheet second time, will be deemed not to have handed over the Answer Sheet and dealt with as an Unfair Means case.**

13. Use of Electronic/Manual Calculator is prohibited.

14. The candidates are governed by all Rules and Regulations of the examination with regard to their conduct in the Examination Room/Hall All cases of unfair means will be dealt with as per the Rules and Regulations of this examination.

15. **No part of the Test Booklet and Answer Sheet shall be detached under any circumstances.**

16. The candidates will write the Correct Test Booklet Code as given in the Test Booklet/Answer Sheet in the Attendance Sheet.

Name of the Candidate (in Capitals):_____

Roll Number: in figures _____

       in Words _____

Centre of Examination (in Capitals): _____

Candidate's Signature: _____ Invigilator's Signature _____

Facsimile signature Stamp of Centre Superintendent:_____

Test Syllabus

Physics   :   Vector, Alternating Current & Electromatic Induction

Chemistry   :   Redox reaction & Electrochemistry

**Biology**   :   Celly Cycle & Cell Division and Principale of Inheritance & Variation

PHYSICS

01. A rectangular loop of sides of length ℓ and b is placed in a x-y plane. A uniform but time varying magnetic field of strength $\vec{B} = 20t\hat{i} + 10t^2\hat{j} + 50\hat{k}$, where t is the time elapsed, is present in space. The magnitude of induced emf at time t is:
    (1) $20 + 20t$ (2) 20
    (3) 20t (4) Zero

02. A uniform but time varying magnetic field B=C-Kt, where K and C are positive constants and t is time, is applied perpendicular to the plane of a circular loop of radius a and resistance R. The total charge that will pass through any point of the loop by the time B becomes zero is:
    (1) $C\dfrac{\pi a^2}{RK}$ (2) $K\dfrac{\pi a^2}{R}$
    (3) $C\dfrac{\pi a^2}{R}$ (4) None of these

03. When magnetic flux through a coil is changed, the variation of induced current in the coil with time is as shown in the graph. If the resistance of coil is 10Ω, then the total change in flux through the coil will be:
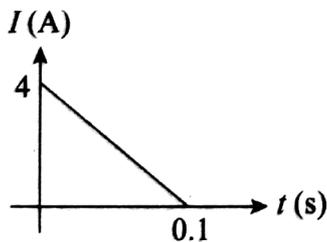

    (1) 4 Wb (2) 8 Wb (3) 2 Wb (4) 6 Wb

04. A loop of area $1m^2$ is placed in a magnetic field B=2T such that the plane of the loop is parallel to the magnetic field. If the loop is rotated by 180° about its axis, then the amount of charge passed through any point of the loop if its resistance is 10Ω, is:
    (1) 0.4 C (2) 0.2 C (3) 0.8 C (4) 0

05. A loop having chargeable self inductance but a constant resistance is placed in a uniform magnetic field which is varying with time at rate of 1 T/s. The area of loop is $1m^2$ and it has signal turn. If at some time t, the current in the loop is 1 A, then the rate of charge of current would be:
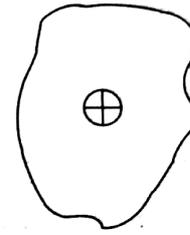

    (1) 1 A/s (2) 0 (3) 2 A/s (4) None

06. A conducting loop rotated with constant angular velocity about its fixed diameter in a uniform magnetic field whose direction is perpendicular to that fixed diameter. Select the incorrect option.
    (1) The emf will be maximum at the moment when flux is zero.
    (2) The emf will be 0 at the moment when flux is maximum.
    (3) The emf will be maximum at the moment when plane of the loop is parallel to the magnetic field.
    (4) The phase difference between the flux and the emf is $\dfrac{\pi}{2}$.

07. Due to change in magnetic flux linked with a coil or resistance 10 ohm, a current is induced in it. The variation of induced current i (in amperes) with time t (in seconds) is shown in the figure. The magnitude of change in flux through the coil from t=0 to t=2s (in weber) is:
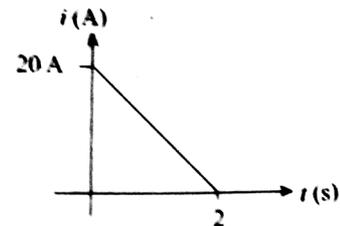

    (1) 200 (2) 400 (3) 600 (4) 800

08. A plane loop of wire is placed in a region where the magnetic field is perpendicular to the plane of the loop and has the same magnitude and direction at all points within the area of the loop at any time. The magnitude of the magnetic field B varies with time according to the expression $B = B_0 e^{-at}$, where B_0 is maximum value of magnetic field and a is a positive constant. The time at which induced emf in the loop is maximum, is:
   (1) t=0 (2) $t = \dfrac{1}{a}$
    (3) $t = \dfrac{2}{a}$ (4) $t = \dfrac{1}{a}\ln 2$

09. The magnetic flux ϕ through a metal ring varies with time t as to $\phi = 3\left(at^3 - bt^2\right) T m^2$, where $a = 2s^{-3}$ and $b = 6s^{-2}$. The resistance of the ring is 3Ω. The maximum current induced in the ring during the interval $t = 0$ to $t = 2s$, is:

(1) 1A   (2) 2A
(3) 3A   (4) 6A

10. A square coil of 0.01 $metre^2$ area is placed perpendicular to the uniform magnetic field of intensity $10^3 Wb/m^2$. The magnetic flux linked with the coil is:

(1) 10 Wb   (2) $10^{-5} Wb$
(3) Zero   (4) 100 Wb

11. A coil having 500 square loops each of side 10 cm is placed normal to a magnetic field increasing at a rate of 1.0 T/s. The induced emf (in volts) is:

(1) 0.1   (2) 0.5
(3) 1.0   (4) 5.0

12. A coil of 100 turns having an average are of $100\ cm^2$ for each turn is held in a uniform field of 50 gauss. The direction of field is at right angle to the plane of coil. The field is removed in $\frac{1}{100}s$. Average emf (in volts) induced in the coil is:

(1) 0.5 V   (2) 10 V   (3) 15 V   (40 50 V

13. A small piece of metal wire is dragged across the gap between the pole pieces of a magnet in 0.4 s. If magnetic flux between the pole pieces is known to be $8 \times 10^{-4} Wb$, then induced emf in the wire will be:

(1) $1 \times 10^{-3} V$ (2) $2 \times 10^{-3} V$
(3) $8 \times 10^{-3} V$ (4) $6 \times 10^{-3} V$

14. A coil of resistance 40Ω is connected to a galvanometer of 160Ω resistance. The coil has 6 mm radius and 100 turns. This coil is placed between the poles of a magnet such that magnetic field is perpendicular to the coil. If the coil is dragged out, then the charge through the galvanometer is $32\mu C$. The magnetic field is:

(1) 6.55 T   (2) 5.66 T   (3) 0.655 T   (4) 0.566 T

15. A flexible wire bent in the form of a circle is placed in a uniform magnetic field perpendicular to the plane of the coil. The radius of the coil changes with time as shown in the figure. The induced emf in the coil is:

(1)   (2)

(3)   (4)
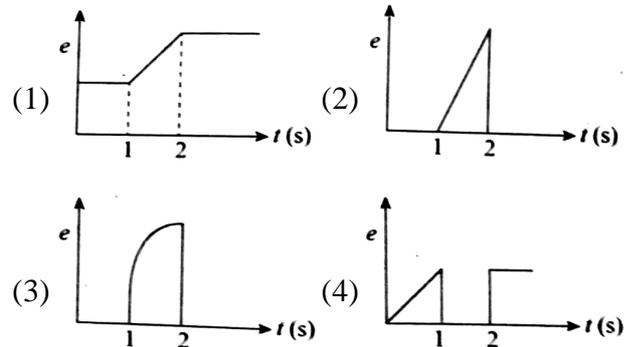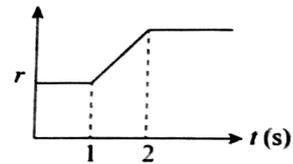
16. In the graph, a varying time magnetic field applied perpendicular to the plane of the ring is shown. Then:
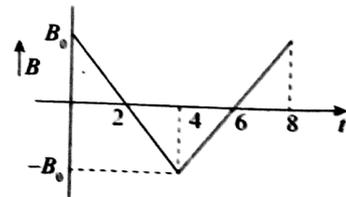
(1) At t=2 s and current flowing in the ring is equal to zero
(2) Current will charge its direction two times in gime interval t=0 to t=8 s
(3) Current will change its direction only once in the interval t=0 to t=8 s
(4) Flux in the ring is same at t=0 and t=4 s

