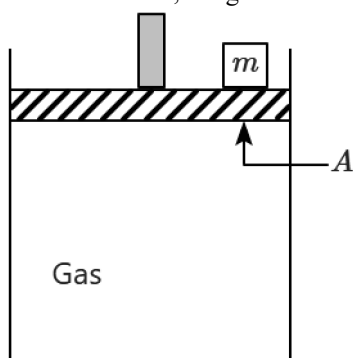


PHYSICS - SECTION A

1 An ideal gas is enclosed in a volume by means of a piston-cylinder arrangement as shown in the adjacent diagram. The piston as well as the walls of the cylinder are non-conducting. The cross-sectional area of the piston is A . g is acting downward. A small block of mass m is placed on top of the piston. There is no atmospheric pressure outside. An amount of thermal energy ΔQ is slowly supplied to the gas, and its temperature rises. Then, the gas:



- | | |
|----|---|
| 1. | expands continuously, making the volume infinite. |
| 2. | first expands and then contracts slightly. |
| 3. | expands and then reaches a steady-state. |
| 4. | expands and then contracts to return to its initial volume. |

2 Given below are two statements:

Assertion (A):	During an adiabatic expansion, a gas A cools faster than another gas B : during adiabatic compression, the gas A would heat faster than gas B .
Reason (R):	The rate of cooling or heating during an adiabatic process has the same magnitude, at any given point of the process.

- | | |
|----|--|
| 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. | (A) is False but (R) is True. |

3 For an object radiating heat at 300 K, the wavelength corresponding to maximum intensity is λ . If the temperature of the body is increased by 300 K, the new wavelength corresponding to maximum intensity will be:

- | | | | |
|----|---------------------|----|----------------------|
| 1. | $\frac{\lambda}{2}$ | 2. | 2λ |
| 3. | λ | 4. | $\frac{5\lambda}{2}$ |

4 If the volume of a solid sphere increases by 1% when its temperature is raised from 0°C to 100°C , then the volume of a hollow sphere of the same material, when the temperature is raised similarly,

- increases by 1%
- increases between 0 to 1%
- increases by more than 1%
- decreases

5 If two rods, of identical dimensions but made of materials with conductivity K_1 and K_2 , are placed end-to-end, the combination behaves as a single rod of (average) conductivity K . Then, K satisfies:

1.	$K = K_1 + K_2$	2.	$K = \frac{K_1 + K_2}{2}$
3.	$\frac{1}{K} = \frac{1}{K_1} + \frac{1}{K_2}$	4.	$\frac{2}{K} = \frac{1}{K_1} + \frac{1}{K_2}$

6 A monoatomic gas (A) and a diatomic gas (B) are taken in two separate identical containers at the same conditions of temperature and pressure.

The two gases are allowed to expand slowly, isothermally, until their volumes are doubled. The final pressure of gas A is P_A and that of gas B is P_B . Then:

1.	$P_A = P_B$
2.	$P_A = 2P_B$
3.	$P_A = \frac{1}{2}P_B$
4.	the relationship between P_A and P_B depends on the molecular weights of A and B

7 1 g of water at 100°C requires 540 cal in order to be converted to 1 g of steam, at normal atmospheric pressure. The internal energy of the water is U_1 and the steam is U_2 . Then:

- $U_2 = U_1$
- $U_2 - U_1 = 540 \text{ cal}$
- $U_2 - U_1 > 540 \text{ cal}$
- $U_2 - U_1 < 540 \text{ cal}$

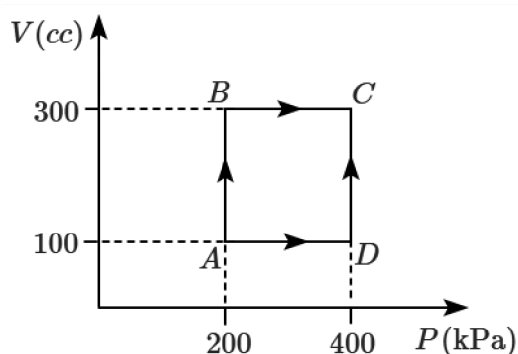
8 The SI unit of thermal capacity per unit volume is:

1.	joule/ m^3	2.	joule/kelvin
3.	joule/ $\text{kg}\cdot\text{m}^3$	4.	joule/kelvin- m^3

9 A monoatomic gas initially at pressure P and volume V is compressed to $\left(\frac{1}{8}\right)^{\text{th}}$ of its volume adiabatically. The final pressure of the gas is:

1.	$4P$	2.	$8P$
3.	$16P$	4.	$32P$

10 An ideal gas is taken from A to C through the process ABC and independently, from A to C through the process ADC – as shown on the indicator (P - V) diagram. The work done in ABC is W_1 and in ADC is W_2 ; the change in internal energy is ΔU_1 for process ABC , ΔU_2 for process ADC .



