



NTPL

ALL INDIA TEST SERIES

CODE - A

TEST ID 001914

AIIMS - 2019

FULL TEST - 7

Time : 3^{1/2} Hours

Maximum Marks : 200

Please read the instructions carefully. You are allotted 5 minutes specifically for this purpose.

You are not allowed to leave the Examination Hall before the end of the test.

INSTRUCTIONS

1. This booklet is your Question Paper containing **200 questions**.
2. The test is of **3^{1/2} hours** duration. The question paper consists of **4 sections** (Physics, Chemistry, Biology & General Knowledge).
3. Each question carries **1 mark**. For each correct response the candidate will get **1 mark**. For each incorrect response, **-1/3 mark** will be deducted. The maximum marks are **200**.
4. Fill the bubbles completely and properly using a **Blue/Black Ball Point Pen** only.
5. No additional sheets will be provided for rough work.
6. Blank papers, clipboards, log tables, slide rules, calculators, cellular phones, pagers, and electronic gadgets in any form are not allowed to be carried inside the examination hall.
7. The answer sheet, a machine-readable Optical mark recognition sheet (OMR Sheet), is provided separately.
8. **DO NOT TAMPER WITH / MUTILATE THE OMR OR THE BOOKLET.**
9. Do not break the seals of the question-paper booklet before being instructed to do so by the invigilator.

Name of the Candidate (in Capitals) _____

Test Centre _____

Centre Code _____

Candidate's Signature _____

Invigilator's Signature _____

PHYSICS**SECTION – I**

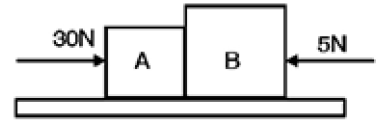
1. What is the fractional error in g calculated from $T = 2\pi\sqrt{\ell/g}$? Given fractional error in T and ℓ are ± 3 and ± 2 respectively?
- (a) 5 (b) 1 (c) 8 (d) 4
2. The dimensional formula of σb^4 (σ = stefan's constant and b = wein's constant) is
- (a) $[M^0 L^0 T^0]$ (b) $[M^1 L^4 T^{-3}]$ (c) $[M^1 L^{-2} T^1]$ (d) $[M^1 L^6 T^{-3}]$
3. The coordinates of a moving particle at any time t are given $x = 4t$ and $y = 2t^2$. The speed of the particle is
- (a) $4t + 2t^2$ (b) $4(1+t)$ (c) $4\sqrt{1-t^2}$ (d) $\sqrt{1+t^2}$
4. If \vec{a}_1 and \vec{a}_2 are two non collinear unit vectors and if $|\vec{a}_1 + \vec{a}_2| = \sqrt{3}$ then $(\vec{a}_1 - \vec{a}_2) \cdot (2\vec{a}_1 + \vec{a}_2)$ is
- (a) 2 (b) $\frac{3}{2}$ (c) $\frac{1}{2}$ (d) 1
5. A ball is dropped from the roof of a tower of height h . The total distance covered by it in the last second of its motion is equal to the distance covered by it in first three seconds. The value of h in meter is ($g = 10 \text{ m/s}^2$)
- (a) 125 (b) 200 (c) 100 (d) 80
6. A ball is released from the top of a tower of height h meters. It takes T second to reach the ground. What is the position of the ball at $\frac{T}{2}$ second
- (a) $\frac{h}{2}$ meters from the ground (b) $\frac{3h}{4}$ meters from the ground
(c) $\frac{h}{4}$ meters from the ground (d) $\frac{7h}{9}$ meters from the ground
7. In uniform circular motion
- (a) Velocity remains constant (b) Acceleration remains constant
(c) speed remains constant (d) none of above

8. A particle moves in circle of radius 50 cm at two revolutions per second. The acceleration of the particle in meter per second² is

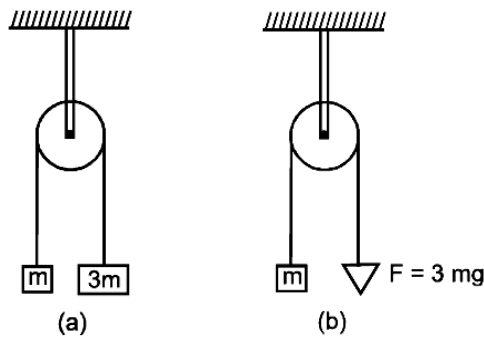
- (a) π^2 (b) $8\pi^2$ (c) $4\pi^2$ (d) $2\pi^3$

9. On a smooth plane surface (figure) two block A and B are accelerated up by applying a force 30 N on A and 5 N on B as shown in figure If mass of B is same as that of A, the force on B is

- (a) 30 N
 (b) 15 N
 (c) 17.5 N
 (d) 5 N

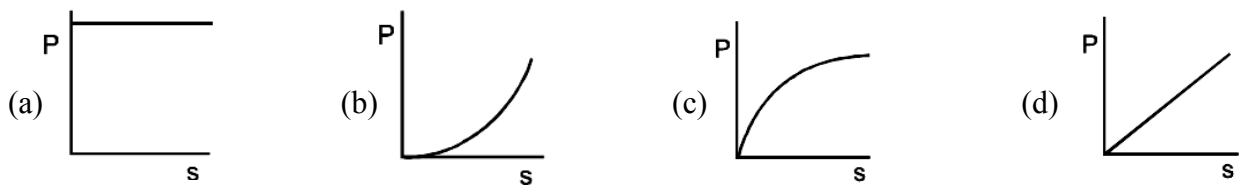


10. Two pulley arrangements of figure given are identical. The mass of the rope is negligible. In fig (a), the mass m is lifted by attaching a mass $3m$ to the other end of the rope. In fig (b), m is lifted up by pulling the other end of the rope with a constant downward force $F = 3mg$. The acceleration of m in the two cases are respectively

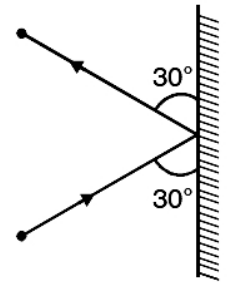


- (a) $3g, g$ (b) $g/2, 2g$ (c) $g/3, 2g$ (d) $g, g/3$

11. A motor drives a body along a straight line with a constant force. The power P developed by the motor must vary with distance s according to

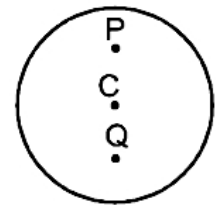


12. A 3 kg ball strikes a heavy rigid wall with a speed of 10m/s at an angle of 30° . It gets reflected with the same speed and angle as shown here. If the ball is in contact with the wall for 0.20s, what is the average force exerted on the ball by the wall?