17. In the figure shown, the magnet is pushed towards the fixed ring along its axis and is made to pass through it.
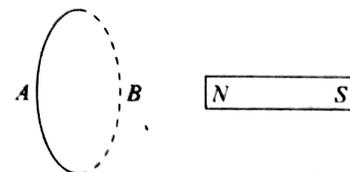

Choose the correct option based on the given information.
(1) When magnet goes towards the ring, the face B becomes south pole and the face A becomes north pole.
(2) When magnet goes away from the ring, the face B becomes north pole and the face A becomes south pole.
(3) When magnet goes away from the ring, the face A becomes north pole and the face B becomes south pole.
(4) The face A will always be a north pole

18. Two magnets are dropped along the axis of two metallic tubes of finite length. One is of copper and the other of iron. Then
(1) Magnet will come out from both the tubes simultaneously
(2) Magnet will take longer time to travel through iron tube than copper tube
(3) Magnet will take longer time to travel through copper tube than iron tube
(4) None of these

19. Figure shows plane figure made of a conductor located in a magnetic field along the inward normal to the plane of the figure. The magnetic field starts diminishing. Then select the incorrect statement.
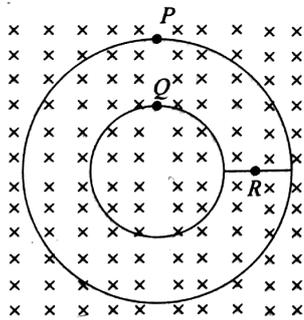

(1) The induced current at point P is clockwise
(2) The induced current at point Q is anticlockwise
(3) The induced current at point Q is clockwise
(4) The induced current at point R is zero

20. A conducting wire frame is placed in a magnetic field which is directed into the paper. The magnetic field is increasing at a constant rate. The directions of induced currents in wires AB and CD, respectively, are:
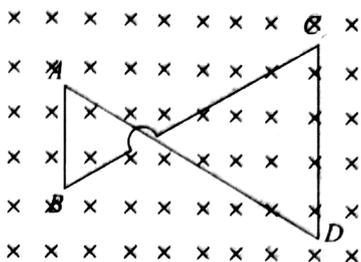

(1) B to A and D to C   (2) A to B and C to D
(3) A to B and D to C   (4) B to C and D to C

21. A solenoid having an iron core has its terminals connected across an ideal DC source. If the iron core is removed, the current flowing through the solenoid:
(1) Increases   (2) Decreases
(3) Remain unchanged (4) Nothing can be said

22. A metallic ring with a small cut is held horizontally and a magnet is allowed to fall vertically through the ring, then the acceleration of the magnet is:
(1) Always equal to g
(2) Initially less than g but greater than g once it passes through the ring
(3) Initially greater than g but less than g once it passes through the ring
(4) Always less than g

23. A and B are two metallic rings placed at opposite sides of an infinitely long straight conducting wire as shown. If current in the wire is slowly decreased, the direction of induced current will be:
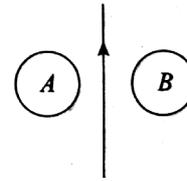
(1) Clockwise in A and anticlockwise in B
(2) Anticlockwise in A and clockwise in B
(3) Clockwise in both A and B
(4) Anticlockwise in both A and B

24. As shown in figure, a permanent magnet and current carrying coil are placed. If the coil is moved towards the magnet, then current in the coil (Magnet is symmetrical)
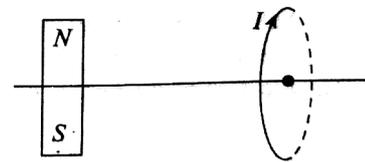

(1) Increases
(2) Decreases
(3) Remains same
(4) First increases then decreases

25. Two co-axial solenoids are shown in the figure. If key of solenoid I is suddenly opened, then direction of instantaneous induced current in resistance R which is connected to solenoid II is
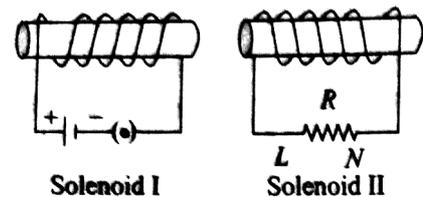

(1) From L to N
(2) From N to L
(3) Alternating
(4) Insufficient information

26. In the given figure, if the magnetic field which is perpendicular to the plane of the paper in the inward direction increases, then:
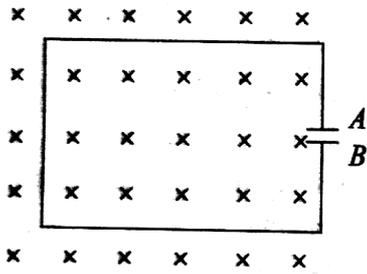

(1) Plate B of the capacitor will become positively charged

(2) Plate A of the capacitor will become positively charged

(3) The capacitor will not be charged

(4) Both plates will be charged alternately

27. Two identical circular coils A to B are placed parallel to each other with their centres on the same axis. The coil B carries a current I in the clockwise direction as seen from A. What would be the direction of the induced current in A seen from B when (i) the current in B is increased (ii) the coil B is moved towards A keeping the current in B constant.

(1) (i) Clockwise, (ii) Clockwise

(2) (i) Clockwise, (ii) Anticlockwise

(3) (i) Anticlockwise, (ii) Clockwise

(4) (i) Anticlockwise (ii) Anticlockwise

28. Consider a metal ring kept on a horizontal plane. A bar magnet is held above the ring with its length along the axis of the ring. IF the magnet is dropped freely, the acceleration of the falling magnet is (g is acceleration due to gravity)
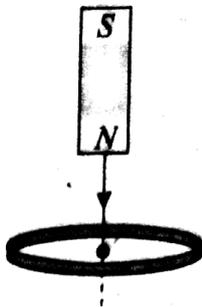
(1) More than g

(2) Equal to g

(3) Less than g

(4) Dependent on mass of magnet

29. An aeroplane in which the distance between the tips of the wings is 50 metre is flying horizontally with a speed of 360 km/hour over a place where the vertical component of earth's magnetic field is 2.0×10^{-4} T. The potential difference between the tips of the wings would be:

(1) 0.1 V   (2) 1.0 V   (3) 0.2 V   (4) 0.0

30. If the vertical component of earth's magnetic field is 6×10^{-5} Wb/m^2, then what will be the induced potential difference produced between the rails of a meter-gauge when a train is running on them with a speed of 36 km/h?
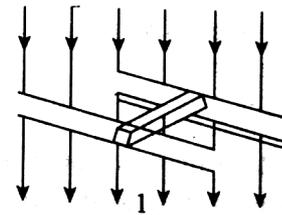
(1) 2×10^{-4} V   (2) 6×10^{-4} V

(3) 3×10^{-4} V   (4) 9×10^{-4} V

31. The volume of parallelepiped formed by vectors, $\vec{A} = 2\hat{i} + 2\hat{j} - 2\hat{k}$, $\vec{B} = 4\hat{i} + \hat{j} + \hat{k}$ and $\vec{C} = 2\hat{i} + 4\hat{j} + \hat{k}$.

(1) 38 units   (2) 50 units

(3) 40 units   (4) 30 units

32. For what value of 'a' $\vec{A} = a\hat{i} + \hat{j} - \hat{k}$, $\vec{B} = 2\hat{i} + \hat{j} + \hat{k}$ and $\vec{C} = 2\hat{i} - 2\hat{j} + \hat{k}$ are coplanar?

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

33. If a vector $2\hat{i} + 3\hat{j} + 8\hat{k}$ is perpendicular to the vector $4\hat{i} - 4\hat{j} + a\hat{k}$. Then the value of a is $-\dfrac{1}{x}$. Find x.

