

16/04/2024

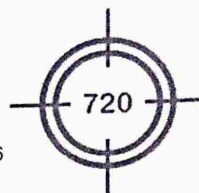


Aakash

Medical | IIT-JEE | Foundations

Corporate Office: Aakash Tower, 8, Pusa Road, New Delhi-110005, Ph.011-47623456

CODE-A



AIM - 720

(Advanced INTENSIVE Master for 720)

MM : 720

CST-9

Time : 3 Hrs. 20 Mins.

Complete Syllabus of NEET

Instructions :

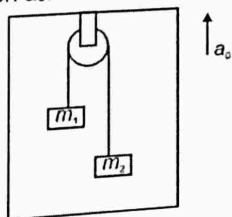
- There are two sections in each subject, i.e. Section-A & Section-B. You have to attempt all 35 questions from Section-A & only 10 questions from Section-B out of 15.
- Each question carries 4 marks. For every wrong response 1 mark shall be deducted from the total score. Unanswered / unattempted questions will be given no marks.
- Use blue/black ballpoint pen only to darken the appropriate circle.
- Mark should be dark and completely fill the circle.
- Dark only one circle for each entry.
- Dark the circle in the space provided only.
- Rough work must not be done on the Answer sheet and do not use white-fluid or any other rubbing material on the Answer sheet.

PHYSICS

Choose the correct answer:

SECTION-A

- The average kinetic energy per molecule of hydrogen gas at temperature T is E . If the molar gas constant is R then the Avogadro's number is equal to CC-144
 - $\frac{RT}{2E}$
 - $\frac{5RT}{2E}$
 - $\frac{3RT}{E}$
 - $\frac{3RT}{2E}$
- Consider an arrangement of pulley and blocks kept in an elevator which is moving upward with acceleration a_0 .



The acceleration of block m_1 w.r.t. elevator is (Assume the pulley to be massless and $m_2 > m_1$)

$$(1) \frac{m_2 - m_1}{m_1 + m_2} (g - a_0) \quad (2) \frac{m_2 + m_1}{m_2 - m_1} (g - a_0)$$

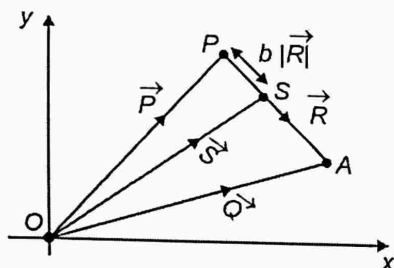
$$(3) \frac{m_2 - m_1}{m_1 + m_2} (g + a_0) \quad (4) \frac{m_2 + m_1}{m_1 - m_2} (g + a_0)$$

- A man can swim at the rate of 5 km h^{-1} in still water. A river 1 km wide flows at the rate of 3 km h^{-1} . If the man wishes to swim across the river directly opposite to the starting point, then the direction in which he should swim is

- 37° with the direction of river flow
- 120° with the direction of river flow
- 127° with the direction of river flow
- 153° with the direction of river flow

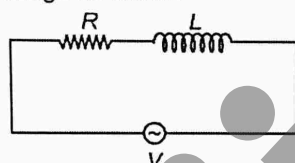
(1)

4. Three vectors $\vec{P}$, $\vec{Q}$ and $\vec{R}$ are shown. Let S be any point on the $\vec{R}$. The distance between points P and S is $b|\vec{R}|$.



Based upon the above information which among the following vector relation is correct?

- (1) $\vec{P} + b\vec{R} = \vec{S}$ (2) $\vec{P} + \vec{Q} = \vec{R}$
 (3) $\vec{P} + \vec{R} = \vec{Q}$ (4) Both (1) and (3)
5. A resistance R and inductor L is connected to supply voltage as shown



$$V = V_0 \sin \omega t$$

Which of the following quantities have zero average value over a cycle?

- (1) Current through inductor
 (2) Induced emf in inductor
 (3) Magnetic energy stored in inductor
 (4) Both (1) and (2)
6. A circular coil is expanded radially in a region of magnetic field and no electromotive force is produced in the coil. This can be because
- (1) There is a constant magnetic field in the perpendicular direction to the plane of coil
 (2) There is a decreasing magnetic field in the perpendicular direction to the plane of coil
 (3) There is a increasing magnetic field in the perpendicular direction to the plane of coil
 (4) Both (2) and (3)

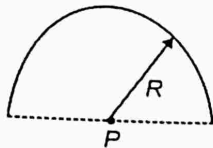
Paragraph (Q7-Q8)

The potential energy of a particle of mass 2 kg is given by $U = (4x^3 - 12x)$ J. The particle moves along x-axis under the influence of conservative force only.

7. The particle is at stable equilibrium at
 (1) $x = 1$ m (2) $x = -1$ m
 (3) $x = 0$ (4) $x = -2$ m
8. If total mechanical energy of the particle is 12 J, then maximum speed of the particle is
 (1) $2\sqrt{3}$ m s⁻¹ (2) $2\sqrt{2}$ m s⁻¹
 (3) $2\sqrt{5}$ m s⁻¹ (4) 2 m s⁻¹
9. A person using a lens as a simple microscope sees an
 (1) Inverted and virtual image
 (2) Inverted and real image
 (3) Erect and virtual image
 (4) Erect and real image
10. The critical angle for a medium w.r.t. air is 53°. The refractive index of the medium is
 (1) $\frac{5}{4}$ (2) $\frac{4}{3}$
 (3) $\frac{5}{3}$ (4) $\frac{4}{5}$
11. The electromagnetic wave having the shortest wavelength among the following is
 (1) X-rays (2) UV rays
 (3) Infrared rays (4) Micro waves
12. In Young's double slit experiment, the phase difference between the light waves reaching 5th dark fringe from the central fringe will be ($\lambda = 4500$ Å)
 (1) 5π (2) 7π
 (3) 9π (4) 3π
13. The angle between the electric dipole moment and the electric field due to the dipole on its axial line is
 (1) 0° (2) 90°
 (3) 180° (4) 120°

Space for Rough Work

14. A thin rod is bent into a semicircular arc of radius R . The rod is uniformly charged having charge q . The potential at the centre of the arc at point P is



- (1) $\frac{q}{2\pi\epsilon_0 R}$ (2) $\frac{q}{4\pi\epsilon_0 R}$
 (3) $\frac{q}{\pi\epsilon_0 R}$ (4) Zero
 CC-144 CC-144

15. A simple harmonic wave represented by the equation $y = 4 \sin 2\pi (t + 4)$, where y is in cm and t is in second. The time period of oscillation of a particle of medium will be

- (1) 2 s (2) 4 s
 (3) $\frac{1}{2}$ s (4) 1 s

16. **Statement A:** All the particles between two consecutive nodes vibrates in the same phase.

Statement B: Particles on either side of a node vibrate mutually in opposite phase.

- (1) Both statement (A) and statement (B) are correct
 (2) Both statement (A) and statement (B) are incorrect
 (3) Statement (A) is correct and statement (B) is incorrect
 (4) Statement (A) is incorrect and statement (B) is correct

17. The energy flux of sunlight reaching the surface of the earth is $2.776 \times 10^3 \text{ W m}^{-2}$. The photons in the sunlight have an average wavelength of 650 nm. How many photons per square meter are incident on the earth per second?

- (1) 9×10^{31} (2) 9×10^{25}
 (3) 9×10^{21} (4) 9×10^{24}

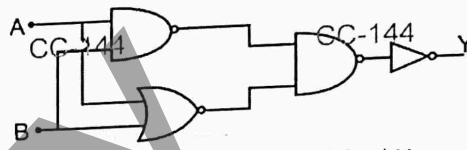
18. If in a nuclear reaction, mass defect is 0.4% then energy released in fusion of 2 kg mass is

- (1) $72 \times 10^5 \text{ J}$ (2) $72 \times 10^9 \text{ J}$
 (3) $72 \times 10^{11} \text{ J}$ (4) $72 \times 10^{13} \text{ J}$

19. The wavelength of light that may excite an electron in the valence band of diamond to the conduction band if the energy band gap is 4.8 eV is

- (1) 258 nm (2) 312 nm
 (3) 402 nm (4) 595 nm

20. The correct truth table for given logic circuit is



A	B	Y
0	0	1
0	1	0
1	0	1
1	1	0

(1)

A	B	Y
0	0	0
0	1	1
1	0	0
1	1	1

(2)

A	B	Y
0	0	1
0	1	0
1	0	0
1	1	0

(3)

A	B	Y
0	0	1
0	1	1
1	0	0
1	1	0

(4)

21. Match the dimensional formula given in column I with the physical quantity given in column II and tick the correct option.