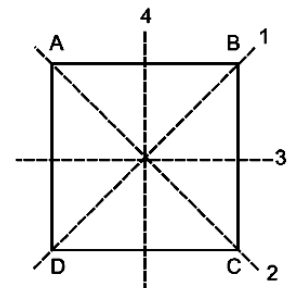
- (a) 150 N
- (b) Zero
- (c) $150\sqrt{3}N$
- (d) 300N

13. A disc is rolling (without slipping) on a horizontal surface. C is its centre and Q and P are two points equidistant from C. Let V_P , V_Q and V_C be the magnitude of velocities of points P, Q and C respectively, then



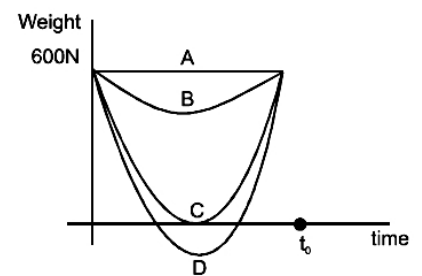
- (a) $V_Q > V_C > V_P$
- (b) $V_Q < V_C > V_P$
- (c) $V_Q = V_P, V_C = \frac{1}{2}V_P$
- (d) $V_Q < V_C < V_P$

14. The moment of inertia of a thin square plate ABCD of uniform thickness about given axis passing through will satisfy the condition



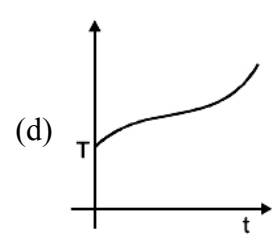
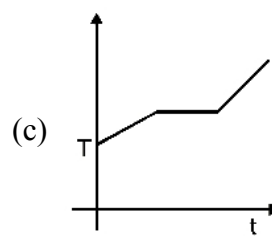
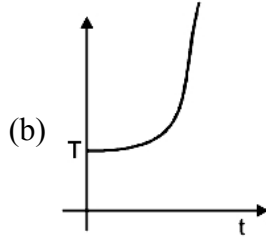
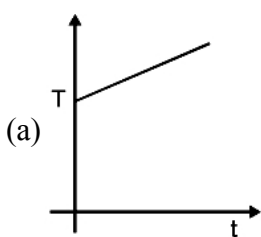
- (a) $I_1 \neq I_2$
- (b) $I_3 \neq I_4$
- (c) $I_1 = I_2 = I_3 = I_4$
- (d) $I_1 \neq I_2 \neq I_3 \neq I_4$

15. Suppose, the acceleration due to gravity at the Earth's surface is 10 ms^{-2} and at the surface of unknown planet (similar to earth) is also 10m/s^2 . A 60 kg passenger goes from the Earth to the unknown planet in a spaceship moving with a constant velocity. Neglect all other objects in the sky. Which part of figure best represents the weight (net gravitational force) of the passenger as a function of time?

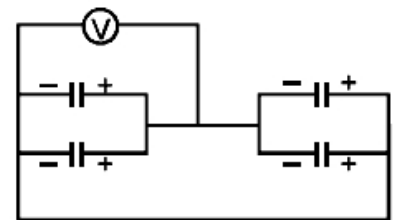


- (a) A
- (b) B
- (c) C
- (d) D

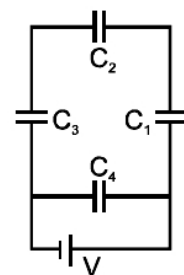
16. Two positive charge particles q_1 and q_2 ($q_1 > q_2$) and masses m_1 and m_2 ($m_1 < m_2$) are released from rest from a finite distance. They start under their mutual electrostatic repulsion.
- (a) acceleration of m_1 is more than that of m_2 .
 - (b) acceleration of m_2 is more than that of m_1 .
 - (c) centre of mass of system will remain at rest in all the reference frame
 - (d) total energy of system does not remain constant.
17. Water rises to a height of 5 cm in capillary tube and mercury falls to a depth of 2 cm in the same capillary tube. If the density of mercury is 13.6 and the angle of contact for mercury is 120° , the approximate ratio of surface tensions of water and mercury is (approximate)
- (a) 1 : 0.15
 - (b) 1 : 3
 - (c) 1 : 11
 - (d) 1.5 : 1
18. Magnus effect is based on.
- (a) Torricelli's theorem
 - (b) bernoulli's theorem
 - (c) law of gravitation
 - (d) conservation of linear momentum
19. An open and closed organ pipe have the same length. The ratio of fundamental mode of frequency of vibration of two pipes is.
- (a) 1 : 2
 - (b) 2 : 1
 - (c) 3 : 2
 - (d) 2 : 3
20. A child swinging on a swing in Standing position, sits down, then the time period of the swing will
- (a) increase
 - (b) decreases
 - (c) remains same
 - (d) increases of the child is long and decrease if the child is short
21. If ice at 1atmospheric pressure is heated from -40°C to 35°C water by supplying heat at constant rate. The graph of temperature vs time will be.



22. When two tuning forks (fork 1 and fork 2) are sounded simultaneously, 6 beats per second are heard. Now, some tape is attached on the prong of the fork 2. When the tuning forks are sounded again, 8 beats per second are heard. If the frequency of fork 1 is 200 Hz, then what was the original frequency of fork 2?
- (a) 202 Hz (b) 200 Hz (c) 204 Hz (d) 194 Hz
23. A sound absorber attenuates the sound level by 10 dB. The intensity decreases by a factor of
- (a) 100 (b) 1000 (c) 10000 (d) 10
24. If a dipole of dipole moment \vec{p} is placed in a uniform electric field \vec{E} then potential energy of it is given by.
- (a) $u = \vec{P} \cdot \vec{E}$ (b) $u = -\vec{P} \cdot \vec{E}$ (c) $u = |\vec{P} \times \vec{E}|$ (d) $u = -|\vec{P} \times \vec{E}|$
25. Which of the following is incorrect statement?
- (a) Electric field is always conservative
 (b) Electric field due to a varying magnetic field is non-conservative
 (c) Electric field due to stationary charge is conservative
 (d) none of above
26. The four capacitors, each of $10 \mu F$ are connected as shown in Fig. The dc voltmeter reads 100 V. The charge on each plate of capacitor is.



- (a) $\pm 2 \times 10^{-3} C$
 (b) $\pm 1 \times 10^{-3} C$
 (c) $\pm 1 \times 10^{-2} C$
 (d) $\pm 2 \times 10^{-2} C$
27. A network of four capacitor of capacity equal to $C_1 = C$, $C_2 = 2C$, $C_3 = 3C$ and $C_4 = 4C$ are connected to a battery as shown in the figure. The ratio of the charge on C_2 and charge given by battery is.



- (a) 4/7
 (b) 3/25
 (c) 7/4
 (d) 22/3

28. Two wires of same metal have the length in ratio 1: 3 but their cross section area in the ratio 3:1. They are joined in series. The resistance of the thicker wire is $10\ \Omega$. The total resistance of the combination is.

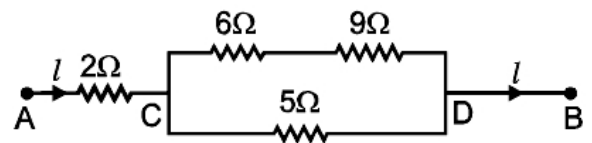
- (a) $5/2\ \Omega$ (b) $40/3\ \Omega$ (c) $100\ \Omega$ (d) $22/3\ \Omega$

29. A constant voltage is applied between the two ends of uniform metallic wire. Some heat is developed in it. The heat developed will be same.

- (a) both the length and radius of wire are halved (b) length is quadrupled and radius is doubled
 (c) the radius of wire of doubled (d) the length of the wire is doubled.

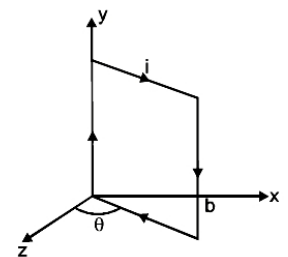
30. In the circuit shown in figure, the $5\ \Omega$ resistance develops $20.00\ \text{cal/s}$ due to the current flowing through it. The heat developed in complete network (in cal/s) is

- (a) 23.8
 (b) 40.9
 (c) 11.9
 (d) 7.1



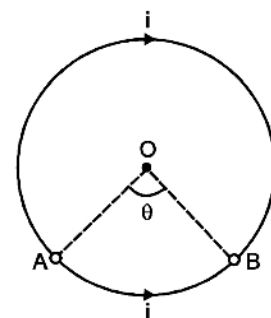
31. A rectangular loop ($a \times b$) carries a current i . A uniform magnetic field $\vec{B} = B_0 \hat{i}$ exists in space. Then which of the statement is wrong.