(1) 2   (2) 3   (3) 4   (4) 0

34. Two forces $\vec{F_1} = 5\hat{i} + 10\hat{j} - 20\hat{k}$ and $\vec{F_2} = 10\hat{i} - 5\hat{j} - 15\hat{k}$ act on a single point. The angle between $\vec{F_1}$ and $\vec{F_2}$ (in degree) is nearly:

(1) 44   (2) 45

(3) 46   (4) 47

35. Consider to vectors $\vec{A} = 3\hat{i} - 2\hat{j} + 4\hat{k}$ and $\vec{B} = 5\hat{i} + 6\hat{j} + \hat{k}$. The magnitude of the scalar product of these vectors is:

(1) 5   (2) 7   (3) 11   (4) 15

36. The vector $\vec{P} = a\hat{i} + a\hat{j} + 3\hat{k}$ and $\vec{Q} = a\hat{i} - 2\hat{j} - \hat{k}$ are perpendicular to each other. The positive value of a is:
(1) 1
(2) -1
(3) -3
(4) 3

37. The component of vector $\vec{A} = 2\hat{i} + 3\hat{j}$ along the vector $\hat{i} + \hat{j}$ is $\dfrac{x}{\sqrt{y}}$. Find (x+y).
(1) 7
(2) 8
(3) 9
(4) 6

38. The linear velocity of a rotating body is given by $\vec{v} = \vec{\omega} \times \vec{r}$, where $\vec{\omega}$ is the angular velocity and $\vec{r}$ is the radius vector. The angular velocity of a body is $\vec{\omega} = \hat{i} - 2\hat{j} + 2\hat{k}$ and the radius vector $\vec{r} = 4\hat{j} - 3\hat{k}$, then $|\vec{v}|$ is $\sqrt{x}$ units. Find x.
(1) 28
(2) 29
(3) 30
(4) 31

39. The vector projection of a vector $3\hat{i} + 4\hat{k}$ on y-axis is:
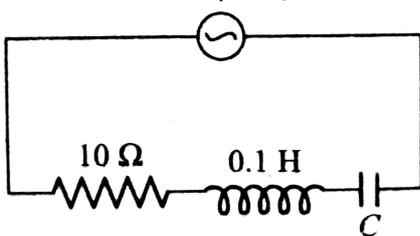(1) 1
(2) 2
(3) 0
(4) 3

40. $\vec{a} + \vec{b} = \vec{c}$ and $\vec{a} + 2\vec{b} = \vec{R}$. It is given that $\vec{R}$ is perpendicular to $\vec{a}$. Find $\dfrac{|\vec{b}|}{|\vec{c}|}$.
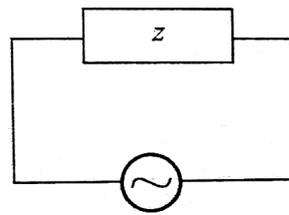(1) 0
(2) 2
(3) -1
(4) 1

41. The power factor of the circuit in the figure is $1/\sqrt{2}$. The capacitance of the circuit is equal to

(1) 400μF
(2) 300μF
(3) 500μF
(4) 200μF

42. In a black box of unknown elements (L or R or any other combination), an ac voltage $E = E_0 \sin(\omega t + \phi)$ is applied and current in the circuit was found to be $I = I_0 \sin\left[\omega t + f + (\pi/4)\right]$. Then the unknown elements in the box may be
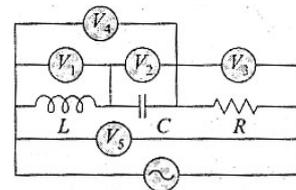

(1) only capacitor
(2) inductor and resistor both
(3) either capacitor, resistor, and inductor or only capacitor and resistor
(4) only resistor

43. The reading of ammeter in the circuit shown will be
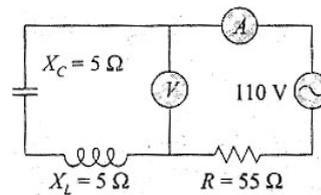
(1) 2A
(2) 2.4A
(3) Zero
(4) 1.7 A

44. In the adjoining ac circuit the voltmeter whose r will be zero at resonance is

(1) V_1
(2) V_2
(3) V_3
(4) V_4

45. An ac voltage source $V = V_0 \sin \omega t$ is connected across resistance R? and capacitance C as shown in figure. It is given that $R = 1/\omega C$. The peak current is I_0. If the angular frequency of the voltage source is changed to $\omega/\sqrt{3}$ then the new peak current in the circuit is
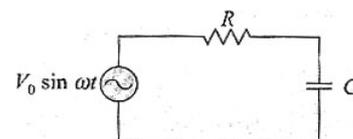
(1) $\dfrac{I_0}{2}$
(2) $\dfrac{I_0}{\sqrt{2}}$
(3) $\dfrac{I_0}{\sqrt{3}}$
(4) $\dfrac{I_0}{3}$

CHEMISTRY

46. Strong oxidizing agent among the following is
    (1) F_2 (2) Cl_2 (3) Br_2 (4) I_2

47. The standard potentials at 25ºC for the following half reactions are given then
 $Zn^{2+} + 2e^- \rightarrow Zn$, $E^o = - 0.762$ V;
    $Mg^{2+} + 2e^- \rightarrow Mg$, $E^o = - 2.37$ V
    When zinc dust is added to a solution of magnesium chloride
    (1) no reaction will take place
    (2) zinc chloride is formed
    (3) zinc dissolve in solution
    (4) magnesium is precipitated

48. Consider the following E^o values
    E^o (Fe^{3+} | Fe^{2+}) = +0.77V
    E^o(Sn^{2+} | Sn) = - 0.14 V
    Under standard conditions, the potential for the reaction :
    $Sn(s) + 2Fe^{3+}(aq) \rightarrow 2Fe^{2+}(aq) + Sn^{2+}(aq)$ is
    (1) 0.91V (2) 1.40 V
    (3) 1.68 V (4) 0.63V

49. The standard reduction potential values of three metallic cations of X^+, Y^+, Z^+ are 0.52, - 3.03 and - 1.18V respectively.
    The order of reducing power of the corresponding metals is :
    (1) Y > Z > X (2) X > Y > Z
    (3) Z > Y > X (4) Z > X > Y

50. A gas X at 1 atm is bubbled through a solution containing a mixture of 1M Y^- and 1M Z^- at 25ºC.
    If the reduction potential of Z > Y > X, then :
    (1) Y will oxidize X and not Z
    (2) Y will oxidize Z and not X
    (3) Y will oxidize both X and Z
    (4) Y will reduce both X and Z

51. In the electrochemical cell,
    $Mg(s) | Mg^{2+}(aq) || Zn^{2+}(aq) | Zn(s)$; E^o = +313 V
    The correct plot of E_{cell} versus $\log \dfrac{\left[Mg^{2+}\right]}{\left[Zn^{2+}\right]}$ will be represented as

    (1)


    (2)

    (3)

    (4)
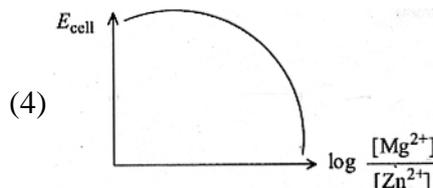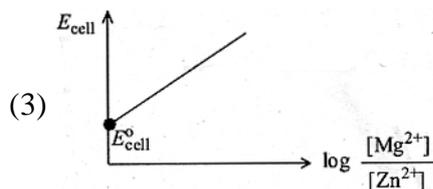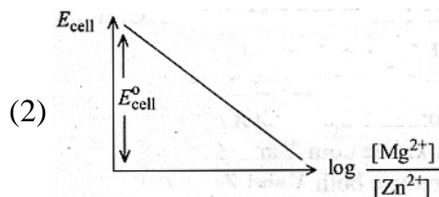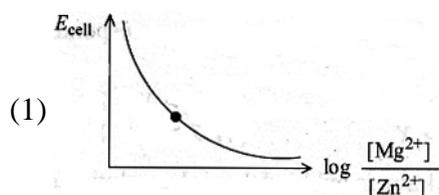
52. Potential of a working cell containing two hydrogen electrodes, one in contact with 10^{-8} M H^+ and the other in contact with 0.025 M H^+ is
    (1) 0.38V (2) 0.48V
    (3) 0.18V (4) 0.28V

53. For the cell
    Pt | H(0.4 atm) | H^+(pH = 1) || H^+ (pH = 2)H_2 (0.1 atm) | Pt
    the measured potential at 25°C is
    (1) - 0.1 V (2) - 0.5 V
    (3) - 0.041 V (4) - 0.005 V

54. For the following electrochemical cell at 298 K
    Pt, H_2 (1 bar) | H^+(aq) (1M) || M^{+4} (aq), M^{+2}(aq)| Pt;
    $$E_{cell} = 0.092\,V, \text{when} \dfrac{\left[M^{+2}(aq)\right]}{\left[M^{+4}(aq)\right]} = 10^x$$
    If $E^0_{M^{+4}/M^{+2}} = 0.151\,volt$, then the value of x is
    (1) - 2 (2) -1 (3) 1 (4) 2