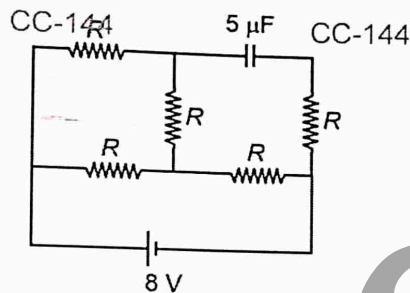
- Column-I**
 a. $[M^1 L^1 T^{-2}]$
 b. $[M^0 L^1 T^{-2}]$
 c. $[M^1 L^2 T^{-2}]$
 CC-144

- Column-II**
 (i) Work
 (ii) Force
 (iii) Energy
 (iv) Rate of change in linear momentum
 (v) Acceleration

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

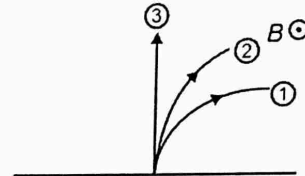
Space for Rough Work

22. Potentiometer is preferred over voltmeter for voltage measurement, because
- (1) Size of potentiometer is less than voltmeter
 - (2) Potentiometer has very less resistance
 - (3) Potentiometer does not draw any current from the source for measuring voltage
 - (4) The life cycle of potentiometer is more than voltmeter
23. If each resistance in the given circuit is of $1\ \Omega$, then the charge on the capacitor at steady state in the given circuit will be



- (1) $4\ \mu\text{C}$
 - (2) $\frac{8}{3}\ \mu\text{C}$
 - (3) $16\ \mu\text{C}$
 - (4) $32\ \mu\text{C}$
24. Given below are two statements one is labelled as assertion (A) other is labelled as Reason (R).
- Assertion (A):** If we move along a magnetic field line then magnetic field remains constant.
- Reason (R):** Direction of $\vec{B}$ is perpendicular to magnetic field line.
- In the light of the above statements, choose the correct answer from the options given below.
- (1) Both A and R are true and R is the correct explanation of A
 - (2) Both A and R are true and R is NOT the correct explanation of A
 - (3) A is true but R is false
 - (4) Both A and R are false

25. A neutron, a proton and an α -particle enter a region of transverse uniform magnetic field with the same velocity. The trajectories of the particles are shown in the figure. The trajectory of the proton is given by



- (1) Path 1
 - (2) Path 2
 - (3) Path 3
 - (4) Either path 1 or path 2
26. When a substance is placed near a bar magnet it get weakly attracted towards it. The relative permeability of the substance can be
- (1) 1.1
 - (2) 0.80
 - (3) 500
 - (4) 0.5
27. A disc is given a linear velocity on a rough horizontal surface then its angular momentum is
- (1) Conserved about COM
 - (2) Conserved about the point of contact
 - (3) Conserved about all the points
 - (4) Not conserved about any point
28. The moment of inertia of a thin uniform rod of mass M and length L about an axis passing through its midpoint and perpendicular to its length is I_0 . Its moment of inertia about an axis passing through one of its ends and perpendicular to its length is
- (1) $I_0 + \frac{ML^2}{2}$
 - (2) $I_0 + \frac{ML^2}{4}$
 - (3) $I_0 + 2ML^2$
 - (4) $I_0 + ML^2$
29. In planetary motion, the angular momentum conservation is in synchronization with the law of
- (1) Orbits
 - (2) Areas
 - (3) Periods
 - (4) Conservation of energy

Space for Rough Work

30. A copper wire ($Y = 10^{11} \text{ N/m}^2$) of length 4 m and steel wire ($Y = 2 \times 10^{11} \text{ N/m}^2$) of length 2 m each of 0.25 cm^2 cross-section are fastened end to end and stretched with a tension of 500 N.

Based on the given information match entries in column I with its correct entries in column II.

Column-I

Column-II

- a. Elongation in copper wire (i) 0.6 mm
 b. Elongation in steel wire (ii) 1.0 mm
 c. Total elongation (iii) 0.8 mm
 d. Difference in the elongation (iv) 0.2 mm
- (1) a(iii), b(iv), c(ii), d(i) (2) a(iv), b(ii), c(iii), d(i)
 (3) a(i), b(ii), c(iii), d(iv) (4) a(ii), b(i), c(iii), d(iv)
31. An ideal fluid is flowing through a horizontal tapered pipe as shown. As the fluid flows the velocity of fluid along the flow



- (1) Increases
 (2) Decreases
 (3) Remains constant
 (4) May increase or decrease
32. A copper rod of length 1 meter is heated from 20°C to 120°C . If the coefficient of linear expansion of copper is $5 \times 10^{-5} \text{ }^\circ\text{C}^{-1}$ then the change in the length of the rod is
- (1) 2.5 cm (2) 0.5 cm
 (3) 7.5 cm (4) 10 cm
33. Consider an ideal gas undergoing an isothermal process. The ratio of the final pressure to the initial pressure if the volume is reduced to one-fourth of its initial value is
- (1) 1 : 1 (2) 3 : 5
 (3) 4 : 1 (4) 8 : 1

34. A particle moves along a straight line and its velocity depends upon time as $v = 4t - t^2$, then the magnitude of acceleration of body at $t = 1 \text{ s}$ is (Where velocity is in m s^{-1})

- (1) 4 m s^{-2} (2) 2 m s^{-2}
 (3) 1 m s^{-2} (4) Zero

35. Among the given substances which has highest specific heat capacity at room temperature and atmospheric pressure is

- (1) Iron (2) Water
 (3) Aluminium (4) Mercury

SECTION-B

36. The surface tension of a fluid under consideration is 32 N/m . If a film of this fluid is held on a ring of surface area 0.06 m^2 , then total surface energy is nearly

- (1) 0.2 J (2) 0.3 J
 (3) 1.44 J (4) 1.86 J

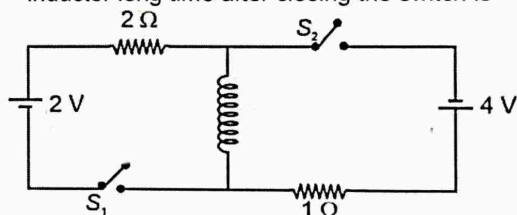
37. During an isothermal process the internal energy of an ideal gas

- (1) Increases
 (2) Decreases
 (3) Remains constant
 (4) Depends on the pressure

38. A block weighing 20 N rests on a horizontal surface. The coefficient of static friction between block and surface is 0.4 and coefficient of kinetic friction is 0.3. The frictional force exerted on block is

- (1) Zero (2) 5 N
 (3) 8 N (4) 4 N

39. In the circuit shown below, the switch S_1 and S_2 are closed at $t = 0$. The current through the inductor long time after closing the switch is



- (1) 5 A (2) 2 A
 (3) 3 A (4) 4 A

Space for Rough Work

40. In a transformer the ratio of secondary turns (N_2) and primary turns (N_1) i.e. $\frac{N_2}{N_1} = 10$. If the voltage applied in primary is 200 V and current is 1 A, then current in secondary turns at 80% efficiency is

(1) 8 mA (2) 80 mA
(3) 160 mA (4) 100 mA

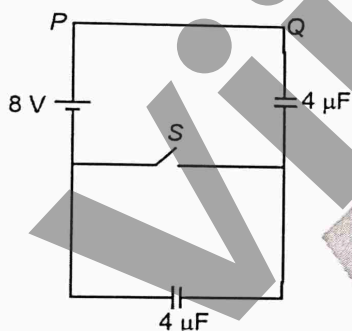
41. The plane faces of two identical plano-convex lenses each having a focal length of 40 cm are placed against each other to form a biconvex lens. The distance from this lens combination at which an object must be placed to obtain a real, inverted image which has the same size as the object is

(1) 10 cm (2) 20 cm
(3) 30 cm (4) 40 cm

42. Two non-coherent sources having intensities I and $2I$ are superimpose with each other then maximum intensity after superposition will be

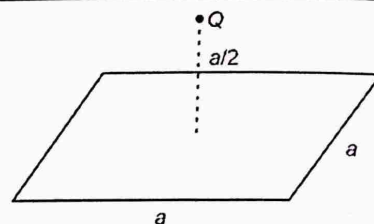
(1) $\sqrt{5}I$ (2) $3I$
(3) $\sqrt{3}I$ (4) $7I$