The relationship between the change in internal energies is:

- $\Delta U_1 = \Delta U_2$
- $\Delta U_2 = 6\Delta U_1$
- $\Delta U_2 = 3\Delta U_1$
- $\Delta U_1 + \Delta U_2 = 0$

11 A cavity is made within a solid, shaped in the form of a cube. The cavity is also cubical and centred within the solid. The temperature of the solid is raised. The volume of the cavity:

1.	increases by the same fraction as the cube
2.	increases by a lower fraction than the cube
3.	decreases
4.	remains the same

12 If the coefficient of linear expansion of a metal is $10^{-5}/^{\circ}\text{C}$, the coefficient of volume expansion of the same metal is:

- $10^{-5}/^{\circ}\text{C}$
- $2 \times 10^{-5}/^{\circ}\text{C}$
- $4 \times 10^{-5}/^{\circ}\text{C}$
- $3 \times 10^{-5}/^{\circ}\text{C}$

13 The same amount of heat is supplied to equimolar masses of hydrogen and helium, under constant pressure. The work done by the two gases, H_2 and He , are W_1 and W_2 . Then:

1.	$W_1 > W_2$
2.	$W_1 < W_2$
3.	$W_1 = W_2$
4.	W_1 and W_2 cannot be compared unless the temperatures are known.

14 The specific heat capacity of water is $1 \text{ cal g}^{-1} ^{\circ}\text{C}^{-1}$ and the specific latent heat is 80 cal g^{-1} when ice melts to form water at 0°C under standard atmospheric pressure. Hot water at 100°C is added to 100 g of ice at 0°C in a calorimeter and in the final equilibrium state, it is observed that 20 g of ice remains. There is no loss of heat from the system. The quantity of hot water (at 100°C), that was added to the system, is:

1.	80 g	2.	64 g
3.	20 g	4.	100 g

15 Under standard conditions of temperature and pressure, a piece of ice melts completely upon heating it. The increase in internal energy of the system (ice and water) is:

1.	equal to the heat given
2.	more than the heat given
3.	less than the heat given
4.	zero

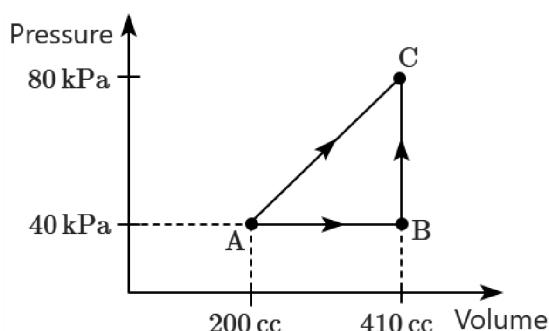
16 Gas molecules at a temperature T are enclosed within a thin-walled enclosure, the inner and outer walls having the same temperature T in equilibrium. The rms speed of the gas molecules is v_{rms} . The enclosure radiates outward as a blackbody, and the most probable wavelength is λ_{mp} , in the blackbody radiation. As the temperature of the gas varies, so do v_{rms} and λ_{mp} . The relationship between v_{rms} and λ_{mp} is:

1.	$\lambda_{\text{mp}} v_{\text{rms}} = \text{constant}$	2.	$\frac{\lambda_{\text{mp}}}{v_{\text{rms}}} = \text{constant}$
3.	$\lambda_{\text{mp}} v_{\text{rms}}^2 = \text{constant}$	4.	$\frac{\lambda_{\text{mp}}}{v_{\text{rms}}^2} = \text{constant}$

17 A resistance thermometer reads $40\ \Omega$ at 0°C and $41\ \Omega$ at 100°C . The temperature of a sample, when the resistance is $41.2\ \Omega$, is:

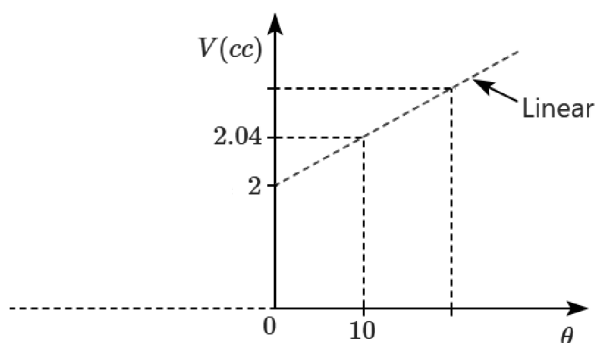
1.	20°C	2.	80°C
3.	120°C	4.	-20°C

18 The quantity of heat required to take a system from A to C through the process ABC is 20 cal. The quantity of heat required to go from A to C directly is:



1.	20 cal	2.	24.2 cal
3.	21 cal	4.	23 cal

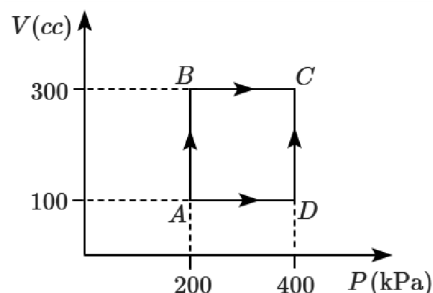
19 The volume of a fixed mass of an ideal gas (at constant pressure) is plotted as a function of temperature, measured on a certain scale (see figure). Further, θ (temperature) = 0 corresponds to the melting point of ice under standard atmospheric pressure.