- (a) torque on the loop is $iabB_0 \sin \theta$
 (b) torque on the loop is in negative y - direction
 (c) if allowed to move the loop turn so as to increase θ
 (d) if allowed to move the loop turn so as to decrease θ

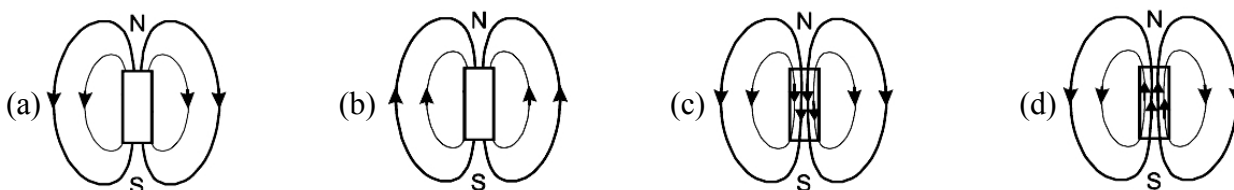


32. Equal current i flows in two segments of a circular loop in the directions shown in figure. Radius of the loop is a . Magnetic field at the centre of the loop is

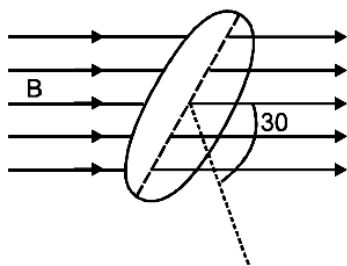
- (a) zero
 (b) $\left(\frac{\pi - \theta}{\pi}\right) \frac{\mu_0 i}{2a}$
 (c) $\left(\frac{2\pi - \theta}{\pi}\right) \frac{\mu_0 i}{2a}$
 (d) $\left(\frac{\theta}{2\pi}\right) \frac{\mu_0 i}{2a}$



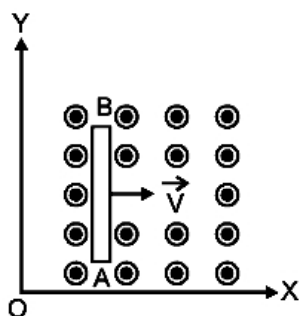
33. According to Curie's law magnetic susceptibility is related with absolute temperature T as
 (a) $\chi_m \propto T$ (b) $\chi_m \propto 1/T^2$ (c) $\chi_m \propto 1/T$ (d) $\chi_m \propto T^3$
34. The magnetic field lines due to a bar magnetic are correctly shown in



35. Fig represents an area $A = 1\text{m}^2$ situated in a uniform magnetic field $B = 2.0$ weber/ m^2 and making an angle of 30° with respect to magnetic field. The value of the magnetic flux through the area would be equal to



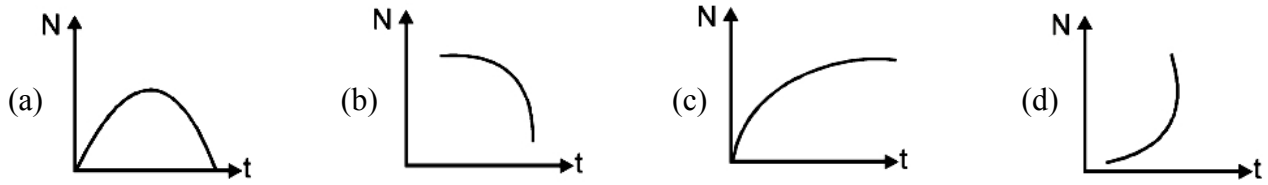
- (a) 2.0 weber (b) $\sqrt{3}$ weber (c) $\sqrt{3}/2$ weber (d) 0.5 weber
36. A conducting rod AB of length l moves with constant speed v parallel to X-axis in a uniform magnetic field of strength B , pointing in the positive Z-direction. The potential difference between A and B would be



- (a) $V_A - V_B = Bvl$ (b) $V_A - V_B = -Bvl$ (c) $V_A - V_B = 0$ (d) $V_A - V_B = Bvl/2$
37. Series RLC circuit at resonance known as
 (a) Rejector circuit (b) Acceptor circuit
 (c) Rejector if resonance frequency is high (d) Acceptor circuit if resonance frequency is low.

38. An inductance L ($2H$) having a resistance R (4Ω) is connected to an alternating source of angular frequency ω (10 rad/s) The Quality factor Q of inductance is
 (a) 80 (b) 20 (c) 5 (d) 8

39. Radioactive element decays to form a stable nuclide, then decayed nuclide (N) versus time (t) graph will be



40. A nuclear reaction is given by ${}_z X^A \rightarrow {}_z X^A + \text{energy}$, represents
 (a) fission (b) γ -decay (c) σ -decay (d) fusion

Directions: In the following questions (41-60), a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:

- (a) If both assertion and reason are true and reason is the correct explanation of assertion.
 (b) If both assertion and reason are true but reason is not the correct explanation of assertion.
 (c) If assertion is true but reason is false.
 (d) If both assertion and reason are false.

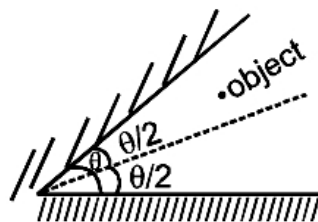
41. **Assertion:** For a prism refracting angle 60° and refractive index $\sqrt{2}$, minimum deviation is 30°

Reason: At minimum deviation, $r_1 = r_2 = \frac{A}{2} = 30^\circ$

42. **Assertion:** Radius of curvature of a convex mirror is 20 cm. If a real object is placed at 10 cm from pole of the mirror, image is formed at infinity.

Reason: When object placed at focus, its image is formed at infinity

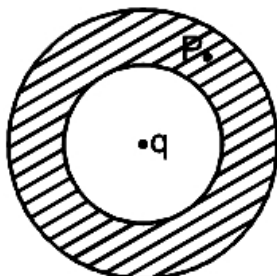
43. **Assertion:** If the angle between the two plane mirror is 60° and the object is asymmetrically placed between the two mirrors, then 5 images of the object will be formed.



Reason: For given system of mirror the total number of image formed due to successive reflection is either $\frac{360^\circ}{\theta}$ or $\frac{360^\circ}{\theta} - 1$ accordingly as $\frac{360^\circ}{\theta}$ is odd even respectively.

44. **Assertion:** A charge q is placed at the centre of a metallic shell as shown in figure. Electric field at point P on the shell due to charge q is zero.

Reason: Net electric field in a conductor under electrostatic conditions is zero.



45. **Assertion:** If the distance between parallel plates of a capacitor is halved and dielectric constant is made 3 times, then the capacitance becomes 6 times

Reason: Capacitance of the capacitor does not depend upon the nature of the material of the plates of the capacitor.

46. **Assertion:** Voltmeter is much better than a potentiometer for measuring emf of cell.

Reason: Potentiometer draws no current while measuring emf of a cell.

47. **Assertion:** We can measure the potential barrier of a PN junction by putting a sensitive voltmeter across its terminals.

Reason: The current through the PN junction is not same in forward and reversed bias.

48. **Assertion:** Nuclear energy is due to the difference in the sum of the masses of the component nucleons and the nucleus.

Reason: The mass of the nucleus is more than the sum of the masses of the component nucleons.

49. **Assertion:** Amongst alpha, beta and gamma rays, α -particle has maximum penetrating power.

Reason: The alpha particle is heavier than beta and gamma rays.

50. **Assertion:** Chock coil is preferred over a resistor to adjust current in an ac circuit.

Reason: Power factor for inductance is zero.

51. **Assertion :** Short wave communication over long distance is not possible via ground waves.

Reason : The ground waves can bend round the corners of the objects on earth.