43. What is the charge flown from P to Q when the switch is closed?



(1) $32 \mu\text{C}$ (2) $16 \mu\text{C}$
(3) $24 \mu\text{C}$ (4) $8 \mu\text{C}$

44. A charge Q is placed at distance $\frac{a}{2}$ above the centre of a square plate of side a as shown in figure. The electric flux associated through the plate will be

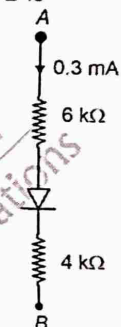


(1) $\frac{Q}{\epsilon_0}$ (2) $\frac{Q}{4\epsilon_0}$
(3) $\frac{Q}{6\epsilon_0}$ (4) $\frac{Q}{2\epsilon_0}$

45. A hydrogen atom initially in the ground state absorbs a photon and is excited to $n = 3$ level then the wavelength of photon is nearly

(1) 690 Å (2) 1026 Å
(3) 915 Å (4) 1223 Å

46. In the circuit shown in figure, if the diode forward voltage drop is 0.5 V, then the potential difference between A and B is



(1) 3 V (2) 3.5 V
(3) 2.5 V (4) 1.8 V

47. A student measured the length of a rod and reported it as 6.43 cm. Which instrument did he use to measure it?

(1) A screw gauge having 100 divisions in the circular scale and pitch as 1 mm
(2) A metre scale
(3) A vernier calliper where the 10 divisions in vernier scale match with 9 divisions in the main scale and main scale have 10 divisions in 1 cm
(4) A screw gauge having 50 divisions in the circular scale and pitch as 1 mm

Space for Rough Work

48. Two discs A and B rotating about their respective axis of rotation with angular speeds 2 rad s^{-1} and 5 rad s^{-1} respectively are brought into contact such that their axes of rotation coincide. Now, the angular speed of the system becomes 4 rad s^{-1} . If the moment of inertia of the disc (B) is $1 \times 10^{-3} \text{ kg m}^2$, then the moment of inertia of the disc (A) (in kg m^2) is (Assume that initially both the disc were having same sense of rotation)

- (1) 0.25×10^{-3} (2) 1.5×10^{-3}
(3) 1.25×10^{-3} (4) 0.5×10^{-3}

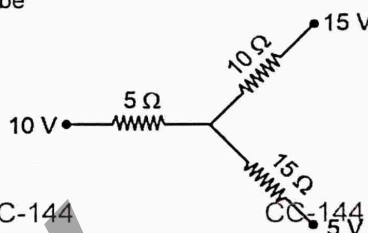
49. Consider the following statements and select the correct statement(s) from the following.

- I. When height of a satellite is increased, its potential energy increases while kinetic energy decreases
II. The orbital velocity of satellite depends upon the density of planet around which it is revolving

- III. For a satellite orbiting in circular orbit, the kinetic energy is always greater than potential energy.

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

50. In the given circuit, current through 15Ω resistor will be



- (1) $\frac{3}{11} \text{ A}$ (2) $\frac{4}{11} \text{ A}$
(3) $\frac{5}{11} \text{ A}$ (4) Zero

CHEMISTRY

SECTION-A

51. 2 gram atoms of sodium hydroxide are dissolved in water to make its 2 L aqueous solution. If the density of this aqueous solution is 1.24 g/cm^3 then the molal concentration of the solution is

- (1) 0.433 m (2) 0.833 m
(3) 0.643 m (4) 0.722 m

52. Volume of CO_2 gas evolved at STP on complete combustion of 8 g of CH_4 with excess of O_2 is

- (1) 22.4 L (2) 44.8 L
(3) 11.2 L (4) 67.2 L

53. Which of the following pairs contains both the ligands which form chelate complexes with transition metals?

- (1) H_2O and NO_2^-
(2) NH_3 and EDTA^{4-}
(3) Ethane-1, 2-diamine and oxalate
(4) CN^- and CO

54. Consider the following statements

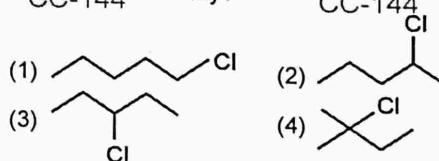
Statement (I): Aniline reacts with bromine water at room temperature to give a white precipitate of 2, 4, 6-tribromoaniline.

Statement (II): Activating effect of $-\text{NHCOCH}_3$ group is less than $-\text{NH}_2$ group when attached with benzene.

Choose the correct option.

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

55. Which of the following compounds undergoes $\text{S}_{\text{N}}2$ reaction most easily?



Space for Rough Work

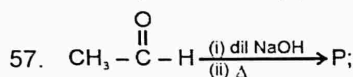
56. Given below are the two statements : One is labelled as assertion (A) and other is labelled as reason (R).

Assertion (A): A mixture containing two enantiomers in equal proportions will have zero optical rotation.

Reason (R): In a racemic mixture, the rotation due to one isomer will be cancelled by the rotation due to other isomer.

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

- (1) Both (A) and (R) are true but (R) is NOT the correct explanation of (A) CC-144
 (2) (A) is true but (R) is false
 (3) (A) is false but (R) is true
 (4) Both (A) and (R) are true and (R) is the correct explanation of (A)



Product P in above reaction is

- (1) CH_3COOH (2) $\text{CH}_3\text{CH}_2\text{OH}$
 (3) $\text{CH}_3\text{CH} = \text{CHCHO}$ (4) $\text{CH}_3 - \overset{\text{O}}{\parallel} \text{C} - \text{OCH}_2\text{CH}_3$
 58. Benzophenone and acetophenone can be distinguished by using
 (1) $\text{I}_2 + \text{NaOH}$
 (2) NaHSO_3
 (3) Tollen's reagent
 (4) Fehling solution

59. For a first order reaction, if $t_{1/2}$ is 40 s then $t_{87.5\%}$ will be

- (1) 60 s (2) 80 s
 (3) 120 s (4) 160 s CC-144

60. On addition of β -naphthol to benzene diazonium salt, the colour of the solution obtained is

- (1) Orange (2) Yellow
 (3) Scarlet red (4) Blue

61. Match the compounds given in column I with their respective shapes given in column II.

	Column I		Column II
a.	I_3	(i)	T-shaped
b.	BF_3	(ii)	Trigonal pyramidal
c.	XeO_3	(iii)	Linear
d.	ClF_3	(iv)	Trigonal planar

Choose the correct match.

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

62. During change of O_2 to O_2^- ion, the electron adds to which one of the following molecular orbitals?

- (1) π^* (2) π
 (3) σ^* (4) σ

63. K_H value for some gases at the same temperature 'T' and pressure 'P' are given

Gas	$K_H/K \text{ bar}$
X	69.16
Y	76.48
Z	144.97

Where K_H is Henry's law constant for the given gases in water. The order of their solubility in water is

- (1) $X < Z < Y$ (2) $Z < Y < X$
 (3) $Z < X < Y$ (4) $Y < X < Z$

64. If 0.4 molal aqueous solution of weak monobasic acid HA undergoes 60% dissociation. The boiling point of the solution will be (K_b of water = $0.52 \text{ K kg mol}^{-1}$)

- (1) 100.33°C
 (2) 100.21°C
 (3) 100.48°C
 (4) 100.22°C

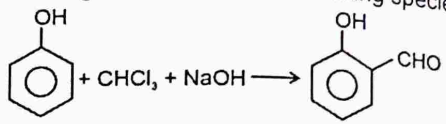
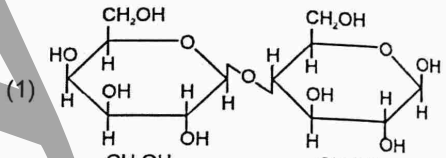
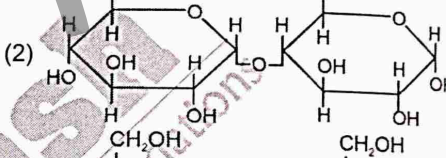
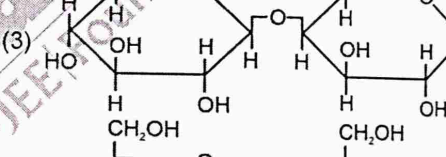
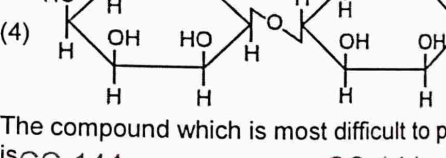
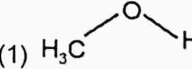
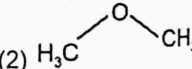
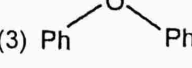
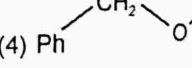
Space for Rough Work