The volume of an ideal gas increases, at fixed pressure, by a fraction δ' of its volume at $\theta = 0$ for every unit increase in temperature (θ). δ' equals:

1.	0.004	2.	0.002
3.	0.001	4.	0.0005

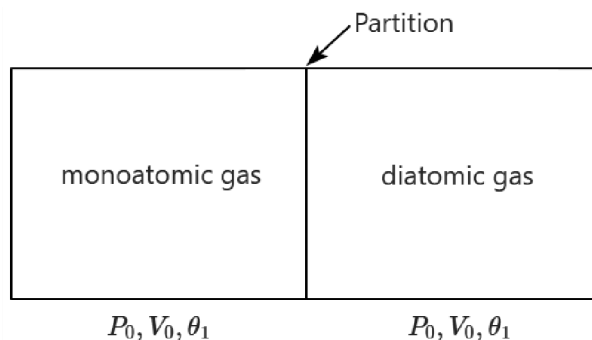
20 An ideal gas is taken from A to C through the process ABC and independently, from A to C through the process ADC – as shown on the indicator (P - V) diagram. The work done in ABC is W_1 and in ADC is W_2 ; the change in internal energy is ΔU_1 for process ABC, ΔU_2 for process ADC.



The relationship between W_1 and W_2 is:

1.	$W_1 = W_2$	2.	$W_1 = 3W_2$
3.	$W_1 = 6W_2$	4.	$W_2 = 2W_1$

21 Monoatomic and diatomic ideal gases are filled into the two compartments of an insulated vessel as shown in the figure. Their initial pressures, volumes and temperatures are P_0, V_0 and θ_1 (see figure). Thereafter, they are allowed to mix by removing the partition. The final temperature is θ_2 . Then:



1.	$\theta_1 = \theta_2$	2.	$2\theta_1 = \theta_2$
3.	$\theta_1 = 2\theta_2$	4.	$\theta_1 = 4\theta_2$

22 A copper ball is suspended by means of an insulating thread within an evacuated enclosure, the walls of which are maintained at a constant temperature of 0°C . The copper ball has to be heated by an electric current of 1 A, passed through a resistor, so as to maintain its temperature at 200°C . When the surface of the ball is blackened and the experiment is repeated: a current of 2 A is now required. The emissivity of the surface of the copper ball is:

1.	$\frac{1}{2}$	2.	$\frac{1}{4}$
3.	$\frac{1}{\sqrt{2}}$	4.	$\frac{1}{\sqrt{8}}$

23 The coefficient of linear expansion of the material of a wire A is α , and that of the material of a wire B is 2α . The two wires are joined end-to-end. If the average coefficient of linear expansion of the composite wire is 1.5α , the lengths of the wires A, B are in the ratio:

1.	1 : 1	2.	2 : 1
3.	1 : 2	4.	3 : 1

24 When water vapour condenses in the atmosphere to form raindrops, the surrounding air:

1.	cools down
2.	heats up
3.	remains at the same temperature as before
4.	condenses into liquid air

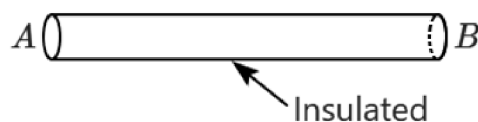
25 When radiant energy from a blackbody at temperature T , is analysed, and the most probable wavelength of the radiation is λ_{mp} , then:

- $\lambda_{\text{mp}} \propto T$
- $\lambda_{\text{mp}} \propto \frac{1}{T}$
- $\lambda_{\text{mp}} \propto T^{1/2}$
- $\lambda_{\text{mp}} \propto T^{-1/2}$

26 A black body of a given surface area at temperature T emits a certain amount of thermal radiation per second. If the temperature of the black body is doubled, the change of thermal radiation emitted will be:

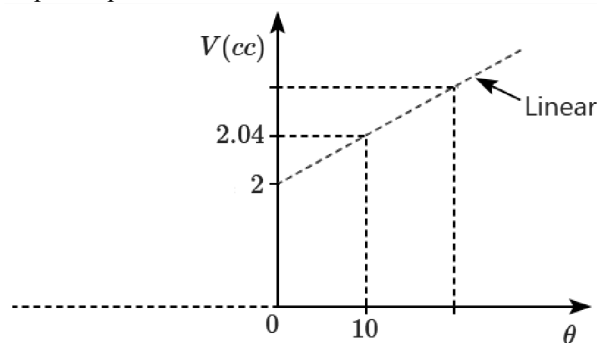
1.	2 times more than the original value.
2.	16 times more than the original value.
3.	$\frac{1}{16}$ times the original value.
4.	$\frac{1}{2}$ times the original value.