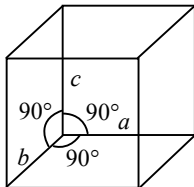
52. **Assertion :** The edges of the images of white object formed by a concave mirror on the screen appear white.
Reason : Concave mirror does not suffer from chromatic aberration.
53. **Assertion :** The relative velocity between any two bodies moving in opposite direction is equal to sum of the velocities of two bodies.
Reason : Sometimes relative velocity between two bodies is equal to difference in velocities of the two bodies.
54. **Assertion :** Current is passed through a metallic wire so that it becomes red hot. When cold water is poured on half of its portion, the rest of the half portion becomes more hotter.
Reason : Resistance decreases due to decrease in temperature.
55. **Assertion :** Long distance transmission of a.c. is carried out at extremely high voltages.
Reason : Because when the distance is large, voltage has to be large.
56. **Assertion :** A body subject to three concurrent forces may be in equilibrium.
Reason : For equilibrium the sum of all the concurrent forces acting at a point should be zero.
57. **Assertion :** A quick collision between two bodies is more violent than a slow collision, even when the initial and the final velocities are identical.
Reason : The rate of change of momentum is greater in the first case.
58. **Assertion :** The ratio for time taken for light emission from an atom to that for release of nuclear energy in fission is 1: 100.
Reason : Time taken for the light emission from an atom is of the order of 10^{-8} s.
59. **Assertion :** The resistance of a junction of a spoiled transistor is low when forward biased or reverse biased.
Reason : The resistance of a junction of a transistor in working order is high always.
60. **Assertion :** A charged particle free to move in an electric field always moves along an electric field line.
Reason : The electric field lines diverge from a negative charge and converge at a positive charge.

CHEMISTRY

SECTION – II

61. The unit cell with the given structure represents _____ crystal system.

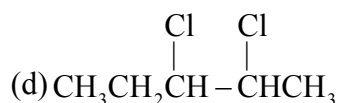
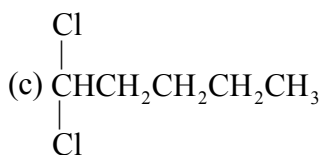
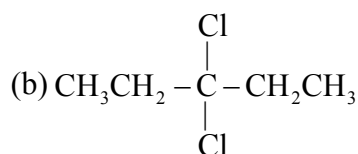
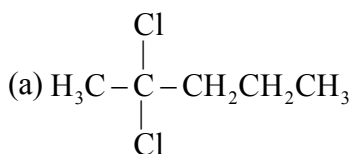
- (a) cubic
 (b) orthorhombic
 (c) tetragonal
 (d) trigonal



62. In electrorefining, the impure metal is made

- (a) anode
 (b) cathode
 (c) anode or cathode
 (d) electrolyte.

63. A compound (A) $C_5H_{10}Cl_2$ on hydrolysis gives $C_5H_{10}O$ which reacts with NH_2OH , forms iodoform but does not give Fehling's test. (A) is




64. In *hcp* arrangement, the coordination number is

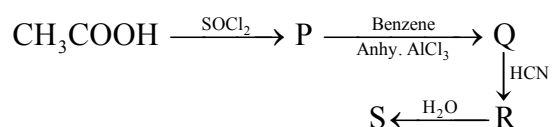
- (a) 6
 (b) 12
 (c) 8
 (d) 10

65. Which of the following statements is not true?

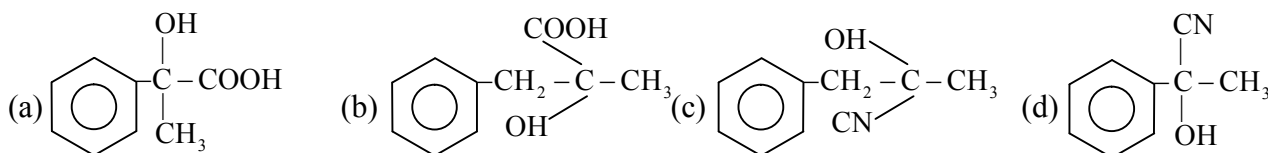
- (a) Paramagnetic substances are weakly attracted by a magnetic field.
 (b) Ferromagnetic substances cannot be magnetised permanently.
 (c) The domains in antiferromagnetic substances are oppositely oriented with respect to each other.
 (d) Pairing of electrons cancels their magnetic moments in the diamagnetic substances.

66. Which property of halogen acids indicated below is incorrect?
- (a) $\text{HF} > \text{HCl} > \text{HBr} > \text{HI}$ (acidic strength) (b) $\text{HI} > \text{HBr} > \text{HCl} > \text{HF}$ (reducing strength)
 (c) $\text{HI} > \text{HBr} > \text{HCl} > \text{HF}$ (bond length) (d) $\text{HF} > \text{HCl} > \text{HBr} > \text{HI}$ (thermal stability)
67. Aqueous solution of nickel sulphate on treating with pyridine and then adding a solution of sodium nitrate gives dark blue crystals of
- (a) $[\text{Ni}(\text{py})_4]\text{SO}_4$ (b) $[\text{Ni}(\text{py})_2(\text{NO}_2)_2]$
 (c) $[\text{Ni}(\text{py})_4](\text{NO}_2)_2$ (d) $[\text{Ni}(\text{py})_3(\text{NO}_2)]_2\text{SO}_4$
68. *m*-Chlorobenzaldehyde on reaction with concentrated KOH at room temperature gives
- (a) potassium *m*-chlorobenzoate and *m*-hydroxybenzaldehyde
 (b) *m*-hydroxybenzaldehyde and *m*-chlorobenzyl alcohol
 (c) *m*-chlorobenzyl alcohol and *m*-hydroxybenzyl alcohol
 (d) potassium *m*-chlorobenzoate and *m*-chlorobenzyl alcohol.
69. Which of the following decreases on dilution of electrolyte solution?
- (a) Equivalent conductance (b) Molar conductance
 (c) Specific conductance (d) Conductance
70. Germanium is an example of
- (a) intrinsic semiconductor (b) *n*-type semiconductor
 (c) *p*-type semiconductor (d) insulator.
71. Which of the following synthesis gives 3-methyl-1-hexanol?
- (a) 2-Bromohexane $\xrightarrow[\text{dry ether}]{\text{Mg}}$ $\xrightarrow[\text{(ii) H}_3\text{O}^+]{\text{(i) HCHO}}$
- (b) 2-Bromopentane $\xrightarrow[\text{dry ether}]{\text{Mg}}$ $\xrightarrow[\text{(ii) H}_3\text{O}^+]{\text{(i) $
- (c) 3-Bromopentane $\xrightarrow[\text{dry ether}]{\text{Mg}}$ $\xrightarrow[\text{(ii) H}_3\text{O}^+]{\text{(i) CH}_3\text{CHO}}$
- (d) 1-Bromobutane $\xrightarrow[\text{dry ether}]{\text{Mg}}$ $\xrightarrow[\text{(ii) H}_3\text{O}^+]{\text{(i) CH}_3\text{COCH}_3}}$