65. The incorrect statement about electrophiles is
 (1) Electrophiles are electron seeking species
 (2) Electrophiles attack at electron rich sites
 (3) SO_3 is an electrophile
 (4) Electrophiles are Lewis bases
66. Choose the most stable alkene from the following.
 (1) $\text{H}_3\text{C}(\text{CH}_3)\text{C} = \text{C}(\text{CH}_3)\text{CH}_3$
 (2) $\text{H}_3\text{C}(\text{CH}_3)\text{C} = \text{CHCH}_3$
 (3) $\text{CH}_3\text{CH} = \text{CHCH}_3$
 (4) $\text{CH}_3(\text{CH}_3)\text{CH} - \text{CH} = \text{CH} - \text{CH}_3$
67. Change in oxidation state of chlorine during thermal decomposition of potassium chlorate is
 (1) +5 to 0 (2) -1 to 0
 (3) +5 to -1 (4) -1 to +1
68. Given below are two statements: One is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): ClO_4^- does not undergo disproportionation.
Reason (R): Highest oxidation state of Cl is +7 and it is present in ClO_4^- .
 In the light of the above statements, choose the correct answer from the options given below.
 (1) Both (A) and (R) are true and (R) is the correct explanation of (A)
 (2) (A) is true but (R) is false
 (3) (A) is false but (R) is true
 (4) Both (A) and (R) are true but (R) is NOT the correct explanation of (A)
69. The element with the lowest value of first ionization enthalpy is
 (1) Si (2) Ge
 (3) Sn (4) Pb
70. Which of the given statement(s) is/are correct with respect to the element with atomic number 102?
 (a) Its IUPAC name and symbol are unnilbium and Unb respectively
 (b) Its official IUPAC name is Nobelium
 (c) Its periodic position is 7th period and 5th group.

The correct option is

- (1) (a) only (2) (b) and (c) only
 (3) (a) and (b) only (4) (a), (b) and (c)
71. The correct order of increasing metallic character of the following elements is
 (1) $\text{Si} < \text{Be} < \text{Mg} < \text{P}$
 (2) $\text{P} < \text{Si} < \text{Be} < \text{Mg}$
 (3) $\text{Si} < \text{P} < \text{Mg} < \text{Be}$
 (4) $\text{P} < \text{Be} < \text{Si} < \text{Mg}$
72. Given below are two statements:
 One is labelled as assertion (A) and the other is labelled as reason (R).
Assertion (A): For the reaction,
 $\text{C(s)} + \text{CO}_2(\text{g}) \rightleftharpoons 2\text{CO(g)}$. If inert gas is added at constant volume then the equilibrium remains undisturbed.
Reason (R): Addition of inert gas does not affect the equilibrium for the reactions with $\Delta n_g = 0$.
 In the light of the above statements, choose the correct answer from the options given below.
 (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
73. The solubility of AgCl in 0.04 M AgNO_3 solution at 25°C is
 $[\text{K}_{\text{sp}}(\text{AgCl}) = 1.6 \times 10^{-10}]$
 (1) $2 \times 10^{-7} \text{ M}$ (2) $4 \times 10^{-8} \text{ M}$
 (3) $4 \times 10^{-9} \text{ M}$ (4) $1.6 \times 10^{-9} \text{ M}$
74. If $E^\circ_{\text{Cu}^{2+}/\text{Cu}} = a \text{ V}$ and $E^\circ_{\text{Cu}^+/\text{Cu}} = b \text{ V}$, then $E^\circ_{\text{Cu}^+/\text{Cu}}$ (in volts) will be
 (1) $2a - b$ (2) $a - 2b$
 (3) $b - 2a$ (4) $2b - a$

Space for Rough Work

75. If radius of third Bohr orbit of Li^{2+} ion is 158.7 pm then the radius of first Bohr orbit of He^+ ion will be
- (1) 26.4 pm (2) 105.8 pm
(3) 52.9 pm (4) 82.5 pm
76. Consider the given reaction:
 $\text{P}_4 + \text{NaOH} + \text{H}_2\text{O} \rightarrow 'X' + \text{NaH}_2\text{PO}_2$
 The incorrect statement about 'X' is
- (1) It has rotten fish like smell
 (2) It explodes in contact with traces of HNO_3
 (3) It is weakly acidic and forms phosphonium ion when reacts with a base
 (4) It reacts with copper sulphate to form copper phosphide
77. Given below are two statements
- Statement (I):** The acidic character of the hydrides of group 16 elements increases from H_2O to H_2Te
- Statement (II):** The bond dissociation enthalpy of hydrides of group 16 elements decreases from H_2O to H_2Te .
- In the light of the above statements, choose the most appropriate answer from the options given below.
- (1) Statement I is correct and statement II is incorrect
 (2) Statement II is correct and statement I is incorrect
 (3) Both statements I and II are correct
 (4) Both statements I and II are incorrect
78. KMnO_4 gets decomposed at 513 K to form
- (1) MnO_2 and KO_2 only
 (2) K_2MnO_4 and Mn only
 (3) K_2MnO_4 , MnO_2 and O_2 only
 (4) K_2MnO_4 and O_2 only
79. The bond dissociation energies of X_2 , Y_2 and XY are in the ratio of 3 : 2 : 1 and the ΔH for XY is 300 kJ mol^{-1} . The bond dissociation energy of Y_2 is
- (1) 200 kJ mol^{-1} (2) 400 kJ mol^{-1}
 (3) 300 kJ mol^{-1} (4) 350 kJ mol^{-1}
80. In the given reaction, the attacking species is
- 
- (1) $^{\oplus}\text{CHCl}_2$ (2) $:\text{CCl}_2$
 (3) $^{\oplus}\text{CHO}$ (4) $:\text{CHCl}_2$
81. Which among the following is the structure of lactose?
- (1) 
 (2) 
 (3) 
 (4) 
82. The compound which is most difficult to protonate is
- (1)  (2) 
 (3)  (4) 

Space for Rough Work

83. 2-Methylpropane on reaction with KMnO_4 majorly gives
- (1) 2-Methylpropan-1-ol (2) 2-Methylpropan-2-ol
(3) Propanone (4) Propanoic acid
84. Correct order of acidity of the given compounds is
- (1) $\text{CH}_3 - \text{C} \equiv \text{CH} > \text{CH}_3 - \text{C} \equiv \text{C} - \text{CH}_3 > \text{HC} \equiv \text{CH}$
CC-144
- (2) $\text{HC} \equiv \text{CH} > \text{CH}_3 - \text{C} \equiv \text{C} - \text{CH}_3 > \text{CH}_3 - \text{C} \equiv \text{CH}$
CC-144
- (3) $\text{CH}_3 - \text{C} \equiv \text{C} - \text{CH}_3 > \text{CH}_3 - \text{C} \equiv \text{CH} > \text{HC} \equiv \text{CH}$
CC-144
- (4) $\text{HC} \equiv \text{CH} > \text{CH}_3 - \text{C} \equiv \text{CH} > \text{CH}_3 - \text{C} \equiv \text{C} - \text{CH}_3$
85. On addition of excess of KCN in CuSO_4 solution, the product formed is
- (1) $[\text{Cu}(\text{CN})_4]^{2-}$ (2) $\text{Cu}(\text{NO}_3)_2$
(3) $[\text{Cu}(\text{SCN})_4]^{2-}$ (4) K_2SO_3

SECTION-B

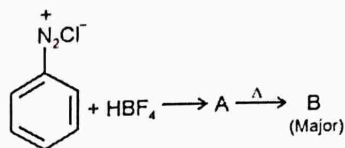
86. Match column I with column II.