55. $2Fe^{3+}(aq.) + 2I^-(aq) \rightleftharpoons 2Fe^{2+}(aq.) + I_2(s)$
    Equilibrium constant of the above redox reaction at 298 K is 1×10^8. If the standard reduction potential of iodine is + 0.54 V, what is the standard reduction potential of Fe^{3+}/Fe^{2+} ?
    (1) + 1.006 V (2) -1.006 V
    (3) + 0.77 V (4) - 0.77 V

56. The change in reduction potential of a hydrogen electrode when 100 ml of 1 M HCl is mixed with 100 mL of 1 M NaOH
    (1) increases by 0.059 V
    (2) decreases by 0.059 V
    (3) increases by 70.41 V
    (4) decreases by 0.41 V

57. The oxidation potential of a hydrogen electrode at pH = 10 and $p_{H_2} = 1$ is
(1) 0.51V (2) 0.00V (3) 0.59V (4) 0.059V

58. How much will the reduction potential of a hydrogen electrode change when its solution initially pH = 0 is neutralized to pH = 7 ;
(1) Increase by 0.059V
(2) Decrease by 0.059 V
(3) Increase by 0.41 V
(4) Decrease by 0.41 V

59. The cell reaction for the given cell is
$Pt(H_2) | pH = 2 || pH = 3 | Pt(H_2)$
$P_1 = 1$ atm $P_2 = 1$ atm
(1) Spontaneous   (2) Non-spontaneous
(3) In equilibrium   (4) Either of these

60. Given the data at 25ºC

$Ag + I^- \rightarrow AgI + e^-$
$E^o = 0.152$ V
$Ag \rightarrow Ag^+ + e^-$
$E^o = -0.800$
What is the value of log K_{sp} for AgI ? (2.303 RT /F = 0.059 V)
(1) + 8.612   (2) - 37.83
(3) - 16.13   (4) - 8.12

61. The emf of given cell $Pt - H_2 | H^+ | H_2 - Pt$ is :
$\qquad\qquad\qquad p_1 \qquad p_2$

(1) $\dfrac{RT}{F} \log_e \dfrac{P_1}{P_2}$ (2) $\dfrac{RT}{2F} \log_e \dfrac{P_1}{P_2}$

(3) $\dfrac{RT}{F} \log_e \dfrac{P_2}{P_1}$ (4) none of these

62. The rusting of iron takes place as follows :
$2H^+ + 2e^- + 1/2 O_2 \rightarrow H_2O_{(l)}$; $E^o = + 1.23$V
$Fe^{+2} + 2e^- \rightarrow Fe(s)$; $E^o = - 0.44$ V
The ΔG^o for the net process is :
(1) - 322 kJ mol^{-1} (2) - 161 kJ mol^{-1}
(3) - 152 kJ mol^{-1} (4) - 76 kJ mol^{-1}

63. The emf of the cell, $Zn | \underset{(0.01M)}{Zn^{2+}} || \underset{(0.001M)}{Fe^{2+}} | Fe$ at 298 K is 0.2905, then the value of equilibrum constant for the cell reaction is :
(1) $e^{0.32/0.0295}$ (2) $10^{0.32/0.0295}$
(3) $10^{0.26/0.0295}$ (4) $10^{0.32/0.0591}$

64. The standard reduction potentials of Cu^{2+}/Cu and Cu^{2+}/Cu^+ are 0.339 V and 0.153 V respectively. The standard electrode potential of Cu^+/Cu half cell is:
(1) 0.525V   (2) 0.827V
(3) 0.184V   (4) 0.490V

65. Given : $E^0_{ClO_3^-/Cl^-} = 0.627$V and $E^0_{Cl_2/Cl^-} = 1.36$V
Then $E^0_{ClO_3^-/Cl_2}$ is equal to
(1) 0.480 V   (2) 0.73
(3) 1.1 V   (4) 1.987 V

66. $0.5Cu(s) + 0.5Cl_2(g) \rightarrow 0.5Cu^{2+} + Cl^-$
The Eº for the above cell reaction is 1.02V. Then its ΔG^o value is
(1) 98430 J   (2) 96500 J
(3) - 98430 J   (4) - 49215 J

67. One gram of metal M^{3+} was discharged by the passage of 18×10^{21} electrons. The atomic weight of metal is
(1) 33.35   (2) 133.4   (3) 66.7   (4) 100.5

68. A current of 3.7 A is passed for 6 hrs between Zinc electrodes in 0.5 L of 2 M solution of $Zn(NO_3)_2$. The molarity of solution at the end of electrolysis with respect to Zn^{+2} is
(1) > 2M(but not 55.5)   (2) < 2M
(3) 55.5 M   (4) None of these

69. 0.01 moles of electrons are passed through three cells connected in series, each containing aqueous solutions of KCl, AgNO, and H_2SO_4. The total volume of hydrogen evolved in the set-up at STP is
(1) 336 ml   (2) 224 ml
(3) 33.67 ml   (4) 22.4 ml

70. How many faradays must be supplied to a cell for the electrolytic production of 245 g of $NaClO_4$ from $NaClO_3$
(molarmass of $NaClO_4$=122.5 g mo^{-1})?
(1) 1F   (2) 2 F   (3) 3F   (4) 4F

71. A current of 2.0 A passed for 5 hours through a molten metal salt deposits 22.2 g of metal (Atomic weight = 177). The oxidation state of the metal in die metal salt is
(1) +1   (2) +2   (3) +3   (4) +4

72. A 250.0 mL sample of 0.20 M Cr^{3+} is electrolyzed with a current of 96.5 A. If the remaining $[Cr^{3+}]$ is 0.1 M, then the duration of the process is
(1) 25 seconds   (2) 225 seconds
(3) 150 seconds   (4) 75 seconds

73. If 9.65 Amperes current is passed for 1 hour through the cell $Ag | \underset{1M}{Ag^+} || \underset{1M}{Cu^{2+}} | Cu$, then
(1) Ag will oxidize to Ag^+ and new $[Ag^+] = 1.36$M
(2) Ag^+ will reduce to Ag and new $[Ag^+] = 0.64$M
(3) Cu will oxidized to Cu^{2+} and new $[Cu^{2+}] = 0.82$M
(4) both (1) and (3)

74. If 10 g of fairly concentrated solution of $CuSO_4$ is elcctrolyzed using 0.01 F of electricity, then mass of resulting solution will be
(1) 0.317g   (2) 9.9g   (3) 9.6g   (4) 10g

75. The number of molecules liberated at anode from molten sodium chloride in one minute by a current of 300 milliamperes is
(1) 5.616×10^{18} (2) 5.616×10^{19}
(3) 2.4×10^{20} (4) 2.4×10^{18}

76. The time required to coat a metal surface of 80 cm² with 5×10^{-3} cm thick layer of silver with passage of 3 amperes current through a silver nitrate solution is ($d_{silver} = 1.05$ g cm⁻³)
(1) 115s   (2) 125s   (3) 135s   (4) 145s

77. A fuel cell is fed with 8 g of H, and 40 g of O_2. How long would the fuel cell run to give a current of 5 A?
(1) 1608 minutes   (2) 8041 minutes
(3) 3217 minutes   (4) 12867 minutes

78. When a quantity of electricity was passed through molten scandium oxide, 5 g of scandium and 2.67 g of oxygen were produced at the electrodes. The formula of scandium oxide is (at. wl. of Sc = 45)
(1) ScO_3 (2) ScO_3 (3) Sc_2O_3 (4) Sc_3O_2

79. The total volume of gases obtained at S.T.P. by electrolysis of aqueous sodium acetate, by passing 0.5 A for 965 minutes, is
(1) 10.7 litres   (2) 20.8 litres
(3) 75.3 litres   (4) 13.44 litres

80.
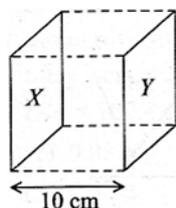
The conductance of a salt solution (AB) measured by two parallel electrodes of above cube was found to be 0.0001 Ω^{-1}. If volume enclosed between two electrode contain 0.5 mole of sail, what is the molar conductivity of salt at same concentralion ?
(1) 0.01 Scm²mol⁻¹   (2) 0.02 Scm²mol⁻¹
(3) 2×10^{-5} Scm²mol⁻¹   (4) 0.2 Scm²mol⁻¹