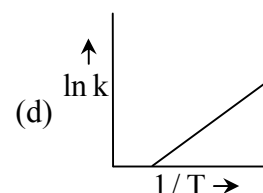
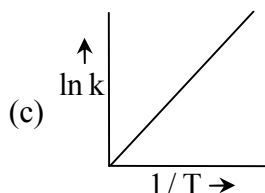
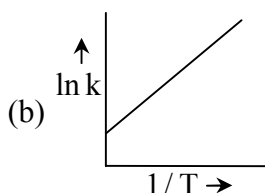
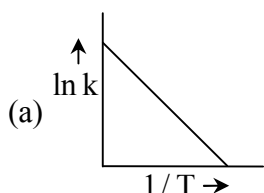
72. Non-reducing sugar is
 (a) maltose (b) sucrose (c) lactose (d) none of these.
73. The electrode potential of oxidation half cell
 (a) is independent of the concentration of ions in the cell
 (b) decreases with decreased concentration of ions in the cell
 (c) decreases with increased concentration of ions in the cell
 (d) none of these.
74. In a close packed structure of mixed oxides, the lattice is composed of oxide ions, one-eighth of tetrahedral voids are occupied by divalent cations 'A' while one-half of octahedral voids are occupied by trivalent cations 'B'. The formula of the oxide is
 (a) A_2BO_4 (b) AB_2O_3 (c) AB_2O_3 (d) AB_2O_4
75. Which of the following is not an actinide?
 (a) Uranium (b) Curium (c) Californium (d) Erbium
76. Copper is extracted from copper pyrites ore by heating in a blast furnace. The method is based on the principle that
 (a) copper has more affinity for oxygen than sulphur at high temperature
 (b) iron has more affinity for oxygen than copper at high temperature.
 (c) sulphur has less affinity for oxygen at high temperature
 (d) copper has less affinity for oxygen than sulphur at high temperature.
77. Alcohols can be converted to various types of gasoline (petrol) by shape-selective catalysts
 (a) Maltase (b) ZSM-5
 (c) Lindlar's catalyst (d) Ziegler Natta catalyst.
78. In a set of reactions, acetic acid yields a product S.



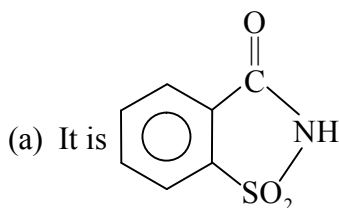
The compound S would be



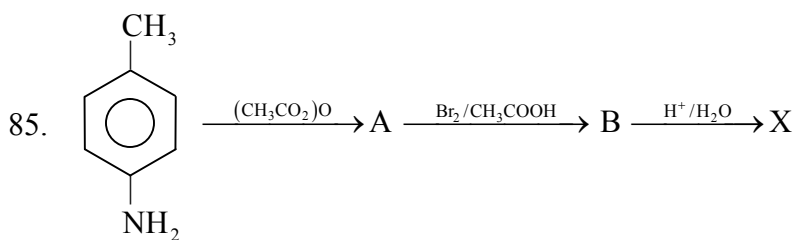
79. The element with atomic number 33 belongs to
 (a) group 13 (b) group 14 (c) group 15 (d) group 16.
80. For H_3PO_3 and H_3PO_4 the correct choice is
 (a) H_3PO_3 is dibasic and reducing (b) H_3PO_3 is dibasic and non-reducing
 (c) H_3PO_4 is tribasic and reducing (d) H_3PO_4 is tribasic and non-reducing.
81. According to Arrhenius equation, rate constant k is equal to $Ae^{-E_a/RT}$. Which of the following options represents the graph of $\ln k$ vs $\frac{1}{T}$?



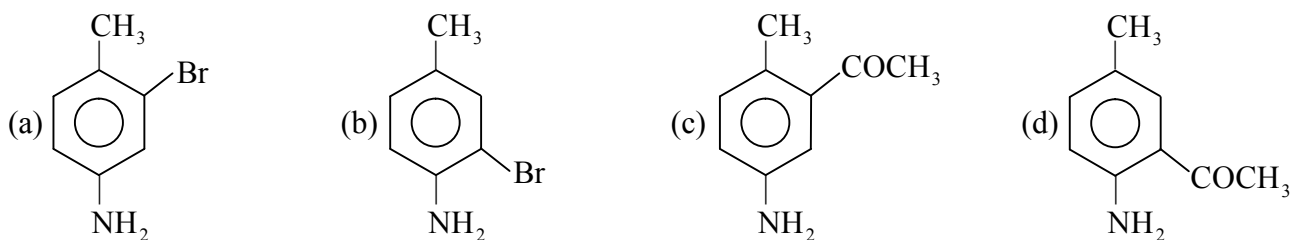
82. Among the electrolytes Na_2SO_4 , CaCl_2 , $\text{Al}_2(\text{SO}_4)_3$ and NH_4Cl , the most effective coagulating agent for Sb_2S_3 sol is
 (a) Na_2SO_4 (b) CaCl_2 (c) $\text{Al}_2(\text{SO}_4)_3$ (d) NH_4Cl
83. Which is correct about saccharin?



- (b) It is 600 times sweeter than sugar.
 (c) It is used as sweetening agent.
 (d) All of these.
84. In which mode of expression, the concentration of solution remains independent of temperature?
 (a) Normality (b) Formality (c) Mole fraction (d) Molarity



What is X?



86. The order of reactivities of the following alkyl halides for an S_N2 reaction is
- (a) $RF > RCl > RBr > RI$ (b) $RF > RBr > RCl > RI$
 (c) $RCl > RBr > RF > RI$ (d) $RI > RBr > RCl > RF$
87. Gabriel phthalimide reaction is used for the preparation of _____ amines.
- (a) primary aromatic (b) secondary (c) primary aliphatic (d) tertiary
88. $CH_3CHO + HCHO \xrightarrow[\text{Heat}]{\text{dil. NaOH}} A \xrightarrow[\text{H}_3\text{O}^+]{\text{HCN}} B$
- The structure of compound B is
- (a) $CH_2 = CH - \underset{\text{OH}}{\text{CH}} - COOH$ (b) $CH_2 = CH - \underset{\text{CN}}{\text{CH}} - OH$
 (c) $CH_3CH_2 - \underset{\text{OH}}{\text{CH}} - COOH$ (d) $CH_3 - \underset{\text{OH}}{\text{CH}} - COOH$
89. Drugs which bind strongly to the active site of an enzyme and do not depend upon concentration of natural substrate are called as
- (a) competitive inhibitors (b) non-competitive inhibitors
 (c) β -blockers (d) α -blockers.
90. Tincture of iodine is
- (a) aqueous solution of I_2 (b) alcoholic solution of I_2
 (c) solution of I_2 in aqueous KI (d) aqueous solution of KI.
91. Which of the following cannot show linkage isomerism?
- (a) NO_2^- (b) SCN^- (c) CN^- (d) NH_3
92. The oxidation of central atom in the complex $[Co(NH_3)_4ClNO_2]$ is
- (a) +2 (b) +3 (c) +1 (d) zero.

93. Which of the following are intermediates in the reaction of excess of CH_3MgBr with $\text{C}_6\text{H}_5\text{COOC}_2\text{H}_5$ to make 2-phenyl-2-propanol?
- A. $\text{C}_6\text{H}_5 - \overset{\text{OMgBr}}{\underset{\text{CH}_3}{\text{C}}} - \text{OC}_2\text{H}_5$ B. $\text{C}_6\text{H}_5 - \overset{\text{O}}{\parallel}{\text{C}} - \text{CH}_3$ C. $\text{C}_6\text{H}_5 - \overset{\text{OMgBr}}{\underset{\text{CH}_3}{\text{C}}} - \text{CH}_3$
- (a) A and B (b) A, B and C (c) A and C (d) B and C
94. Acetic acid is obtained when
- (a) methyl alcohol is oxidised with potassium permanganate
 (b) calcium acetate is distilled in the presence of calcium formate
 (c) acetaldehyde is oxidised with potassium dichromate and sulphuric acid
 (d) glycerol is heated with sulphuric acid.
95. In α -helix structure, polypeptide chains are folded in a
- (a) right hand side (b) left hand side
 (c) both way (d) none of these.
96. The electrode potential is the tendency of metal
- (a) to gain electrons (b) to lose electrons
 (c) to either lose or gain electrons (d) none of these.
97. Transition elements exhibit higher enthalpies of atomization because
- (a) of large number of unpaired electrons (b) of having stronger interatomic interaction
 (c) of strong bonding between atoms (d) all of these.
98. Which of the following is a monomer of natural rubber?
- (a) Chloroprene (b) Caprolactam
 (c) Urea (d) None of these
99. The compound which reacts fastest with Lucas reagent at room temperature is
- (a) butan-1-ol (b) butan-2-ol
 (c) 2-methylpropan-1-ol (d) 2-methylpropan-2-ol
100. Bakelite is obtained from phenol by reaction with
- (a) HCHO (b) $(\text{CH}_2\text{OH})_2$ (c) CH_3CHO (d) CH_3COCH_3

Directions: In the following questions (101-120), a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:

- (a) If both assertion and reason are true and reason is the correct explanation of assertion.
(b) If both assertion and reason are true but reason is not the correct explanation of assertion.
(c) If assertion is true but reason is false.
(d) If both assertion and reason are false.