	Column I (Coordination compound)		Column II (Central metal atom/ion)
a.	Wilkinson catalyst	(i)	Magnesium
b.	Chlorophyll	(ii)	Cobalt
c.	Haemoglobin	(iii)	Rhodium
d.	Cyanocobalamin	(iv)	Iron

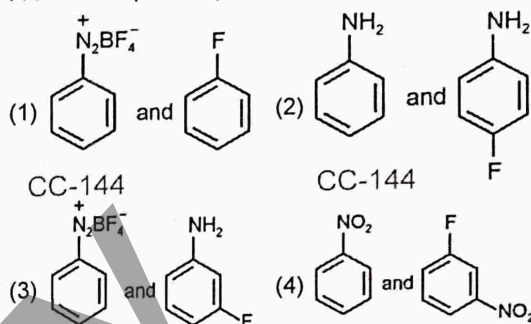
Choose the correct option.

- CC-144
- (1) a-(i), b-(iv), c-(iii), d-(ii)
(2) a-(iii), b-(iv), c-(i), d-(ii)
(3) a-(ii), b-(iii), c-(iv), d-(i)
(4) a-(iii), b-(i), c-(iv), d-(ii)

87. Consider the following reaction sequence

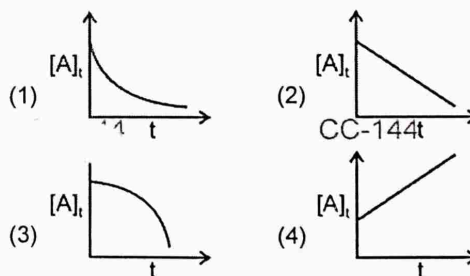


A and B respectively are



88. Incorrect statement about carboxylic acids is

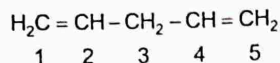
- (1) pK_a of trifluoroacetic acid is less than that of acetic acid
(2) 2 moles of ethanoic acid when heated with P_2O_5 , ethanoic anhydride is produced
(3) Carboxylic acids do not undergo Friedel Craft reaction
(4) Direct attachment of vinyl group to the carboxylic acid decreases the acidity of corresponding carboxylic acid
89. Which among the following graph represents a zero-order reaction? ($[\text{A}]_t$ is the concentration of reactant at time t)

 $\text{A} \rightarrow \text{P}$ 

Space for Rough Work

CST-9 (Code-A)

90. The state of hybridization of C₁, C₃, C₄ and C₅ for the given hydrocarbon is



- (1) sp , sp^2 , sp^3 and sp^2
 (2) sp^2 , sp^2 , sp^3 and sp
 (3) sp^2 , sp^3 , sp^2 and sp^2
 (4) sp^3 , sp^2 , sp and sp^2
91. In Carius method of estimation of halogen, 0.12 g of an organic compound when treated with conc. HNO_3 produces 0.24 g of silver chloride. The percentage of chlorine in the organic compound is approximately
 (1) 28.5% (2) 49.5%
 (3) 36.4% (4) 61.4%
92. The quantity of electricity required to convert 0.02 mol of MnO_4^- into Mn^{2+} is
 [1 F = 96500 C]
 (1) 4825 C (2) 19300 C
 (3) 2412.5 C (4) 9650 C
93. pH of 10^{-3} M $\text{Ca}(\text{OH})_2$ is [log 2 = 0.3]
 (1) 12.7 (2) 11.3
 (3) 11 (4) 2.7
94. Identify the orbital with total number of nodes and angular nodes equal to 2 and 1 respectively.
 (1) 2p (2) 3p
 (3) 3d (4) 3s
95. **Assertion (A)** : Hypophosphorous acid reduces AgNO_3 to metallic silver.
Reason (R) : Hypophosphorous acid contains three P – H bonds.
 In the light of the above statements, choose the correct answer from the options given below.
 (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

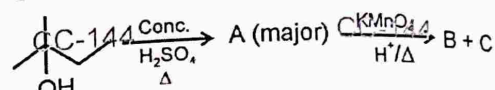
96. Which of the following ions will exhibit colour in aqueous solution?

- (1) Lu^{3+} (Z = 71) (2) Ti^{4+} (Z = 22)
 (3) La^{2+} (Z = 57) (4) Zn^{2+} (Z = 30)

97. The values of ΔH and ΔS for the reaction,
 $\text{C}_{(\text{graphite})} + \text{CO}_2(\text{g}) \rightarrow 2\text{CO}(\text{g})$ are 100 kJ and 200 JK^{-1} . This reaction is spontaneous at

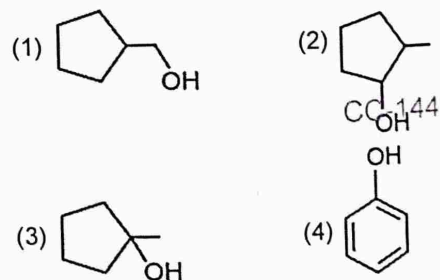
- (1) 110 K (2) 560 K
 (3) 345 K (4) 450 K

98. Consider the following reaction sequence



Major products B and C are

- (1) CH_3COOH and $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$
 (2) CH_3COOH and $\text{CH}_3\text{CH}_2\text{CHO}$
 (3) CH_3CHO and $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$
 (4) $\text{CH}_3\text{COCH}_2\text{CH}_3$ and CO_2
99. Which among the following is a bicyclic compound?
 (1) Guanine (2) Thymine
 (3) Cytosine (4) Uracil
100. The compound which gives blue colouration in Victor Meyer's test is



Space for Rough Work

BOTANY**SECTION - A**

101. Which of the following pair of surface structures in prokaryotes do **not** play a role in motility?
- Pili and flagella
 - Flagella and fimbriae
 - Pili and fimbriae
 - Cilia and flagella
102. The main arena of cellular activities in a cell is
- Nucleolus
 - Ribosome
 - Nucleus
 - Cytoplasm
103. Which of the following statements are **not** true about eukaryotes?
- They have extensive compartmentalisation of cytoplasm.
 - All eukaryotic cells are identical.
 - They have a variety of complex cytoskeletal structures.
 - They all have chemically complexed cell walls.
- (a) and (b)
 - (b) and (d)
 - (b) and (c)
 - (c) and (d)
104. Meiosis II is different from mitosis
- In showing no variation among offsprings
 - In forming two daughter cells at the end
 - As it occurs in haploid cells only
 - As it involves production of diploid daughter cells with identical genetic complement
105. Karyokinesis refers to
- DNA replication
 - Duplication of cell organelles
 - Division of cytoplasm
 - Division of nucleus
106. What will be the number of chromosomes in a meiotic product, if the parent cell has 20 chromosomes?
- 40
 - 10
 - 5
 - 20
107. According to Paul Ehrlich, rivet popper hypothesis states that the species whose removal, poses more serious threat to ecosystem are symbolised by
- Rivets of the seat
 - Tyre of airplane
 - Rivets on the wings
 - Rivets on windows
108. While exploring species-area relationship, Alexander von Humboldt observed that —
- Value of Z lies in the range of 0.6 to 1.2 regardless of taxonomic group.
 - Within a region species richness increased with increasing explored area, but only up to a limit
 - There is more solar energy available at tropics than in the temperate region.
 - Increased diversity of organism contributes to higher productivity.
109. Select the **odd** one out w.r.t. number of carbon atoms present in one molecule.
- Pyruvic acid
 - 1, 3-bisphosphoglycerate
 - Phosphoenolpyruvate
 - Acetyl CoA
110. Read the following statements for Punnett square
- It is a mathematical formula which helps to calculate the types of gamete.
 - It is used to calculate the probability of all possible genotypes of offsprings
 - It is useful for monohybrid crosses only.
- The **correct** one(s) is/are
- (i) and (iii) only
 - (ii) and (iii) only
 - All (i), (ii) and (iii)
 - (ii) only

Space for Rough Work

CST-9 (Code-A)

111. Which among the following is an autosomal dominant trait?

- (1) Myotonic dystrophy (2) Thalassemia
(3) Sickle cell anaemia (4) Haemophilia

112. A males have only one chromosome as sex chromosome besides the autosomes.

Here, A is

- (1) Birds (2) Honey bees
(3) *Drosophila* (4) Grasshopper

113. A normal couple is having two daughters and two sons. Among the two daughters one is normal and other is carrier for haemophilia. Among the two sons one is normal and other is haemophilic. What would be the genotype of the parents?

- (1) $XX^h \times X^hY$ (2) $XX \times XY$
(3) $XX^h \times XY$ (4) $XX \times X^hY$

114. Which of the following tissue is absent in most of the monocotyledons?

- (1) Tracheids (2) Xylem fibres
(3) Phloem parenchyma (4) Phloem fibres

115. Select the option which correctly matched.

	Character	Dicot root	Monocot root
(1)	Pericycle	Present	Absent
(2)	Cambium	Absent	Present
(3)	Pith	Small and inconspicuous	Large and well developed
(4)	Vascular bundles	Polyarch usually	Diarch usually

116. Read the following statements and select the correct option.

Assertion (A): Ethephon is most widely used compound as a source of ethylene.