27 A cylindrical rod of copper (AB) is insulated on its sides, and its two ends are kept at temperatures of 100°C (at A) and 0°C (at B). After sufficient time, the temperature at the mid-point of the rod becomes:



1.	50°C
2.	100°C
3.	0°C
4.	any value between 0°C and 100°C , depending on its cross-section

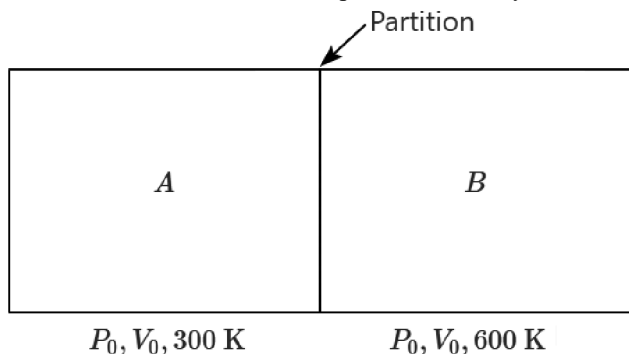
28 The volume of a fixed mass of an ideal gas (at constant pressure) is plotted as a function of temperature, measured on a certain scale (see figure). Further, θ (temperature) = 0 corresponds to the melting point of ice under standard atmospheric pressure.



The value of absolute zero, in this new scale, is:

1.	$\theta = -100$	2.	$\theta = -200$
3.	$\theta = -500$	4.	$\theta = -1000$

29 Two monoatomic gases A, B are taken in two parts of a vessel having equal volumes V_0 . The gases are at the same pressure P_0 but at temperature of 300 K and 600 K. There is a partition between the parts of the vessel. The partition is removed, and the gases are allowed to mix. The vessel, as a whole, is insulated. The final temperature of the system is:



1. 450 K
2. 400 K
3. 500 K
4. 550 K

30 Steam (at 100°C) is passed through a vessel containing 270 g of water at 0°C , initially. The steam is passed until the temperature of the water reaches a steady state. The final temperature of the water in the vessel is:

1.	50°C	2.	100°C
3.	27°C	4.	0°C

31 A solid A has a lower coefficient of thermal expansion than a liquid B . A sphere made of A floats in liquid B : fully submerged, but does not sink, at a fixed temperature. If the temperature of the system is raised, the sphere will:

1.	move slightly upward, but remain submerged
2.	move slightly down, but remain submerged
3.	rise up to the surface
4.	sink within the liquid

32 A gas is compressed adiabatically. Which of the following statements is not correct?

1.	Internal energy is constant
2.	Temperature increases
3.	$ \text{Work done} = \text{change in internal energy} $
4.	Heat is not supplied to the system

33 An object cools down from 80°C to 60°C in 5 min in a surrounding of temperature 20°C . The time taken to cool from 60°C to 40°C will be:

(Assume Newton's law of cooling to be valid.)

1.	$\frac{25}{3}$ min	2.	5 min
3.	$\frac{25}{4}$ min	4.	9 min

34 If the ends of the meter stick are maintained at $\theta_1^\circ\text{C}$ and $\theta_2^\circ\text{C}$, the temperatures measured at the 25 cm and 80 cm marks are observed to be 35°C and 68°C respectively. Then the temperatures of the left end ($\theta_1^\circ\text{C}$) and the right end ($\theta_2^\circ\text{C}$) are:

1.	$\theta_1 = 0, \theta_2 = 90$
2.	$\theta_1 = 10, \theta_2 = 85$
3.	$\theta_1 = 20, \theta_2 = 80$
4.	$\theta_1 = 30, \theta_2 = 100$

35 Given below are two statements:

Assertion (A):	When heat is supplied to a system, its temperature must increase.
Reason (R):	Positive work done by the system increases the volume of the thermodynamic system.

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

PHYSICS - SECTION B

36 The molar specific thermal capacity of the following ideal gases are compared. Which one of them is the highest?

1. H_2
2. He
3. Ne
4. Ar

37 A mixture of hydrogen and oxygen has a volume of 2000 cm^3 , temperature 300 K, pressure 100 kPa and mass 0.76 g. The ratio of the number of moles of hydrogen to the number of moles of oxygen in the mixture will be:

1. $\frac{1}{3}$
2. $\frac{3}{1}$
3. $\frac{1}{16}$
4. $\frac{16}{1}$

38 An equimolar mixture of nitrogen and carbon dioxide gases is cooled until the carbon dioxide gas condenses. Assume that the volume of liquid CO_2 is negligible compared to CO_2 gas which behaves ideally. Before the gas condensed, the total pressure was P_1 and after condensation the total pressure was P_2 . The change in temperature is negligible. Then:

1. $P_1 = P_2$	2. $P_1 = 2P_2$
3. $\frac{P_1}{28} = \frac{P_2}{44}$	4. $28P_1 = 44P_2$

39 Given below are two statements:

Statement I:	In an ideal gas, all the molecules move with the same rms speed but in different directions.
Statement II:	The molecules of an ideal gas undergo random elastic collisions with the walls of the container.