101. **Assertion:** Solids have definite volume and shape.

Reason: In solids, the constituent particles are very close to each other and there is not much freedom of movement.

102. **Assertion:** On heating, a solid usually changes to a liquid and the liquid on further heating changes to the gaseous state.

Reason: Arrangement of constituent particles is different in solid, liquid and gaseous state.

103. **Assertion:** In Rutherford's α -particle scattering experiment, most of the α -particles were deflected by nearly 180° .

Reason: The positive charge of the atom is spread throughout the atom that repelled and deflected the positively charge α -particles.

104. **Assertion:** All the isotopes of a given element show same chemical behaviour.

Reason: Isotopes have different number of neutrons present in the nucleus.

105. **Assertion:** Dipole moment of NH_3 is greater than that of NF_3 .

Reason: Nitrogen is more electronegative than fluorine.

106. **Assertion:** In NH_3 , N is sp^3 hybridised but bond angle is 107° .

Reason: Shape of NH_3 molecule is trigonal pyramidal.

107. **Assertion:** Boiling point of *p*-nitrophenol is greater than that of *o*-nitrophenol.

Reason: There is intramolecular hydrogen bonding in *p*-nitrophenol and intermolecular hydrogen bonding in *o*-nitrophenol.

108. **Assertion:** Dipole-dipole forces acting between the molecules possessing permanent dipole, are weaker than ion-ion interactions.

Reason: The attractive forces decrease with the increase of distance between the dipoles.

109. **Assertion:** At constant temperature PV vs P plot for real gases is not a straight line.

Reason: In the curves of dihydrogen and helium, as the pressure increases the value of PV also increases.

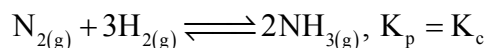
110. **Assertion:** In adiabatic system, $\Delta U = W_{ad}$.

Reason: In adiabatic system, no transfer of heat takes place.

111. **Assertion:** There is no change in internal energy in a cyclic process.

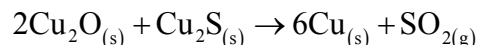
Reason: Internal energy is a state function.

112. **Assertion:** For the reaction :



Reason: Concentration of gaseous reactants and products is taken as unity.

113. **Assertion:** In the reaction,



copper acts as a reductant and sulphur acts as an oxidant.

Reason: The given reaction is not a redox reaction.

114. **Assertion:** In atomic form hydrogen consists of one proton and one electron.

Reason: In elemental form hydrogen exists as a diatomic molecule and is called dihydrogen.

115. **Assertion:** Dihydrogen is inert at room temperature.

Reason: The H – H bond dissociation enthalpy is the highest for a single bond between two atoms of any element.

116. **Assertion:** Lithium resembles magnesium diagonally placed in next group.

Reason: The size of Li^+ and Mg^{2+} are different and their electropositive character is same.

117. **Assertion:** In diborane, each B atom is sp^3 hybridised.

Reason: In diborane, the terminal 2-centre-2-electron B–H bonds are called banana bonds.

118. **Assertion:** The order of stability of carbocations is $3^\circ > 2^\circ > 1^\circ$.

Reason: Carbon atom in carbocation is in sp^3 state of hybridisation.

119. **Assertion:** Wurtz reaction is not preferred for the preparation of alkanes containing odd number of carbon atoms.

Reason: It is not possible to prepare alkanes with odd number of carbon atoms through Wurtz reaction.

120. **Assertion:** Cyclopentadienyl anion is aromatic in nature.

Reason: Cyclopentadienyl anion has six π electrons.

BIOLOGY**SECTION – III**

121. Groups Contain Aiginsare?
(a) rhodophyceae & chlorophyceae (b) phcophyceae and chlorophyceae
(c) only pheophyceae (d) rhodo and pheophyceae
122. Which of the following is not a product of Plants:
(a) opium (b) cannabinoids (c) DDT (d) cocaine
123. Human Menstrual Cycle Control by Hormone Secreted & release by:
(a) ovaries (b) uterus
(c) pituitary gland and ovaries (d) pituitary gland and uterus
124. GnRH Hormone is Transported to Anterior Pituitary Gland By?
(a) hypothalamic nuclei (b) lymphatic vessels
(c) bloodvessels (d) axons
125. Barr body is absent in?
(a) Turners syndrome (b) Klinefelter's (c) Huntington's (d) cystic fibrosis
126. Parkinsons disease is caused due to deficiency of:
(a) Dopamine (b) Norepinephrine (c) Serotonin (d) Acetylcholine
127. Denitrification in soil is caused by:
(a) Nitrosomonas (b) Nitrobacter
(c) Nitrococcus (d) Pseudomonasrificans
128. Viticulture is the growing of:
(a) Grapes (b) Oranges (c) Banana (d) Apple
129. In the R.H whittaker system of classification, which are not given any place:
(a) Viruses, viroids (b) Protists (c) Fungi (d) Bacteria
130. Closed circulatory system originated from:
(a) Annelids (b) Arthropods (c) Echinoderms (d) Flat worms
131. Ribosomal RNA synthesis takes place in:
(a) Nucleoplasm (b) Nucleus (c) Cytoplasm (d) Mitochondria

132. Most of the cell organelles are synthesized and assembled in:
(a) G1 (b) G2 (c) S (d) M
133. Silencing of RNA involves:
(a) mRNA (b) tRNA (c) RNA-i (d) rRNA
134. Which is not a restriction enzyme:
(a) Chitinase (b) EcoRJ (c) BamH1 (d) BamH2
135. Double fertilization is a feature of:
(a) Angiosperms (b) Gymnosperms (c) Algae (d) Pteridophytes
136. Which part is eaten in mango:
(a) Mesocarp (b) Endocarp (c) Endosperm (d) Aril
137. Enzyme transferring phosphate group from ATP to protein:
(a) ATPase (b) Protein kinase (c) Phosphatase. (d) Phosphorylase
138. First stable product of C3 cycle:
(a) 3-PGA (b) Oxalic acid (c) Citric acid (d) Acetic acid
139. Which helps in nitrogen fixing in cyanobacteria:
(a) Heterocyst (b) Heterospore (c) Algin (d) Carageen
140. Spring wood is:
(a) Light colour and less density (b) Light colour and high density
(c) Dark colour and less density (d) Dark colour and high density
141. In primary endosperm nucleus, which 3 nucleus fuse together:
(a) 2 polar nuclei and 1 male gamete (b) 2 synergid and 1 egg
(c) 2 polar nuclei and 1 antipodal (d) 2 male gamete and 1 synergid
142. Enzyme which is not used In biotech:
(a) Endonuclease (b) Exonuclease (c) Catalase (d) Ligase
143. Coralloid roots is present in:
(a) Spirullina (b) Cycas (c) Pteris (d) Sphagnum
144. Arrange the steps of amplification of DNA in r-DNA technology:
1. annealing, 2. primer addition, 3. denaturation. 4. extension
(a) 1234 (b) 3214 (c) 2314 (d) 2134