Reason (R): Ethephon hastens fruit ripening in tomatoes and apples, and delays the abscission in flowers and fruits.

(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.

117. Select the **odd** one out w.r.t. false fruit.

- (1) Cashew nut (2) Mango
(3) Apple (4) Strawberry

118. State **True (T)** or **False (F)** to the given statements.

a. Vegetative cell is bigger in size having abundant food reserve and a large spindle shaped nucleus.

b. Generative cell is small and floats in the cytoplasm of vegetative cell.

c. Carrot grass came into India as a contaminant with imported rice.

d. In over 60 percent of angiosperms, pollen grains are shed at 2-celled stage.

Choose the **correct** option.

- | | (a) | (b) | (c) | (d) |
|-----|-----|-----|-----|-----|
| (1) | (F) | (T) | (F) | (T) |
| (2) | (T) | (F) | (T) | (F) |
| (3) | (T) | (F) | (T) | (T) |
| (4) | (T) | (T) | (F) | (F) |

119. Select the **incorrect** statement for Bryophytes.

(1) The plant body is attached to the substratum by root like structures called rhizoids

(2) Vascular tissues are absent

(3) They are the first embryophytes

(4) Gametophyte is the diploid phase that produces gametes by mitosis

120. Which of the following plant belongs to the class Sphenopsida?

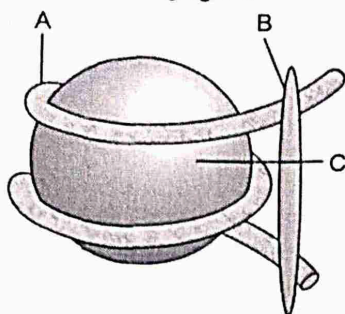
- (1) *Lycopodium* (2) *Equisetum*
(3) *Adiantum* (4) *Psilotum*

Space for Rough Work

121. Which of the following statements is **incorrect** w.r.t. cyanobacteria?
- They are autotrophic microbes
 - Many of them can fix atmospheric nitrogen
 - Aulosira* is non-symbiotic nitrogen fixer in rice field in India
 - They increase alkalinity and decrease fertility of soil
122. Read the following statements and select the **correct** option.
- Assertion (A):** Altitude sickness can be experienced at high altitude where body does not get enough oxygen due to low atmospheric pressure.
- Reason (R):** At high altitude body decreases R.B.Cs production and increases binding capacity of haemoglobin.
- Both A and R are true and R is the correct explanation of A.
 - Both A and R are true but R is not the correct explanation of A.
 - A is true but R is false.
 - Both A and R are false.
123. Which one of the following biotic components is also known as transducers?
- Primary consumers
 - Secondary consumers
 - Producers
 - Tertiary consumers
124. Which of the following statements is **true** regarding binomial nomenclature?
- Each organism is given two names
 - Scientific names are hand written in italics
 - Biological names are generally taken from Latin
 - It was given by Aristotle
125. Select the option of organisms that are **not** classified in the five kingdom system of classification.
- Bacteria
 - Lichens
 - Protozoa
 - Fungi
126. In three domain classification system
- The domain archaea includes all prokaryotic and eukaryotic organisms
 - Classification is based on the sequence of 16S ribosomal RNA genes.
 - Eukarya only included kingdom animalia and plantae.
 - Monera was divided into two domains.
- The **correct** statements are
- (a), (b) and (c)
 - (b) and (d) only
 - (a), (c) and (d)
 - (b), (c) and (d)
127. Identify the features **not** true for mango and coconut fruits.
- They develop from polycarpellary superior ovaries
 - Mesocarp in mango is fibrous and in coconut it is fleshy
 - Fruit is known as drupe
 - In mango, the pericarp is not well differentiated
- (a) and (d) only
 - (a), (c) and (d) only
 - (a), (b) and (d) only
 - (b), (c) and (d) only
128. Tendril of pea and tendril of cucumber are the modification of A and B respectively. Choose the **correct** option to fill (A) and (B).
- A - Axillary buds, B - Stem
 - A - Stem, B - Apical bud
 - A - Stem, B - Flower
 - A - Leaf, B - Stem
129. Correct position of floral parts over thalamus in brinjal plant is
- Gynoecium is present in the centre and other part of flower are located on the rim of the thalamus almost at same level.
 - The gynoecium occupies the highest position while the other parts are situated below it.
 - Margin of the thalamus grows upward enclosing the ovary completely and the other parts arise below the ovary.
 - Gynoecium is present in the centre and other parts cover it partially.

Space for Rough Work

130. Observe the following figure.



Select the **correct** option associated with the figure CC-144

- (1) Label A is the only constituent of the repeating unit of chromatin
- (2) Label B represents negatively charged protein
- (3) Label C represents proteins rich in lysine and arginine
- (4) The structure comprised of 80 bp of DNA helix wrapped around nucleosome
131. Which of the following characteristic is found in the organism having cytosolic 70S ribosome?
- (1) Split gene arrangement
- (2) Polycistronic gene
- (3) Presence of three different types of RNA polymerases
- (4) Uncoupled transcription and translation
132. Which of the following processes requires activity of a ribozyme?
- (1) DNA → DNA (2) DNA → RNA
- (3) RNA → Protein (4) RNA → DNA
133. If there are 99 bases in an RNA that codes for a protein with 33 amino acids, and the base at position 91 is deleted such that the length of the RNA becomes 98, how many maximum number of codons will remain unaltered?
- (1) 30 (2) 20
- (3) 33 (4) 25

134. Which of the following characteristics will not be observed in *Sorghum*?

- (1) Formation of phosphoglycolate during CO_2 fixation
- (2) Presence of Kranz anatomy
- (3) CO_2 saturation occurs at about $360 \mu\text{L}^{-1}$ under light high intensity
- (4) Presence of PEPcase enzyme
135. The light saturation for photosynthesis occurs at A of the total sunlight available to plants. Select the **correct** option to fill (A).
- (1) 2% (2) 3% (3) 10% (4) 5%

SECTION - B

136. The adapter molecule that participates in the process of translation eukaryotes is transcribed by
- (1) RNA polymerase I (2) RNA polymerase II
- (3) RNA polymerase III (4) RNA primase
137. DNA polymorphism is the basis of
- (1) DNA fingerprinting
- (2) PCR
- (3) Transforming principle
- (4) Autoradiography
138. Small sized neutral solutes move across the plasma membrane along the concentration gradient by
- (1) Simple diffusion
- (2) Use of energy
- (3) Active transport
- (4) Osmosis
139. Cells at quiescent stage are
- (1) Undergoing DNA replication
- (2) Metabolically active
- (3) Proliferating rapidly
- (4) Actively doubling their organelles

Space for Rough Work

140. Select the **incorrect** one regarding assumption opted for theoretical calculations of the net gain of ATP for every glucose molecule oxidised.
- None of the intermediates in the pathway are utilized to synthesize any other compound
 - There is sequential, orderly pathway functioning with one substrate forming the next
 - The NADH synthesised in glycolysis is transferred into the cytosol and undergoes oxidative phosphorylation
 - Only glucose is being respired, no other alternative substrates are entering in the pathway at any intermediate stage.
141. Choose the **wrong** statement for polygenic inheritance.
- Polygenic trait is generally controlled by three or more genes
 - In a polygenic trait the phenotype reflects the contribution of dominant alleles only
 - Polygenic inheritance also takes into account the influence of environment
 - It can be exemplified by human skin colour
142. Given below are two statements
- Statement I** : Phellogen is made of narrow, thin-walled and nearly rectangular cells.
- Statement II** : Cork is impervious to water due to lignin deposition in the cell wall.
- In the light of above statements, choose **correct** answer from the options given below.
- Only statement I is correct
 - Only statement II is correct
 - Both statements are correct
 - Both statements are incorrect
143. The exponential growth can be expressed as
- $W_1 = W_0 e^{rt}$
 - $W_1 = e^{rt} + W_0$
 - $W_1 = W_0 \cdot t/e^r$
 - $W_1 = \frac{e^{rt}}{W_0}$
144. Read the given features of a plant
- Female flowers remain submerged in water
 - Long, ribbon like pollen grains
 - Mucilaginous covering on pollen grains
- The plant is
- Zostera*
 - Water hyacinth
 - Water lily
 - Vallisneria*
145. Select the **incorrect** matched pair.
- Unbranched stem – *Cycas*
 - Branched stem – *Pinus*
 - Gymnosperms – Seeded plants without fruit
 - Pinus* – Possess coralloid roots
146. Select the **correct** matched pair.
- | | | | |
|-----|--------------|---|---------------------|
| (1) | Euryhaline | – | Shark |
| (2) | Stenohaline | – | Salmon |
| (3) | Eurythermal | – | Most of the mammals |
| (4) | Stenothermal | – | Most of the birds |
147. *Bacillus thuringiensis* (Bt) is a microbial biocontrol agent that can be introduced to control
- Aphids
 - Butterfly caterpillars
 - Mosquitos
 - Protozoa
148. Which of the following are the most important climatic factors that regulate the rate of decomposition?
- Aeration and temperature
 - Temperature and soil moisture
 - Soil pH and aeration
 - Moisture and soil pH