1. Statement I is incorrect and Statement II is correct.
2. Both Statement I and Statement II are correct.
3. Both Statement I and Statement II are incorrect.
4. Statement I is correct and Statement II is incorrect.

40 Hydrogen at $27^\circ C$ is heated at constant pressure so that its volume is doubled. The final temperature is θ_H (in kelvin). The same experiment is done with an equimolar mass of helium, the final temperature being θ_{He} (in kelvin). The ratio $\frac{\theta_H}{\theta_{He}}$:

1. equals 1	2. equals $\frac{7}{5}$
3. equals $\frac{5}{7}$	4. equals $\frac{1}{2}$

41 A vessel contains a mixture of hydrogen (H_2) and helium (He) molecules at a temperature of 300 K. The rms speed of hydrogen molecules is v_1 and that of helium molecules is v_2 . Their masses are m_1 (hydrogen molecule) and m_2 (helium molecule), respectively. Then:

- $v_1 = v_2$
- $m_1 v_1 = m_2 v_2$
- $\frac{1}{2} m_1 v_1^2 = \frac{1}{2} m_2 v_2^2$
- $\frac{m_1}{m_2} = \frac{v_1}{v_2}$

42 The molar heat capacity of an ideal gas:

1. is $\frac{3}{2}R$
2. $\geq \frac{3}{2}R$
3. $\leq \frac{3}{2}R$
4. can have any value depending on the process

43 The average torque on a wall of a cubical vessel, containing an ideal gas at absolute temperature T , measured about the centre of the wall is:

1. $\propto T$	2. $\propto \sqrt{T}$
3. $\propto \frac{1}{\sqrt{T}}$	4. zero

44 The molar specific heat capacity (at constant pressure) of a monoatomic gas is C_1 , of a diatomic gas is C_2 ; and of an equimolar mixture of the two is C_3 . Then:

1. $C_1 > C_3 > C_2$	2. $C_1 > C_2 > C_3$
3. $C_1 < C_3 < C_2$	4. $C_1 < C_2 < C_3$

45 The average internal kinetic energy, due to translational motion of a molecule in an ideal gas at absolute temperature T , is E_{tr} . This quantity, E_{tr} , depends on:

(A)	mass of a molecule
(B)	number of atoms in a molecule
(C)	temperature, T

- C
- B
- B, C
- A, B, C

46 For a monoatomic gas at temperature T , match the following:

Column-I	Column-II
A. Speed of sound	P. $\sqrt{\frac{2RT}{M}}$
B. Root mean square (rms) speed of gas molecules	Q. $\sqrt{\frac{8RT}{\pi M}}$
C. Average speed of gas molecules	R. $\sqrt{\frac{3RT}{M}}$
D. Most probable speed of gas molecules	S. $\sqrt{\frac{5RT}{3M}}$

Codes:

1.	A - P, B - R, C - Q, D - P
2.	A - S, B - R, C - Q, D - P
3.	A - R, B - Q, C - S, D - P
4.	A - Q, B - P, C - R, D - S

47 Suppose that the rms rotational kinetic energy of a diatomic molecule in a gas is written as: $E_{\text{rms}} = \frac{1}{2} I \omega_{\text{rms}}^2$ where ω_{rms} is the rms angular speed, and I is the moment of inertia about the axis through centre-of-mass, perpendicular to the plane of rotation. The variation of ω_{rms} with temperature is given by:

1. $\propto T^{1/2}$
2. $\propto T$
3. $\propto T^{-1/2}$
4. $\propto T^{-1}$

48 The lowest possible temperature is:

1.	0°C	2.	0°F
3.	-173°C	4.	0 K

49 A mixture of two or more ideal gases:

1.	does not follow the ideal gas equation
2.	does not follow the first law of thermodynamics
3.	has the same rms speed (per molecule) for each gas
4.	has the same average translational kinetic energy for each type of gas molecule

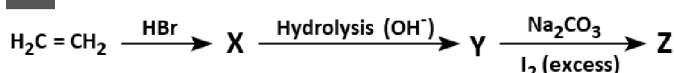
50 Given below are two statements:

Statement I:	On reducing the volume of a gas at a constant temperature, the pressure of the gas increases.
Statement II:	At constant temperature, according to Boyle's law, volume is inversely proportional to the pressure.

1.	Statement I is correct and Statement II is incorrect.
2.	Statement I is incorrect and Statement II is correct.
3.	Both Statement I and Statement II are correct.
4.	Both Statement I and Statement II are incorrect.