81. At 298K, ionic product of pure water is 10^{-14}. If its specific conductivity is 5.58×10^{-8} ohm⁻¹cm¹, then its molar conductance at infinite dilution is
(1) 658 ohm⁻¹ cm²mol⁻¹   (2) 558 ohm⁻¹ cm²mol⁻¹
(3) 167.3 ohm⁻¹ cm²mol⁻¹ (4) 200 ohm⁻¹ cm²mol⁻¹

82. In the equation $\wedge_{eq}$ = specific conductance $\times$ V, volume for $\dfrac{1}{10}$N solution will be
(1) 10 cc   (2) 100 cc
(3) 1000 cc   (4) 10000 cc

83. The molar conductivity of 0.025 mol L⁻¹ methanoic acid is 46.1 S cm² mol⁻¹. Then its degree of dissociation is [Given $\lambda°(H^+) = 349.6$ S cm² mol⁻¹ and $\lambda°(HCOO^-) = 54.6$ S cm² mol⁻¹]
(1) 0.114   (2) 0.367
(3) 0.215   (4) 11.4

84. The λ^∞ of NH_4OH at infinite dilution is ..... S cm² eq⁻¹.   Given $\lambda^\infty_{OH^-} = 174, \lambda^\infty_{Cl^-} = 66$ and $\lambda^\infty_{NH_4Cl} = 130 S\, cm^2$ eq⁻¹.
(1) 138   (2) 218
(3) 198   (4) 238

85. Which one of the following changes there are transfer of five electrons
(1) $MnO_4^- \rightarrow Mn^{2+}$
(2) $CrO_4^2 \rightarrow Cr^{3+}$
(3) $MnO_4^{2-} \rightarrow MnO_2$
(4) $Cr_2O_7^{2-} \rightarrow 2Cr^{3+}$

86. Oxidation number of N in $(NH_4)_2SO_4$ is
(1) - 1/3   (2) - 1
(3) +1   (4) - 3

87. In the reaction
$Ag_2O + H_2O_2 - 2Ag + H_2O + O_2$, the H_2O_2 acts as
(1) reducing
(2) oxidising agent
(3) bleaching agent
(4) none of these

88. For the redox reaction,
$MnO_4^- + C_2O_4^{2-} + H^+ \rightarrow Mn^{2+} + CO_2 + H_2O$,
the correct coefficients of the reactants for the balanced reaction are

	MnO_4^-	$C_2O_4^{2-}$	H^+
(1)	2	5	16
(2)	16	5	2
(3)	5	16	2
(4)	2	16	5

89. In the balanced chemical reaction,
$IO_3^- + al^- + bH^+ \rightarrow cH_2O + dl_2$
a, b, c and d respectively correspond to
(1) 5, 6, 3, 3   (2) 5, 3, 6, 3
(3) 3, 5, 3, 6   (4) 5, 6, 5, 5

90. $2MnO_4^- + 5H_2O_2 + 6H^+ \rightarrow 2Z + 5O_2 + 8H_2O$.
In the reaction Z is
(1) Mn^{2+} (2) Mn^{+4}
(3) MnO_2 (4) Mn

BIOLOGY

91. In cell cycle, DNA replication takes place in _____
    (1) G_1 phase
    (2) G_2 phase
    (3) Mitotic metaphase
    (4) S phase

92. Which phase of cell cycle is known as quiescent stage?
    (1) M phase
    (2) G_0 phase
    (3) G_1 phase
    (4) S phase

93. Which of the following phase is called the resting phase during which cell is preparing for division by undergoing both cell growth and replication of DNA?
    (1) M – phase
    (2) Prophase
    (3) G_0 phase
    (4) Interphase

94. In mitosis, nucleolus and nuclear membrane disappear at
    (1) interphase
    (2) prophase
    (3) metaphase
    (4) telophase

95. What is the stage of mitosis in which chromosomes are arranged on the equator of spindle?
    (1) Anaphase
    (2) Prophase
    (3) Metaphase
    (4) Telophase

96. In anaphase of mitosis,
    (1) chromosomes get arranged in middle of cell
    (2) nuclear envelope disappears
    (3) chromosome fibres become clear
    (4) chromosomes aggregate at opposite poles to form daughter nuclei

97. Which of the following cellular structures always disappears during mitosis and meiosis?
    (1) Plastid and nuclear membrane
    (2) Nucleolus and nuclear membrane
    (3) Endoplasmic reticulum and mitochondria
    (4) Endoplasmic reticulum and plasma membrane

98. Interkinesis is a
    (1) stage between meiosis I and meiosis II
    (2) stage between two mitotic divisions
    (3) interphase
    (4) both (2) and (3)

99. Synapsis occurs between
    (1) spindle fibres and centromeres
    (2) mRNA and ribosomes
    (3) a male and female gamete
    (4) two homologous chromosomes

100. During mitosis, nuclear envelope, nucleolus begin to form and ER to reappear at _____
    (1) prophase
    (2) late metaphase
    (3) anaphase
    (4) telophase

101. The synaptonemal complex appears
    (1) between homologous chromosomes
    (2) in zygotene stage
    (3) composed of DNA + protein
    (4) All of the above

102. Chromosome synapsis or bivalent formation occurs in _____
    (1) leptotene
    (2) zygotene
    (3) pachytene
    (4) diplotene

103. Recombination between homologous chromosomes is completed by the end of _____
    (1) leptotene
    (2) pachytene
    (3) diplotene
    (4) diakinesis

104. Chiasmata are first seen in _____
    (1) leptotene
    (2) zygotene
    (3) pachytene
    (4) diplotene

105. Terminalization occurs during _____
    (1) mitosis
    (2) diakinesis
    (3) meiosis II
    (4) cytokinesis

106. Electron micrographs of which stage indicate that chromosomes accompanied by the formation of complex structure called synaptonemal complex?
    (1) Zygotene
    (2) Pachytene
    (3) Diplotene
    (4) Diakinesis

107. The microtubules of the mitotic spindle attach to a specialized structure in the centromere region of each chromosome called the _____.
    (1) Telomere
    (2) Centriole
    (3) Chromatin
    (4) Kinetochore

108. Select the correct statement with respect to mitosis.
    (1) Chromatids separate but remain in the centre of the cell in anaphase
    (2) Chromatids start moving towards opposite poles in telophase
    (3) Golgi complex and endoplasmic reticulum are still visible at the end of prophase
    (4) Chromosomes move to the spindle equator and get aligned along equatorial plate in metaphase

109. Which one of the following precedes re-formation of the nuclear envelope during M phase of the cell cycle?
    (1) Decondensation from chromosomes, and reassembly of the nuclear lamina
    (2) Transcription from chromosomes, and re-assembly of the nuclear lamina
    (3) Formation of the contractile ring, and formation of the phragmoplast
    (4) Formation of the contractile ring, and transcription from chromosomes

110. Which of the following statement is not true for homologous chromosome pairs?
(1) They come from only one of the individual's parents
(2) They usually contain slightly different versions of the same genetic information
(3) They segregate from each other during meiosis I.
(4) They synapse during meiosis I

111. Which of the following statement(s) is/are true?
(1) Cell plate represents the middle lamella between the walls of two adjacent cells
(2) At the time of cytokinesis, organelles like mitochondria and plastids get distributed between the daughter cells
(3) Cytokinesis in plant cell is centrifugal and takes place by cell-plate formation while animal cells by furrowing/cleavage and is centripetal
(4) All of the above

112 Which of the following statement(s) is/are correct about S-phase (synthetic phase)?
(i) It occurs between G1 and G2 phase
(ii) It marks the period during which DNA replicates
(iii) At the end of this phase, DNA is doubled but the number of chromosomes remains unchanged
(iv) As the DNA is doubled in this phase number of chromosomes is also doubled
(v) Centrioles replicate in this phase
(vi) Amount of DNA changes from 2C to 4C
(1) (i), (ii), (iv), (v), (vi)
(2) (i), (ii), (iii), (v), (vi)
(3) All of the above
(4) Only (iv)

113. Which of the following statements related to G0 stage of the cell cycle are correct?
(i) It is a quiescent stage.
(ii) In this phase, cell cycle is stopped.
(iii) G0 cells do not grow or proliferate but metabolically active.
(iv) G0 cells can divide in response to some stimulus.
(1) (i), and (ii)   (2) (i), (ii) and (iii)
(3) Only (i) and (iv)   (4) All of the above