Space for Rough Work

149. Mark the **wrongly** matched pair.

(1)	Phycobiont partner of lichens	-	Is mostly a member of Chlorophyceae or can be a BGA
(2)	Prions	-	Causative agent of Bovine spongiform encephalopathy (BSE)
(3)	<i>Neurospora</i> CC-144	-	Consider as weed of laboratory
(4)	Euglenoid	-	Presence of proteinaceous pellicle

150. Which of the following groups of plants represent the family that generally shows the given characteristics (a - e)?

- (a) Tricarpellary, syncarpous, superior ovary, trilocular with many ovules
- (b) Perennial herbs with underground bulbs/corms/rhizome
- (c) Inflorescence is solitary/cymose; often umbellate clusters
- (d) Tepals six (3 + 3), often united into tube; valvate aestivation
- (e) Leaves mostly basal, alternate, linear, exstipulate with parallel venation.

Select the **correct** option. CC-144

- (1) *Petunia* and *Ashwagandha*
- (2) *Sesbania* and Sunhemp
- (3) *Asparagus* and *Gloriosa*
- (4) *Lupin* and *Muliathi*

ZOOLOGY

SECTION-A

151. At a chemical synapse, the membranes of pre-synaptic and post-synaptic neurons are separated by a fluid-filled space called

- (1) Synaptic fluid (2) Synaptic cleft
- (3) Synaptic vesicle (4) Synaptic knob

152. Choose the correct option to complete the analogy w.r.t. human brain.

Cerebral cortex : Association areas :: Medulla oblongata : _____

- (1) Respiratory rhythm centre
- (2) Thermoregulatory centre
- (3) Appetite centre
- (4) Centre for sexual behaviours

153. The secretions of _____ help in lubrication of penis. CC-144

Select the **correct** option to fill in the blank. CC-144

- (1) Seminal vesicles
- (2) Prostate gland
- (3) Sebaceous glands
- (4) Bulbourethral glands

154. The sliding filament theory states that contraction of a muscle fibre takes place by

- (1) Shortening of myofilaments
- (2) Sliding of the thin filaments over the thick filaments
- (3) Sliding of the thick filaments over the thin filaments
- (4) Pulling Z-lines attached to the thick filaments away from each other

155. In human females, primary oocytes start division and get temporarily arrested in

- (1) Prophase stage of mitotic division
- (2) Prophase-I of meiotic division
- (3) Prophase-II of meiotic division
- (4) Metaphase-I of meiotic division

156. Which of the following is the third step of respiration in humans? CC-144

- (1) Transport of gases by the blood
- (2) Diffusion of O₂ and CO₂ between blood and tissues
- (3) Atmospheric air is drawn in and CO₂ rich alveolar air is released out
- (4) Diffusion of gases across alveolar membrane

Space for Rough Work

157. How many of the following statements is/are correct?
- (a) Air bladder is present in *Trygon* to provide buoyancy.
 - (b) Fertilisation is external in *Rana tigrina*.
 - (c) In *Aptenodytes*, hindlimbs are modified into wings.
 - (d) Notochord is persistent throughout the life in *Pristis*.
- Select the correct option.
- (1) Four
 - (2) Two
 - (3) Three-144
 - (4) OneCC-144
158. Primary site for exchange of gases in human lungs is lined by
- (1) Simple squamous epithelium
 - (2) Cuboidal epithelium
 - (3) Compound epithelium
 - (4) Columnar epithelium
159. The numeric value of length of each kidney of an adult human is equal to the number/length of
- (1) Ova released by female *Rana tigrina* at a time
 - (2) Each fallopian tube present in a human female
 - (3) Cardiac cycle per minute in humans
 - (4) Pairs of gill slits in Rohu
160. Select the odd one w.r.t. intrauterine devices.
- (1) LNG-20
 - (2) Cu7
 - (3) Lippes loop
 - (4) Diaphragm
161. Which of the following is not an incorrect statement w.r.t. steroidal oral contraceptive pills?
- (1) They all contain progestogen only
 - (2) Their mode of action is similar to that of implants-144 CC-144
 - (3) Their effective periods are much longer than that of implants
 - (4) They have to be taken daily for a period of 30 days
162. The selectable marker in the cloning vector pBR322 contains the restriction sites for
- (1) *Pst*I and *Cl*I
 - (2) *Pvu*II and *Pvu*I
 - (3) *Bam*HI and *Sal*I
 - (4) *Pvu*II and *Bam*HI
163. The type of joint that does not allow any movement is present between
- (1) Atlas and axis
 - (2) Carpal and metacarpal
 - (3) Parietal and temporal CC-144
 - (4) Carpals
164. Secretions of all of the following structures are essential for maturation and motility of sperms, except
- (1) Seminal vesicle
 - (2) Prostate gland
 - (3) Epididymis
 - (4) Seminiferous tubules
165. **Assertion (A):** Before industrialisation, the count of melanic moths was low.
Reason (R): Before industrialisation set in, lichens were absent on the tree trunks that led to predation of melanised moths.
- In the light of above statements, select the correct option.
- (1) Both (A) and (R) are true and (R) is the correct explanation of (A)
 - (2) Both (A) and (R) are true but (R) is not the correct explanation of (A)
 - (3) (A) is true, (R) is false
 - (4) Both (A) and (R) are false CC-144
166. According to the theory of special creation, the Earth is about how many years old?
- (1) 10,000
 - (2) 6,000
 - (3) 8,000
 - (4) 4,000

Space for Rough Work

CST-9_(Code-A)

167. The scientist who dismissed the spontaneous generation theory, proposed/demonstrated that
- (1) Life comes only from pre-existing life
 - (2) Formation of life was preceded by chemical evolution
 - (3) Life came on Earth from other stars or planets
 - (4) Decayed and rotting material had the capacity to give rise to organisms like frogs *etc.*
168. Which of the following sequences represents the correct order of formed elements present in human blood w.r.t. their normal count?
- (1) WBCs > RBCs > Platelets
 - (2) RBCs > Platelets > WBCs
 - (3) Platelets > RBCs > WBCs
 - (4) RBCs > WBCs > Platelets
169. Select the odd one w.r.t. factors involved in the coagulation of blood.
- (1) Prothrombin
 - (2) Fibrinogen
 - (3) Fibrin
 - (4) Albumin
170. Number of nitrogen atom(s) in the structure of a nitrogenous base that is present only in RNA and pairs with adenine base is/are
- (1) Two
 - (2) Three
 - (3) One
 - (4) Four
171. Which level describes the protein as an assembly of more than one polypeptides or subunits?
- (1) Tertiary structure
 - (2) Primary structure
 - (3) Secondary structure
 - (4) Quaternary structure
172. Consider the following reaction.
- $$S_{\text{reduced}} + S'_{\text{oxidised}} \rightarrow S_{\text{oxidised}} + S'_{\text{reduced}}$$
- Above reaction is catalysed by a
- (1) Dehydrogenase
 - (2) Transferase
 - (3) Lyase
 - (4) Hydrolase
173. All of the functions given below are true w.r.t. thyroid hormones, **except**
- (1) Support the process of red blood cell formation
 - (2) Maintenance of water and electrolyte balance
 - (3) Regulation of sleep wake cycle
 - (4) Regulation of the basal metabolic rate
174. Match Column I with Column II and select the correct option.
- | | Column I | | Column II |
|----|---------------------|-------|---|
| a. | Columnar epithelium | (i) | Engulf pathogens |
| b. | Macrophages | (ii) | In the tip of nose |
| c. | Cuboidal epithelium | (iii) | Lining of stomach and intestine |
| d. | Cartilage | (iv) | Tubular parts of nephron in the kidneys |
- (1) a(iv), b(i), c(iii), d(ii) (2) a(iv), b(iii), c(ii), d(i)
 (3) a(i), b(ii), c(iii), d(iv) (4) a(iii), b(i), c(iv), d(ii)
175. When a neuron is stimulated, a/an 'X' disturbance is generated which swiftly travels along its plasma membrane. The 'X' is
- (1) Chemical
 - (2) Electrical
 - (3) Mechanical
 - (4) Cellular
176. Match Column I with Column II and select the correct option.
- | | Column I | | Column II |
|----|-----------|-------|-------------------------|
| a. | Emphysema | (i) | Human insulin |
| b. | cry IAb | (ii) | Autoradiography |
| c. | Eli Lilly | (iii) | Cellular defence |
| d. | RNAi | (iv) | α -1-antitrypsin |
| | | (v) | Corn borer |
- (1) a(iii), b(i), c(iv), d(v) (2) a(i), b(iv), c(v), d(iii)
 (3) a(iv), b(v), c(i), d(ii) (4) a(iv), b(v), c(i), d(iii)