CHEMISTRY - SECTION A

51 Identify Z in the following series.



1. $\text{C}_2\text{H}_5\text{I}$
2. CHI_3
3. CH_3CHO
4. $\text{C}_2\text{H}_5\text{OH}$

52 CH_3-CH_3 , $\text{CH}_3-\text{CH}_2-\text{CH}_3$, $(\text{CH}_3)_2\text{CH}-\text{CH}_3$, and $\text{CH}_3-\text{CH}_2-\text{CH}(\text{CH}_3)_2$

The increasing order of stability of the free radicals formed from homolytic fission of the above three alkanes is:

1.	$(\text{CH}_3)_2\dot{\text{C}}-\text{CH}_2\text{CH}_3 < \text{CH}_3-\dot{\text{C}}\text{H}-\text{CH}_3 < \text{CH}_3-\dot{\text{C}}\text{H}_2 < (\text{CH}_3)_3\dot{\text{C}}$
2.	$\text{CH}_3-\dot{\text{C}}\text{H}_2 < \text{CH}_3-\dot{\text{C}}\text{H}-\text{CH}_3 < (\text{CH}_3)_2\dot{\text{C}}-\text{CH}_2\text{CH}_3 < (\text{CH}_3)_3\dot{\text{C}}$
3.	$\text{CH}_3-\dot{\text{C}}\text{H}_2 < \text{CH}_3-\dot{\text{C}}\text{H}-\text{CH}_3 < (\text{CH}_3)_3\dot{\text{C}} < (\text{CH}_3)_2\dot{\text{C}}-\text{CH}_2\text{CH}_3$
4.	$(\text{CH}_3)_3\dot{\text{C}} < (\text{CH}_3)_2\dot{\text{C}}-\text{CH}_2-\text{CH}_3 < \text{CH}_3-\dot{\text{C}}\text{H}-\text{CH}_3 < \text{CH}_3-\dot{\text{C}}\text{H}_2$

53 Consider the following statements:

a.	Benzene hexachloride is an aromatic compound.
b.	$-\text{NHCOCCH}_3$ is meta directing group towards aromatic electrophilic substitution reaction.
c.	In an arenium ion, one of the carbon is sp^3 hybridised.

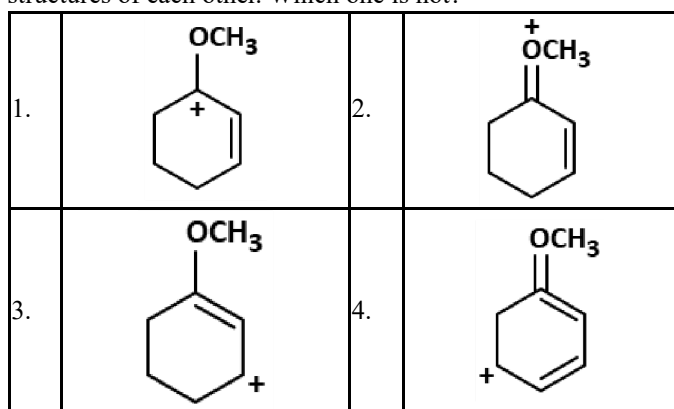
The correct statements is/are:

1.	(a) and (b) only	2.	(a) and (c) only
3.	(c) only	4.	(a), (b) and (c)

54 Consider the following compounds. The Kjeldahl method is not applicable for estimating nitrogen in how many of the given compounds?

1.	5	2.	3
3.	2	4.	4

55 Three structures out of the given four are resonating structures of each other. Which one is not?



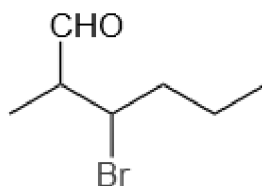
56 Gammexane (a γ -isomer) is:

1. BHC
2. Benzene hexachloride
3. Lindane
4. All of the above

57 0.40 g of an organic compound containing phosphorus gave 0.555g of $\text{Mg}_2\text{P}_2\text{O}_7$ by usual analysis. The % of phosphorus in the organic compound is:

1. 44.76
2. 38.75
3. 52.34
4. 66.44

58 The IUPAC name of the structure given below is:

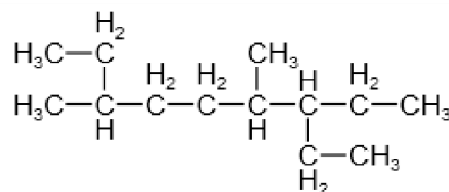


1. 2-Bromo-2-ethylhexanal
2. 3-Bromo-2-methylhexanal
3. 2-Methyl-3-bromohexanal
4. 3-Bromo-2-formylhexane

59 The principle involved in thin-layer chromatography is:

1. Partition
2. Sublimation
3. Adsorption
4. Solubility

60 The correct IUPAC name for this non-polar alkane is:

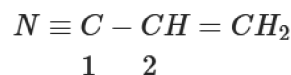


1. 3-Ethyl-4-methylheptane
2. 3-Ethyl-4, 7-dimethynonane
3. 3-Methyl-7-ethydecane
4. 3,4-Diethyl-5, 7-dimethylnonane

61 Incorrect statement regarding aromaticity among the following is:

1.	The compound should have a planar structure.
2.	The π -electrons of the compound are completely delocalized in the ring.
3.	The total number of π -electrons present in the ring should be equal to $(4n + 2)$ π electrons, where $n = 0, 1, 2 \dots$ etc. This is known as Huckel's rule.
4.	The compound should have a linear structure.