114. Which one is correct about bivalent?
(i) Bivalent are tetrads.
(ii) A bivalent means 4 chromatids and 2 centromeres.
(iii) One bivalent consists of 2 homologous chromosomes each and four sister chromatids.
(iv) Bivalents formation occurs in zygotene.
(1) All of these   (2) Only (iii)
(3) (iii) and (iv)   (4) Only (iv)

115. Which one is correct about crossing over/genetic recombination?
(i) It occurs in tetrad stage which occurs in pachytene of prophase I of meiosis I.
(ii) It occurs between non-sister chromatids of homologous chromosomes.
(iii) It is recombinase enzyme mediated process.
(iv) It is also the reciprocal transfer of genes between the non-homologous chromosomes
(1) All of the above
(2) All except (iv)
(3) (ii), (iii) and (iv)
(4) (iii) and (iv)

116. Read the following statements about cell division and select the correct statements.
(i) The nuclear membrane disappears by the end of prophase II.
(ii) The homologous chromosomes separate, while sister chromatids remain associated at their centromeres.
(iii) M phase constitutes more than 95% of the duration of cell cycle.
(1) (i) and (ii)
(2) (ii) and (iii)
(3) (i) and (iii)
(4) (i), (ii) and (iii)

117. **Assertion (A):** Diplotene is characterized by the presence of chiasmata.
Reason (R): Diplotene can last for months and years in oocytes of some vertebrates.
In the following questions, a statement of Assertion is followed by a statement of Reason.
(1) If both Assertion and Reason are true and the Reason is the correct explanation of the Assertion.
(2) If both Assertion and Reason are true but the Reason is not the correct explanation of the Assertion.
(3) If Assertion is true but Reason is false.
(4) If both Assertion and Reason are false.

118. **Assertion (A):** The final stage of meiotic prophase 1 is diplotene.
Reason (R): Diplotene is marked by terminalisation of chiasmata.
In the following questions, a statement of Assertion is followed by a statement of Reason.
(1) If both Assertion and Reason are true and the Reason is the correct explanation of the Assertion.
(2) If both Assertion and Reason are true but the Reason is not the correct explanation of the Assertion.
(3) If Assertion is true but Reason is false.
(4) If both Assertion and Reason are false.

119. **Assertion (A):** The crossing over is an enzyme-mediated process.

Reason (R): The enzyme involved in crossing over is lyase.

In the following questions, a statement of Assertion is followed by a statement of Reason.

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

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

(3) If Assertion is true but Reason is false.

(4) If both Assertion and Reason are false.

120. **Assertion (A):** Metaphase II begins with splitting of centromere of each chromosome into two.

Reason (R): In Anaphase II chromosomes align at the equator.

In the following questions, a statement of Assertion is followed by a statement of Reason.

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

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

(3) If Assertion is true but Reason is false.

(4) If both Assertion and Reason are false.

121. Match the description (given in column I) with correct stage of prophase I (given column II) and choose the correct option.

	Column-I		Column-II
A	Chromosomes are moved to spindle equator	I	Pachytene
B	Centromere splits and chromatids apart	II	Zygotene
C	Pairing between homologous chromosomes takes place	III	Anaphase-II
D	Crossing between homologous chromosomes	IV	Metaphase

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

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

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

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

122. Choose the mismatch pair.

(a) Karyokinesis – Division of centromere

(b) Cytokinesis – Division of cytoplasm

(c) S-phase – DNA synthesis

(d) Synapsis – Pairing of homologous chromosomes

123. Match the column I with column II.

	Column-I (Terms)		Column-II (Explanation)
A	Terminalization	I	Pairing of homologous chromosomes
B	Synapsis	II	Point of attachment between homologous chromosomes
C	Chiasmata	III	Nuclear protein complex that helps in adhernce of sister chromatids and then homologous chromosomes.
D	Synaptonemal complex	IV	Shifting of chiasmata complex outwards towards the ends of a bivalent

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

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

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

(4) A-IV, B-I, C-III, D-I

124. Find out the wrongly matched pair of the stage of prophase I with their feature.

(1) Zygotene – Synaptonemal complex

(2) Pachytene – Mutation

(3) Diplotene – Chiasmata

(4) Diakinesis – Terminalization

125. Mark the incorrect pair.

(1) Interphase – S-phase

(2) M phase – Metaphase

(3) Meiosis I – Diplotene

(4) Meiosis II – Diakinesis

126. Which of the following pair is correctly matched?

(1) G_1 – Second growth phase

(2) S – Duplication phase

(3) G_2 – Synthesis phase

(44) G_0 – Quiescent stage

127. Which of the following pair is correctly matched?

(1) Anaphase I – Homologous chromosomes are separated.

(2) Metaphase I – Pairing of maternal and paternal chromosomes.

(3) Interphase – A nuclear envelop encloses each haploid set of chromosomes.

(4) Prophase I – Non-homologous chromosomes are separated.

128. Given below is a schematic break-up of the phases stages of cell cycle with few parts labelled as A, B, C & D. Which one of the following is the correct indication of the stage/phase in the cell cycle?
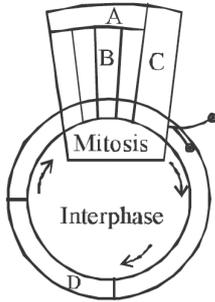
(1) C - Karyokinesis   (2) D - Synthetic phase
(3) A - Cytokinesis   (4) B – Metaphase

129. Which stages of cell division do the following figures A and B represent respectively?
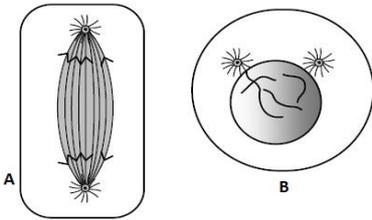

(1) A-Metaphase, B-Telophase
(2) A-Telophase, B-Metaphase
(3) A-Late Anapahse, B-Prophase
(4) A-Prophase, B-Anaphase

130. Consider given statements.
X. The cell is metabolically active and continuously grows.
Y. DNA replication takes place.
Z. Proteins are synthesised in preparation for mitosis
Choose the correct option showing the correct identification of X, Y and Z.

(1) $X - G_1, Y - S, Z - G_2$

(2) $X - G_2, Y - S, Z - G_1$

(3) $X - G_0, Y - S, Z - G_2$

(3) $X - G_1, Y - G_0, Z - S$

131. A stage of mitosis is shown in the given diagram. Identify stage with its characteristics.
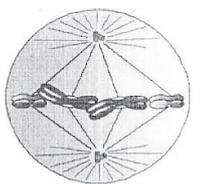
(1) Late prophase - chromosomes move to spindle equator.
(2) Metaphase - Spindle fibres attached to kinetochores, centromeres split and chromatids separate
(3). metapahse- Chromosomes move to spindle equator chromosomes made up of two sister chromatids.
(4) Anaphase - Centromeres split and chromatids separate and start moving away.

132. Choose the diagram which correctly depicts Anaphase-I.

(1)   (2)
(3)   (4)
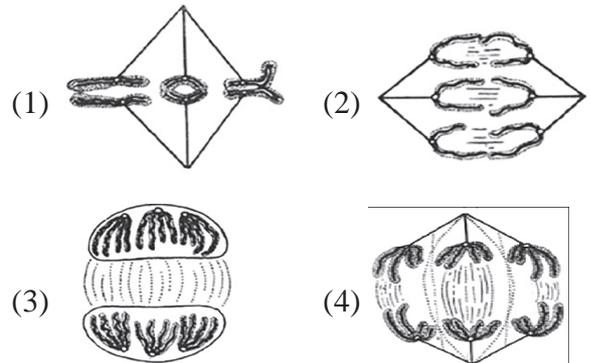
133. The diagram shows a cel whose diploid chromosome numebr is four. Which one of the following option shows correct stage of cell?
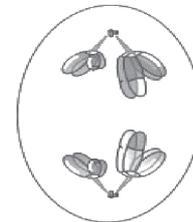
(1) Metaphse
(2) Anaphase of mitosis
(3) Anaphase I of meiosis
(4) Anaphase II of meiosis

134. In the somatic cell cycle:

(1) In G_1 pahse, DNA content is double the amount of DNA present in the original cell.
(2) DNA replication takes place in S-phase.
(3) A short interphse is followed by a along mitotic phase.