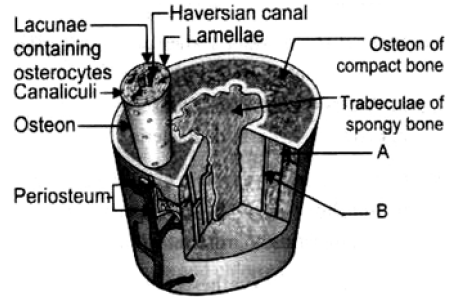
145. Which component of cell membrane would function to reduce water permeability?
- (a) Sphingolipid (b) Glycerol
(c) Cholesterol (d) Transmembrane protein
146. What is not true about C₄ plants?
- (a) They show a response to high light intensities (b) They show Kranz anatomy
(c) Calvin pathway takes place in mesophyll cells (d) Show greater productivity of biomass
147. Which of the following diagrams correctly represents a palindrome sequence?
- (a) 5'-----GAATTC-----3'
3'-----AGGCCT-----5'
- (b) 5'-----GAATTC-----3'
3'-----CTTAAG-----5'
- (c) 5'-----GAATTC-----3'
3'-----TTAAGC-----5'
- (d) 5'-----GAATTC-----3'
3'-----CTTAGA-----5'
148. Match the following:
- | | |
|------------------|---------------------------|
| a. Statins | 1. Clostridium botulinum |
| b. Acetic acid | 2. Monascus purpureus |
| c. Cyclosporin A | 3. Trichoderma Polysporum |
| d. Butyric Acid | 4. Acetobacter aceti |
- (a) a2,b4,c3,d1 (b) a4, b3, c2, d1 (c) a1,b2,c3,d4 (d) a3,b4,c1,d2
149. Which of the following is used as a bioweapon?
- (a) Agrobacterium tumefaciens (b) Bacillus thuringiensis
(c) Pentalandra brazzeana (d) Bacillus anthracis
150. Hind brain is the centre for:
- (a) Auditory and visual reflexes (b) Voluntary and involuntary movements
(c) Pneumotaxis and apneustic centre (d) Temperature, appetite and satiety centre
151. Match the following:
- | | |
|-------------|---|
| a. Zeatin | 1. Seed dormancy |
| b. IAA | 2. Ripening of Fruits |
| c. Ethylene | 3. Initiate Lateral and Adventitious Shoots |
| d. ABA | 4. Apical Dominance |
- (a) A4,B3,C1,D2 (b) A2, B3, C4,D1 (c) A3.B4.C2.D1 (d) A1, B3.C4, D2

152. Match the column:

- | | |
|----------------|---|
| a. XENOLOGY | 1. Transfer of pollen grain from anther to stigma of another flower of same plant |
| b. AUTOLOGY | 2. Transfer of pollen grain from anther to stigma of different plant |
| c. CLEISTOGAMY | 3. Transfer of pollen grain from anther to stigma of same flower |
| d. GEITONOLOGY | 4. Flowers are invariably autogamous which do not open at all |
- (a) A4.B3,C1,D2 (b)(A3, B2, C1, D4 (c) A2, B3, C4, D1 (d) A1, B3, C4, D2

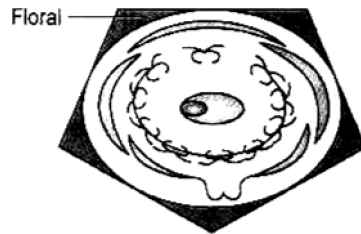
153. Name the structures A and B:

- (a) Haversian canal and Volkmann canal
 (b) Volkmann canal and Haversian canal
 (c) Longitudinal and horizontal artery
 (d) Schlemm's canal and Haversian canal



154. Which family is represented by the following diagram:

- (a) $\% \overset{\uparrow}{\underset{\downarrow}{\text{K}}}_{2+2} \text{C}_4 \text{A}_{2+4} \underline{\text{G}}_{(2)}$
 (b) $\oplus \overset{\uparrow}{\underset{\downarrow}{\text{K}}}_5 \text{C}_{1+2+2} \text{A}_{g+1} \underline{\text{G}}_{(1)}$
 (c) $\oplus \overset{\uparrow}{\underset{\downarrow}{\text{K}}}_{2+2} \text{C}_4 \text{A}_{2+4} \underline{\text{G}}_{(2)}$
 (d) $\oplus \overset{\uparrow}{\underset{\downarrow}{\text{K}}}_{2+2} \text{C}_3 \text{A}_{2+4} \underline{\text{G}}_{(2)}$



155. Breakdown of glucose in liver is stimulated by:

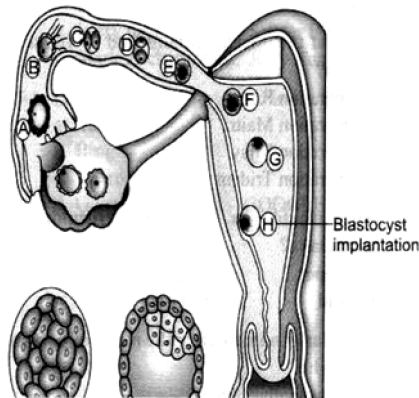
- (a) Adrenaline (b) Glucagon (c) Insulin (d) Both a and b

156. Plant group with unique feature of double fertilization:

- (a) Angiosperms (b) Angiosperms and Pteridophytes
 (c) Gymnosperms and Pteridophytes (d) Gymnosperms and Angiosperm

157. Which stage is represented by E in diagram?

- (a) Blastocyst
 (b) Morula
 (c) Zygote
 (d) Graafian follicle



158. Match

- (a) Eutrophication burn at hightemperature
 (b) Biomagnification increase in toxicity at successive trophic level
 (c) Incineration natural aging of a lake
 (d) Cultural eutrophication increase in temperature of a lake due to industrial pollution
- (a) a-1, b-2, c-3, d-4 (b) a-3, b-2, c-1, d-4 (c) a-4, b-2, c-1, d-3 (d) a-2, b-3, c-1, d-3

159. Which of the following are the same set?

- (a) Cytosine, uracil, thymine (b) Adenine, guanine, uracil
 (c) Glycine, alanine, serine (d) Guanine, uracil, glycine

160. What happens when the RH' blood of the foetus get in posed to the RH -ve blood of the mother?

- (a) Foetus starts preparing antibodies
 (b) Mother starts preparing antibodies against RH antigen in her blood
 (c) Foetus starts preparing antigens
 (d) no change

Directions: for Q. No. 161 to 180: These questions consist of two statements each, printed as Assertion and Reason. While answering these Questions you are required to choose any one of the following four responses.

- (a) If both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.
 (b) If both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.
 (c) If Assertion is True but the Reason is False
 (d) If both Assertion & Reason are false.

161. **Assertion:** Darwin finches are a good example of natural selection

Reason: Different beaks evolved due to different food eating habits and needs.

162. **Assertion:** GM crops face resistance from people

Reason: They cause allergies and make pathogens more resistant

163. **Assertion:** Adrenaline acts almost immediately after injection while thyroxine does not

Reason: Thyroxine acts on many enzymes

164. **Assertion:** Vernalization promotes flowering in plants.

Reason: Gymnosperms do not flower because there is no vernalization.

165. **Assertion:** Ribosomes perform protein synthesis.

Reason: Ribosomes are membrane bound organelle.