62 The hybridization of carbon atoms (1) and (2) in the given compound is:



1. sp^2 and sp^2
2. sp^3 and sp
3. sp and sp^2
4. sp and sp

63 The oxidation of benzene by V_2O_5 in the presence of air produces:

1.	Benzoic anhydride	2.	Maleic anhydride
3.	Benzoic acid	4.	Benzaldehyde

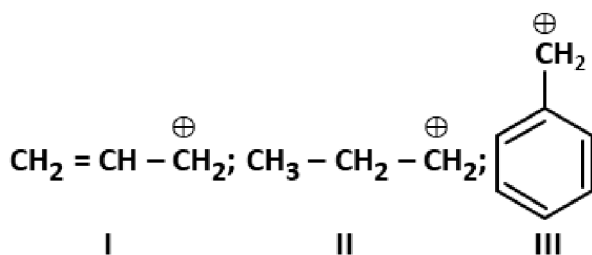
64 In thin layer chromatography, which of the following is not used to visualise the separated layer?

1.	Visualisation agent in the mobile phase
2.	Spraying of suitable reagent
3.	UV light
4.	I_2 solid

65 The substance that can be used as an adsorbent in thin-layer chromatography is:

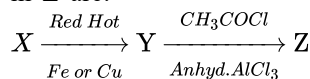
1. Na_2O
2. Na_2SO_4
3. Al_2O_3
4. NaCl

66 The correct order of stability of the following carbocations is :



1. III>II>I
2. II>III>I
3. I>II>III
4. III>I>II

67 In the following reaction, if 'X' is an alkyne with the lowest molecular weight, then the maximum number of atoms in 'Z' are:



1. 15
2. 16
3. 14
4. 17

68 For an electrophilic substitution reaction, the presence of a halogen atom in the benzene ring:

A.	Deactivates the ring by inductive effect
B.	Deactivates the ring by resonance
C.	Increases the charge density at ortho and para position relative to meta position by resonance.
D.	Directs the incoming electrophile to meta position by increasing the charge density relative to ortho and para position.

Choose the correct option

1. (A, B)
2. (B, C)
3. (C, D)
4. (A, C)

69 An unsaturated hydrocarbon 'A' reacts with two molecules of H_2 and upon reductive ozonolysis A gives butane-1,4-dial, ethanal, and propanone.

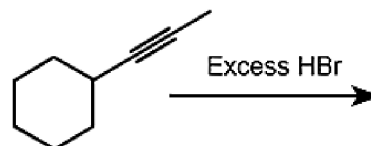
The IUPAC name of A is:

1. 2-Methylocta-2,6-diene
2. 2-Methylocta-1,5-diene
3. 3-Methylocta-2,6-diene
4. 2-Methylocta-1,6-diene

70 The correct order of the leaving group ability is:

1. $\text{OCOC}_2\text{H}_5 > \text{OC}_2\text{H}_5 > \text{OSO}_2\text{Me} > \text{OSO}_2\text{CF}_3$
2. $\text{OC}_2\text{H}_5 > \text{OCOC}_2\text{H}_5 > \text{OSO}_2\text{CF}_3 > \text{OSO}_2\text{Me}$
3. $\text{OSO}_2\text{CF}_3 > \text{OSO}_2\text{Me} > \text{OCOC}_2\text{H}_5 > \text{OC}_2\text{H}_5$
4. $\text{OCOC}_2\text{H}_5 > \text{OSO}_2\text{CF}_3 > \text{OC}_2\text{H}_5 > \text{OSO}_2\text{Me}$

71 Identify the product of the following reaction:



1.		2.	
3.		4.	

72 Identify the compound in which the lone pair of oxygen is delocalized:

1.		2.	
3.		4.	

73 The chain propagation step in the free radical chlorination of dichloromethane is:

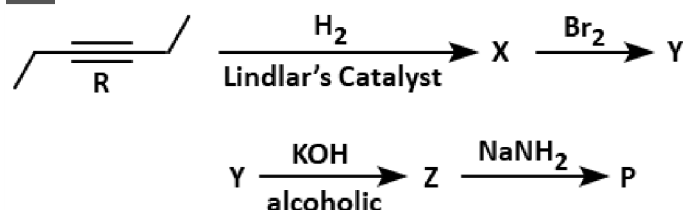
- | | |
|----|--|
| 1. | $\bullet\text{CHCl}_2 + \text{Cl}_2 \longrightarrow \text{CHCl}_3 + \text{Cl}\bullet$ |
| 2. | $\bullet\text{CHCl}_2 + \dot{\text{Cl}} \longrightarrow \text{CHCl}_3$ |
| 3. | $\text{Cl}_2 + \text{UV light} \longrightarrow 2 \dot{\text{Cl}}$ |
| 4. | $\bullet\text{CHCl}_2 + \bullet\text{CHCl}_2 \longrightarrow \text{CHCl}_2\text{CHCl}_2$ |

74 Given below are two statements:

Statement I:	n-Alkanes on heating in the presence of anhydrous AlCl_3 and HCl gas isomerize to branched-chain alkanes.
Statement II:	Ordinarily, alkanes resist oxidation but alkanes having tertiary H atom can be oxidized to corresponding alcohols by potassium permanganate.