(4) G_2 phase follows mitotic phase

135. In which stage of the cell cycle, histone proteins are synthesized in a eukaryotic cell?

(1) During G_2 stage of prophase

(2) During S-phase

(3) DUring entier prophase

(4) During telophase

136. **Statement-I:** Down's syndrome is due to polyploidy.
Statement-II: It occurs due to changes in whole set of chromosomes.
(1) Both statements are correct
(2) Statement I is correct & II is incorrect
(3) Statement I is incorrect & II is correct
(4) Both statements are incorrect

137. **Statement-I:** In Turner's syndrome, oen X-chromosome is missing and in Klinefelter's syndrome, the condition is XXY.
Statemetn-II: These can be easily studied by analysis of karyotypes.
(1) Both statements are correct
(2) Statement I is correct & II is incorrect
(3) Statement I is incorrect & II is correct
(4) Both statements are incorrect

138. **Statement-I:** Person with blood group AB can take blood from any other person.
Statement-II: Blood group incompatibility is due to antigen antibody reaction. Blood group AB has no antibody and thus the antigen of other group is not affected.
(1) Both statements are correct
(2) Statement I is correct & II is incorrect
(3) Statement I is incorrect & II is correct
(4) Both statements are incorrect

139. **Statement-I:** Haemophilia shows transmission from carrier female to male progeny.
Statementn-II: The trait linked to the X-set chromosome.
(1) Both statements are correct
(2) Statement I is correct & II is incorrect
(3) Statement I is incorrect & II is correct
(4) Both statements are incorrect

140. In XO type of sex determination:'
(1) Females produce two different types of gametes
(2) Male produce two different types of gametes
(3) Females produce gamets with Y chromosomes
(4) Male produce single type of gametes.

141. Select the correct statement from the ones given below with respect to 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 recombinations as the tight linked ones.
(4) Tightly linked genes on the same chromosome show very few recombinations.

142. Which one of the following conditions correctly describes the manner of determining the sex in the given example?
(1) Homozygous sex chromosomes (ZZ) determine male sex in birds.
(2) XO type of sex chromosomes determine male sex in grasshoppers
(3) XO condition in human as found in Turner's syndrome, determines female sex.
(4) Homozygous sex chromosomes (XX) produce female in Drosophila.

143. Which one of the following is an incorrect statement regarding mutations?
(1) Deletion and insertion of base pairs cause frameshift mutations.
(2) cancer cells commonly show chromosomal aberrations.
(3) UV and gamma rays are mutagens.
(4) Change in a single base pair of DNA does not cause mutation

144. Match column with column II and select he correct answer using the codes given below.

	Column-I		Column-II
A	ABO bloods	I	Dihybrid corss
B	Law of segragation	II	Monohybrid cross
C	Law of Independent assortment	III	Base pairs substitution
D	Gene mutation	IV	Multiple allelism

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

145. Match column with column II and select he correct answer using the codes given below.

	Column-I		Column-II
A	Turner syndrome	I	Trisomy
B	Linkage	II	AA+XO
C	Y-chromosome	III	Morgan
D	Down's syndrome	IV	Testis determining factor

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

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

146. Match column with column II and select he correct answer using the codes given below.

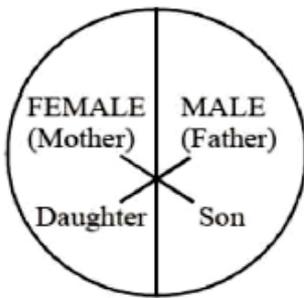|	Column-I		Column-II
A	Monoploidy	I	2n-1
B	Monosomy	II	2n+1
C	Nullisomy	III	2n+2
D	Trisomy	IV	2n-2
E	Tetrasomy	V	n
		VI	3n

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

147. The given figure represents the inheritance pattern of a certain type of traits in humans. Which one of the following conditions could be an example of this pattern?

(1) Thalassemia   (2) Haemophilia
(3) Phenylketonuria   (4) Sickle cell anaemia

148. The test cross is used to determine the:
(1) Genotype of the plant
(2) Phenotype of the plant
(3) Both (1) and (2)
(4) None of the avove

149. In humans, the dominance relationship between the A and B alleles of the ABO blood group gene is an example of:
(1) Complete dominance
(2) Incomplete dominance
(3) Codominance
(4) Epistasis

150. **Statement-I:** The strength of linkage will be more when the distance between two genes is lesser.
Statement-II: In such case crossing over will be relatively les frequent.
(1) Both statements are correct
(2) Statement I is correct & II is incorrect
(3) Statement I is incorrect & II is correct

(3) Both statements are incorrect

151. Sex is determined in human being
(1) By ovum
(2) At time of fertilization
(3) 40 days after fertilization
(4) Seventh to eight week when genitals differentiate in foetus

152. Which of the following statement is not correct of two genes that show 50% recombination frequency?
(1) Genes are tightly linked
(2) The genes show independent assortment
(3) If the genes are present on the same chromosome, they undergo more than one crossovers in every meiosis.
(4) The genes may be on different chromosomes

153. **Assertion(A):** 'Factors' regulating the characters are found in pairs.
Reason(R): The dominant charactes are even expressed when factors are in heaterozygous condition
(1) Both (A) and (R) are true and (R) is the correct explanation of (A)
(2) Both (A) and (R) are true but (R) is not the correct explanation of (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

154. Identify the incorrect statement.
(1) In male grasshoppers, 50% of the sperms have no sex chromosome.
(2) Usually female buirds produce two types of gamets based on sex chromosomes.
(3) The human males have one of their sex chromosomes much shorter than the other.
(4) In domesticated fowls, the sex of the progeny depends on the type of sperm that fertilizes the edd.

155. Which of the following statements are correct?
(i) Incomplete or mosaic inheritace is an example of pre-Mendelian concept of blending inheritance
(ii) Test cross is a special type of back cross.
(iii) Cromosomal aberrations are commonly observed in cancer cells.
(iv) Thalassaemia is a Mendelian disorder.
(1) (i) and (ii)
(2) (ii), (iii) and (iv)
(3) (ii) and (iv)

(4) (i) and (iv) only

156. Match the column-I with column-II and choose the correct option.

	Column-I		Column-II
A	Incomplete dominance	I	Drosophila
B	Mendelian disorder	II	Antirrhinum sp
C	Transforming principle	III	Griffith
D	Dihybrid cross	IV	Haemophilia

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

157. Match the column-I with column-II and choose the correct option.

|	Column-I		Column-II
A	Alfred Sturtevant	I	Mapped position of genes
B	Henking	II	X-body
C	Meischer	III	Nuclein
D	Morgan	IV	Dihybrid corsses in Drosophila

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

158. **Assertion(A):** A recessive character that was expressed in heterozygous condition may be expressed again when it becomes homozygous.
   Reason(R): The characters never blend in heterozygous condition.
   (1) Both (A) and (R) are true and (R) is the correct explanation of (A)
   (2) Both (A) and (R) are true but (R) is not the correct explanation of (A)
   (3) (A) is true but (R) is false
   (4) Both (A) and (R) are false

159. The experiment show in the given figure has been carried out by Morgan to show the phenomenon of linkage and recombination. If in crossA, genes are tightly linked and in cross B, genes are loosely linked then what will be the percentage of recombinants produced in corss A and corss B respectively?
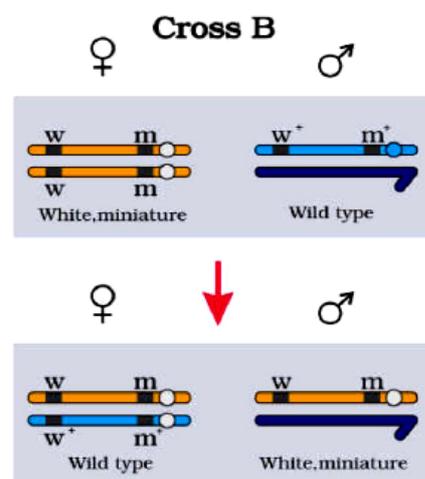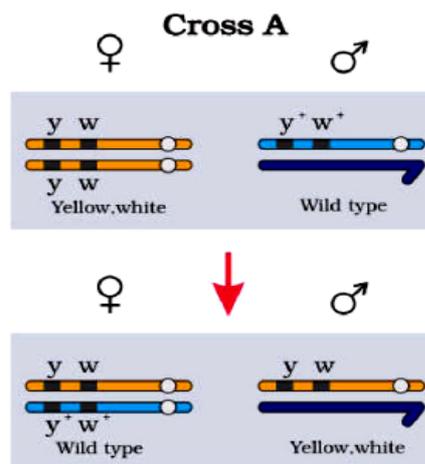
(1) 98.7% and 62.8%   (2) 1.3% and 37.2%
(3) 37.2% and 1.3%   (4) 62.8% and 98.7%

160. In Mendelian dihybrid cross when heterozygous round yellow are self crossed, round green offsprings are represented by genotype:
   (1) RrYy, RrYY, RRYy (2) RrYY, RRyy, rryy
   (3) rrYy, rrYY,   (4) Rryy, RRyy

161. In Drosophila, XXY represents a female but in human it is an abnormal male. It shows that:
   (1) Y-chromosome is essential for male sex in human
   (2) Y-chromosome is essential for female sex determination in Drosophila.
   (3) Y-chromosome is not essential for male sex determination in human.
   (4) All fo the above

162. A tabocco plant heterozygous for albinish (recessive character) is self-pollinated and 1200 seeds are subsequently germinated. How many seedings would have the parental genotype?
   (1) 1250   (2) 600   (3) 300   (4) 2250

163. Down's syndrome is caused by an extra copy of chromosome number 21. What precentage of offspring produced by an affected mother and a normal father?