Space for Rough Work

177. Select the **correct** option with respect to serum and urine analysis.

- (1) Urine analysis serves the purpose of early diagnosis of diseases
- (2) These methods are frequently used in recombinant DNA technology
- (3) They are the modern methods of disease diagnosis
- (4) Early detection of diseases is not possible by using these methods

178. Consider the given statements and select the correct option w.r.t. frogs.

Statement A: They have three-chambered heart with one atrium and two ventricles.

Statement B: Their heart is covered by a membrane called pericardium.

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

179. Choose the incorrect match w.r.t. drugs and their features.

(1)	Smack	–	A depressant
(2)	Cannabinoids	–	Affect cardiovascular system
(3)	Cocaine	–	Causes hallucinations in excessive dosage
(4)	<i>Atropa belladonna</i>	–	Acts as painkiller

180. Sustained high fever (39° to 40°C), weakness, stomach pain, constipation, headache and loss of appetite are some of the common symptoms of a particular disease which is diagnosed by Widal test. This disease is caused by a

- (1) Bacterium
- (2) Protozoan
- (3) Virus
- (4) Fungus

181. Comprehend the given statements and select the **correct** option.

Statement A: The stickiness of overhanging stretches in a DNA fragment facilitates the action of DNA polymerase.

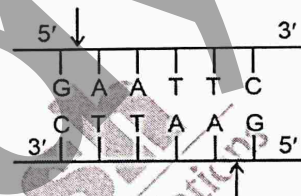
Statement B: *Agrobacterium tumefaciens* acts as a vector to deliver the T-DNA in dicot plants.

- (1) Both (A) and (B) are correct
- (2) Both (A) and (B) are incorrect
- (3) Only (A) is correct
- (4) Only (B) is correct

182. How many DNA fragments will be obtained after 5 PCR cycles of two dsDNA templates?

- (1) 32
- (2) 48
- (3) 64
- (4) 78

183. Consider the DNA sequence given below.



Select the incorrect option w.r.t. it.

- (1) It is a palindrome.
- (2) It is the recognition sequence of *EcoRI*.
- (3) This sequence is present in pBR322.
- (4) This is the recognition sequence of enzyme isolated from *Salmonella* sp.

184. Sea fan and Sea urchin are common names of _____ and _____ respectively.

Select the correct option to fill in the blanks respectively.

- (1) *Adamsia*, *Aplysia*
- (2) *Gorgonia*, *Echinus*
- (3) *Echinus*, *Pinctada*
- (4) *Antedon*, *Ophiura*

Space for Rough Work

185. How many of the organisms given in the box below is/are acoelomate(s) and is/are diploblastic in nature?

Physalia, Pennatula, Psittacula, Pteropus, Pheretima

Select the correct option.

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

SECTION-B

186. Choose the correct sequence of reproductive events in humans.

- (1) Gametogenesis → Fertilisation → Insemination → Gestation
(2) Gametogenesis → Insemination → Parturition → Gestation
(3) Gametogenesis → Fertilisation → Gestation → Parturition
(4) Parturition → Fertilisation → Insemination → Gestation

187. Read the following statements w.r.t. human brain and select the correct option.

- (1) The brain is central information processing organ of the body.
(2) It controls only voluntary movements of the body.
(3) Arachnoid is found attached with brain tissue directly.
(4) It is not a site for processing of vision.

188. JGA is a special sensitive region formed by cellular modifications in the 'X' and 'Y' at the location of their contact. Identify X and Y respectively and select the correct option.

- (1) Distal convoluted tubule, afferent arteriole
(2) Distal convoluted tubule, efferent arteriole
(3) Proximal convoluted tubule, afferent arteriole
(4) Proximal convoluted tubule, efferent arteriole

189. The receptors associated with aortic arch and carotid artery primarily recognise changes in concentration of

- (1) CO₂ and H⁺ in blood
(2) O₂ and H⁺ in blood
(3) Only O₂ in blood
(4) Only CO₂ in blood

190. Select the correct option w.r.t. various contraceptive methods.

- (1) Vasectomy – Removal of fallopian tube
(2) Tubectomy – Removal of vas deferens
(3) Sterilisation – Blocks gamete transport
(4) Sterilisation – High reversibility

191. Choose the correct match w.r.t. equal number of bones in humans.

(1)	Cervical vertebrae	–	Pectoral girdle
(2)	Floating ribs	–	Lumbar vertebrae
(3)	Metacarpals in one limb	–	Metatarsals in one limb
(4)	Phalanges in one limb	–	Tarsals in one limb

192. Fossils are abundantly present in

- (1) Igneous rocks
(2) Sedimentary rocks
(3) Metamorphic rocks
(4) Granite rocks

193. Which of the following correctly represents the composition of lymph?

- (1) WBCs + hormones + water insoluble substances + RBCs
(2) Larger proteins + nutrients + hormones + all formed elements
(3) Hormones + fats + lymphocytes + nutrients
(4) Hormones + RBCs + smaller proteins + water soluble substances

Space for Rough Work

194. **Assertion (A):** Parathyroid hormone is a hypercalcemic hormone.

Reason (R): PTH decreases Ca^{2+} absorption from the digested food.

In the light of above statements, select the correct option.

- (1) Both assertion and reason are true and reason is the correct explanation of the assertion
- (2) Both assertion and reason are true but reason is not the correct explanation of the assertion
- (3) Assertion is true statement but reason is false statement
- (4) Both assertion and reason are false statements

CC-144

195. In a polysaccharide, the individual monosaccharides are linked by a 'A' bond, whereas in a polypeptide, amino acids are linked by a 'B' bond.

Select the option that correctly identifies 'A' and 'B'.

- (1) A-Glycosidic, B-Peptide
- (2) A-Peptide, B-Ester
- (3) A-Amide, B-Hydrogen
- (4) A-Peptide, B-Glycosidic

196. Which enzyme was targeted during the gene therapy which was given to a 4-year old girl in 1990?

- (1) Pyruvate dehydrogenase
- (2) Adenosine deaminase
- (3) Carbonic anhydrase
- (4) Adenine deaminase

197. Select the option representing only correct statements w.r.t. morphology of frogs.

- a. A membranous tympanum is present on either side of their eyes.
- b. They do not have webbed digits for swimming.
- c. Mucous glands are present in their highly vascularised skin.
- d. Their body is divisible into head, neck and trunk.

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

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

198. Read the given statements and select the correct option.

Statement A: Diseases such as malaria and filariasis are transmitted through insect vectors.

Statement B: *Aedes* mosquitoes act as a vector for diseases like dengue and chikungunya.

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

199. A sampling port is provided in a stirred bioreactor to

- (1) Maintain the optimum pH of the broth
- (2) Facilitate the oxygen delivery in the system
- (3) Periodically withdraw the small volumes of the culture
- (4) Maintain the temperature in the system

200. Which of the following contraceptive methods interferes implantation by blocking estrogen receptors?

- (1) Tubectomy (2) Progestasert
- (3) Saheli (4) Vaults

□ □ □

Space for Rough Work