166. **Assertion:** Somatic hybrids cannot be produced without genetic engineering.
Reason: Apomictic seeds are produced through mutation breeding.
167. **Assertion:** In normal pregnancy increased white blood count is observed.
Reason: The elevated white blood will count is caused due to neutrophil leukocytosis.
168. **Assertion:** In pregnancy, WBC increases in number in blood.
Reason: There is an increase in the amount of glucocorticoids in blood during pregnancy.
169. **Assertion:** Cimetidine is an antacid drug.
Reason: Cimetidine promotes the interaction of histamine with the receptors of the stomach wall.
170. **Assertion:** Whitaker introduced 5 kingdom classification.
Reason: He included-virus, viroids, lichens in the system of classification on the basic of cell structure mode of nutrition and reproduction.
171. **Assertion:** The mimic viceroy butterfly and the model monarch butterfly are said to exhibit batesian mimicry.
Reason: Both the mimic and the model looks similar and are also distasteful.
172. **Assertion:** Gross primary productivity is always more than net primary productivity. Reason: Heterotrophs exhibit secondary production.
173. **Assertion:** Coral reef are equivalent to tropic rain forest.
Reason: Maximum diversity of Biota occurs in the reefs.
174. **Assertion:** Ex situ conservations is the conservation of rare plants and animals by horticulturists, agriculturist and others
Reason: Ginkgo tree has been conserved by this method.
175. **Assertion:** Storage of seeds at low temperature is possible.
Reason: Respiration and enzymatic activity are not shown by seeds at low temperature.
176. **Assertion:** Water pollution is measured in terms of BOD.
Reason: BOD measures all oxygen consuming pollutants in water.
177. **Assertion:** Methylmercury is a highly persistant kind of pollutant that accumulates in food chain.
Reason: Mercury pollution is responsible for Minamata disease.
178. **Assertion:** Atavism is the reappearance of disappeared ancestral character.
Reason: Third molars and hair on body are examples of Atavism.
179. **Assertion:** Ctenophores are exclusively marine radially symmetrical, diploblastic organisms.
Reason: Bioluminescence is well marked in them.
180. **Assertion:** Telomeres shorten on repeated mitosis and eventually the cell does not divide.
Reason: the end sequence of Telomeres is lost during successive divisions.

GENERAL KNOWLEDGE**SECTION – IV**

181. From whom does the Indian government take advice on legal issues?
(a) Chief Justice of apex court (b) Solicitor General
(c) Chairman of Planning Commission (d) Attorney General
182. The Vice President of India is the Chairman of:
(a) Lok Sabha (b) Rajya Sabha (c) Vidhan Sabha (d) Legislative Assembly
183. Which of the following players won Miami Men's Double tennis 2012 title?
(a) Daniel Nestor and Padek Stepanek (b) Radek Stepanek and Leander Paes
(c) Daniel Nestor and Max Mirnyi (d) Rohan Bopanna and Mahesh Bhupathi
184. Which ancient Indian sage authored 'Yog Sutra'?
(a) Patanjali (b) Kapil Muni (c) Saatchi dananda (d) Gautam
185. Which Indian Mathematician first time in the world used zero as a number and showed its mathematical operation?
(a) Aryabhata (b) Ramanuja (c) Bhaskaracharya (d) Brahmagupta
186. Which Indian freedom fighter was popularly called "Mahamana"?
(a) Bal Gangadhar Tilak (b) Madan Mohan Malviya
(c) Jawahar lal Nehru (d) Mahatma Gandhi
187. The book "Big Egos, Small Men" is written by:
(a) Mani Shankar Aiyer (b) Kapil Sibal (c) Ram Jethmalani (d) Soli Sorabjee
188. Which is the largest buddhist monastery in India?
(a) Rumtek Monastery, Sikkim (b) Tawang Monastery, Arunachal Pradesh
(c) Thiksey Monastery, Jammu and Kashmir (d) Ghoom Monastery, West Bengal
189. 'Van Mabotsav' Day is observed on:
(a) 1st December (b) 1st July (c) 23rd February (d) 14th March
190. The famous Kashi Vishwanath temple at Varanasi is dedicated to which Hindu god?
(a) Lord Shiva (b) Lord Vishnu (c) Lord Brahma (d) Lord Krishna

191. Which Indian State celebrated its 77th foundation day on 1st April, 2013?
(a) Gujarat (b) Odisha (c) Rajasthan (d) Tamil Nadu
192. According to Mahabharat who constructed the unpailed palace of the Pandavas?
(a) Vishwakarma (b) Krishna (c) Indra (d) Maya Danava
193. Where was first share market of India established?
(a) Mumbai (b) Kolkata (c) Delhi (d) Chennai
194. Garampani Sanctuary is located at:
(a) Diphu, Assam (b) Junagarh, Gujrat (c) Kohima, Nagaland (d) Gangtok, Sikkim
195. Maximum sugarcane production occurs in which country?
(a) India (b) China (c) Brazil (d) Indonesia
196. Which of the following is not a green house gas?
(a) Carbon dioxide (CO₂) (b) Nitrous oxide (N₂O)
(c) Methane (CH₄) (d) Hydrogen (H₂)
197. Which first woman singer got the Bharat Ratna award and is also known as nightingale of carnatic music?
(a) MS. Subbulaxmi (b) Shubha Mudgal (c) N. Rajam (d) Vasundhara Devi
198. For seeing objects on the surface of water from submarine, the instrument used is:
(a) Kaleidoscope (b) Periscope (c) Telescope (d) Spectroscope
199. Under the tenure of which Prime Minister did Indo-Pak war (1965) take place which ended with Tashkent Treaty?
(a) Lal Bahadur Shastri (b) Jawaharlal Nehru (c) Gulzarilal Nanda (d) Morarji Desai
200. A famous writer who travelled to India with Mahmood Ghazni and wrote a book "Tareelhal-Hind" was:
(a) Abdul Hai Lakhnawi (b) Al-Biruni (c) Riyad-us-Saliheen (d) Ibn Kathir

ANSWER KEY

PHYSICS

1	2	3	4	5	6	7	8	9	10
C	B	D	C	A	B	C	B	C	B
11	12	13	14	15	16	17	18	19	20
C	A	D	C	C	A	C	B	B	A
21	22	23	24	25	26	27	28	29	30
C	D	D	B	A	B	B	C	B	B
31	32	33	34	35	36	37	38	39	40
C	B	C	D	B	A	B	C	C	B
41	42	43	44	45	46	47	48	49	50
A	D	D	D	B	D	D	C	D	A
51	52	53	54	55	56	57	58	59	60
A	A	B	A	B	A	A	A	C	D

CHEMISTRY

61	62	63	64	65	66	67	68	69	70
A	A	A	B	B	A	C	D	C	A
71	72	73	74	75	76	77	78	79	80
B	B	B	D	D	B	B	A	C	A
81	82	83	84	85	86	87	88	89	90
A	C	D	C	B	D	C	A	B	B
91	92	93	94	95	96	97	98	99	100
D	A	B	C	A	C	D	D	D	A
101	102	103	104	105	106	107	108	109	110
A	B	D	B	C	B	C	B	B	A
111	112	113	114	115	116	117	118	119	120
A	D	D	B	A	C	C	C	C	A

BIOLOGY

121	122	123	124	125	126	127	128	129	130
C	C	C	C	A	A	D	A	A	A
131	132	133	134	135	136	137	138	139	140
A	A	C	A	A	A	B	A	A	A
141	142	143	144	145	146	147	148	149	150
A	C	C	B	C	C	B	A	D	C
151	152	153	154	155	156	157	158	159	160
C	C	A	B	D	A	B	B	C	B
161	162	163	164	165	166	167	168	169	170
B	C	B	C	C	B	C	A	C	C
171	172	173	174	175	176	177	178	179	180
C	B	A	B	C	C	B	C	B	A

GENERAL KNOWLEDGE

181	182	183	184	185	186	187	188	189	190
D	B	B	B	A	B	C	B	B	A
191	192	193	194	195	196	197	198	199	200
B	D	A	A	C	D	A	B	A	B