(1) 50%   (2) 25%   (3) 100%   (4) 75%

164. **Assertion(A):** Characters segregate while formation of gametes.

Reason(R): The recessive characters are only expressed in homozygous conditions.

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

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

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

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

165. **Assertion(A):** Mendel's laws were extended in the form of 'Chromosomal theory of inheritance'.

Reason(R): Mendel's law of independent assortment does not hold true for the genes that were located on the same chromosomes.

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

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

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

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

166. **Assertion(A):** 'Linked genes' located on the same chromosomes.

Reason(R): Closely located genes assorted together, and distantly located genes, due to recombination, assorted indendently.

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

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

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

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

167. **Assertion(A):** In humas, a normal female has sex chromosomes (XX) and male has sex chromosomes as (XY).

Reason(R): In chicke, sex chromosomes in male are ZZ and in females are ZW.

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

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

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

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

168. Sickle cell anaemia is:

(1) Caused by substitution of valine by glutamin acid in the beta globin chain of haemoglobin.

(2) Caused by a change in a single base pair of DNA.

(3) Characterized by elongated sickle like RBCs with a nulceus.

(4) An autosomal linked dominant trait.

169. Identify the wrong statement with reference to the gene 'I' that controls ABO blood groups.

(1) The gene (I) has three alleles

(2) Aperson willhave onl two of the three alleles.

(3) When I^A and I^B are present together, they express same type of sugar.

(4) Allele i does not produce any sugar.

170. Three children in a family have blood types O, AB and B respectively. What are the genotypes of gheir parents?

(1) I^A i and I^B i   (2) $I^A I^B$ and i i

(3) $I^B I^B$ and $I^A I^A$ (4) $I^A I^A$ and I^B i

171. Which of the following statements are correct?

(i) Haemophilia is a sex-linked recessive disease.

(ii) Down's syndrome is due to aneuploidy.

(iii) Phenylketonuria is an autosomal dominant gene disorder.

(iv) Phenylketonuria is an autosomal recessive gene disorder.

(v) Sickle-cell anaemia is an X-linked recessive gene disorder.

(1) i, iii and v   (2) i and iii

(3) ii and v   (4) i, ii and iv

172. Choose the correct statements given below regarding Mendelian inheritance.

(i) Mendel's experiments had small sample size which gave greater credibility to the data.

(ii) A true breeding line shows a stable trait inheritance and expression for several generations.

(iii) In a dissimilar pair of factors, one member of the pair dominantes over the other.

(iv) A recessive parental trait is expressed only in its heterozygous condition.

(v) Two alleles of a gene are located on homologous sites on homologous.

(1) ii only   (2) ii, iii and v

(3) i, iii and v   (4) i and v

173. Which of the following statements are the correct?

(i) Failure of segregation of chromatids during cell division results in aneuploidy.

(ii) Chromosomal disorders are mainly determined by alteration or mutation in a single gene.

(iii) Thalasemia and cystic fibrosis are Mendelian disorders.

(iv) Sickle cell anemia is an X-linked trait.

(v) Haemophilia is an autosome linked recessive disease.

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

(3) iii and iv   (4) ii and iii

174. Match column-I with column-II and select the correct option from the codes given below.

	Column-I		Column-II
A	Autosomal recessive trait	I	Down's synrome
B	Sex-linked recessive trait	II	Phenylketonuria
C	Metabolic error linked autosomal recessive	III	Haemophilia
D	Additional 21st chromosome	IV	Sickle cell anaemia

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

(2) A-IV, B-I, C-Ii, D-III

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

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

175. Match column-I with column-II and select the correct option from the codes given below.

	Column-I (Defination)		Column-II (Terms)
A	A single trait controlled by three or more than three alleles	I	Pleiotropy
B	A single trait controlled by three or more than three genes	II	Multiple alleles
C	A single gene exhibits multiple phenotypic expression	III	Polygenic inheritance

(1) A-II, B-III, C-I   (2) A-III, B-II, C-I

(3) A-I, B-II, C-III   (4) A-II, B-I, C-III

176. A mutation is a:

(1) Sudden temporary change in an organism's tentic material.

(2) Change in phenotype followed by a change in genotype

(3) Change in hereditary material directed by a changing environment.

(4) Change in genotype which may result in a new expression of a characteristic.

177. What proportion of offsprings obtained from corss AABBCC × AaBbCc will be completely heterozygous for all genes segregated independently?

(1) 1/8   (2) 1/4

(3) 1/2   (4) 1/16

178. A human male produces sperms with the genotypes AB, Ab, aB and ab pertaining to two di-allelic characters in equal proportions. What is the corresponding genotype of this person?

(1) AaBB   (2) AABb

(3) AABB   (4) AaBb

179. **Assertion(A):** In humans, the gamete contributed by the male ditermines whether the child produced will be male or female.

Reason(R): Sex in humans in a polygenic trait depending upon a cumulative effect of some genes on X-chromosome and some on Y-chromosome.

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

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

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

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

180. **Assertion(A):** Test cross is used to determine an unknown genotype within one breeding generation.

Reason(R): Test cross is a cross between F_1 hybrid and dominant parent.

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

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

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

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

ANSWER KEY

PHYSICS

Question No.	1	2	3	4	5	6	7	8	9	10
Answer	4	3	3	4	2	3	1	1	4	1
Question No.	11	12	13	14	15	16	17	18	19	20
Answer	4	1	2	4	2	3	3	3	2	1
Question No.	21	22	23	24	25	26	27	28	29	30
Answer	1	1	2	3	1	1	1	3	2	2
Question No.	31	32	33	34	35	36	37	38	39	40
Answer	1	2	1	2	2	4	1	2	3	4
Question No.	41	42	43	44	45					
Answer	3	3	3	4	2					

CHEMISTRY

Question No.	46	47	48	49	50	51	52	53	54	55
Answer	1	1	1	1	1	2	1	3	4	3
Question No.	56	57	58	59	60	61	62	63	64	65
Answer	4	3	4	2	3	2	1	2	1	1
Question No.	66	67	68	69	70	71	72	73	74	75
Answer	3	4	4	2	4	3	4	1	3	2
Question No.	76	77	78	79	80	81	82	83	84	85
Answer	2	1	3	4	2	2	4	1	4	1
Question No.	86	87	88	89	90					
Answer	4	1	1	1	1					

BIOLOGY

Question No.	91	92	93	94	95	96	97	98	99	100
Answer	4	2	4	2	3	4	2	1	4	4
Question No.	101	102	103	104	105	106	107	108	109	110
Answer	4	2	2	4	2	1	4	4	1	1
Question No.	111	112	113	114	115	116	117	118	119	120
Answer	4	2	4	1	2	1	2	4	3	4
Question No.	121	122	123	124	125	126	127	128	129	130
Answer	3	1	1	2	4	4	1	2	3	1
Question No.	131	132	133	134	135					
Answer	3	4	3	2	2					

BIOLOGY

Question No.	136	137	138	139	140	141	142	143	144	145
Answer	4	1	1	1	2	4	3	4	3	4
Question No.	146	147	148	149	150	151	152	153	154	155
Answer	1	2	1	3	1	2	1	2	4	2
Question No.	156	157	158	159	160	161	162	163	164	165
Answer	4	2	1	2	4	1	3	3	2	2
Question No.	166	167	168	169	170	171	172	173	174	175
Answer	1	2	2	3	1	4	2	1	3	1
Question No.	176	177	178	179	180					
Answer	4	1	4	3	3					