- | | |
|----|---|
| 1. | Both Statement I and Statement II are correct. |
| 2. | Both Statement I and Statement II are incorrect. |
| 3. | Statement I is correct and Statement II is incorrect. |
| 4. | Statement I is incorrect and Statement II is correct. |

75



For the reaction sequence given above, R and P are:

- Geometrical isomers
- The same compound
- Positional isomers
- Non-isomeric different compounds

76

Statement I:	Pyridine is a heterocyclic aromatic compound.
Statement II:	The extra stability a compound gains from having delocalized electrons is called resonance energy.

In light of the above statements, choose the correct answer.

- Both **Statement I** and **Statement II** are correct.
- Both **Statement I** and **Statement II** are incorrect.
- Statement I** is correct, but **Statement II** is incorrect.
- Statement I** is incorrect, but **Statement II** is correct.

77 Consider the following compounds:

A.		B.	
C.		D.	

The correct order of basicity of the above compounds is:

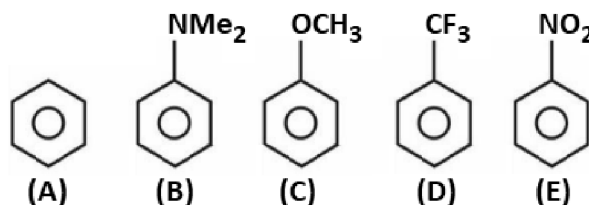
- $\text{C} > \text{A} > \text{B} > \text{D}$
- $\text{D} > \text{B} > \text{A} > \text{C}$
- $\text{B} > \text{A} > \text{C} > \text{D}$
- $\text{D} > \text{C} > \text{A} > \text{B}$

78 Ethyne $\xrightarrow{?}$ Benzene

The reagent used in the above conversion is:

- Cr_2O_3
- Aic. KOH
- Red hot Fe
- $\text{NaNH}_2/\text{liq. NH}_3$

79 The decreasing order of the rate of the electrophilic aromatic substitution reaction is:

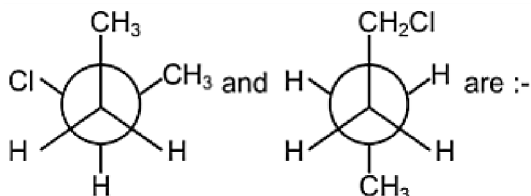


- $\text{B} > \text{C} > \text{A} > \text{D} > \text{E}$
- $\text{A} > \text{B} > \text{C} > \text{D} > \text{E}$
- $\text{E} > \text{D} > \text{C} > \text{B} > \text{A}$
- $\text{A} > \text{B} > \text{D} > \text{C} > \text{E}$

80 Metallic sodium is fused with organic compounds for testing nitrogen, sulphur, and halogens. The correct reason behind this is:

- | | |
|----|---|
| 1. | To convert all compounds to their ionic form. |
| 2. | Sodium reduces the compounds. |
| 3. | Sodium converts all compounds in their covalent form. |
| 4. | None of the above. |

81 Newman's projections shown below are related as:



1. Enantiomers
2. Conformers
3. Positional isomers
4. None of these

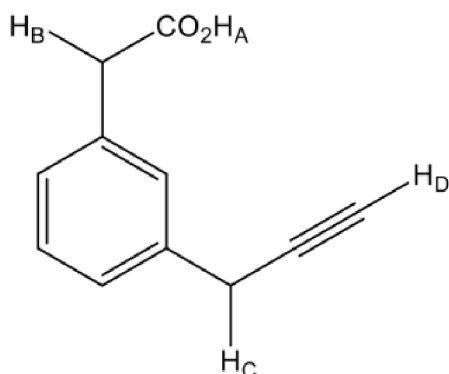
82 Consider the following compounds:

- A. 1, 4-Dichlorobenzene
- B. Cis-1, 2-dichloroethane
- C. trans-1, 2-dichloroethene
- D. Trans-1, 2-dichloro-2-pentene

Polar compounds, among the above, are:

1.	A and C	2.	A and B
3.	B and C	4.	B and D

83 Consider the following molecule:



The correct order of the acidic strength of marked hydrogen is:

1. $H_A > H_D > H_B > H_C$
2. $H_B > H_A > H_D > H_C$
3. $H_A > H_B > H_C > H_D$
4. $H_C > H_B > H_D > H_A$

84 Xylene, on oxidation with acidic $KMnO_4$, gives:

1.	Phthalic acid	2.	Isophthalic acid
3.	Terephthalic acid	4.	All of the above

85 Match the compounds given in column I with their corresponding exhibiting isomer given in column II and mark the appropriate choice:

	Column I		Column II
(A)	CH_3CH_2OH and $H_3C - O - CH_3$	(i)	Position isomers
(B)	$C_2H_5COC_2H_5$ and $C_3H_7COCH_3$	(ii)	Tautomers
(C)		(iii)	Functional isomers
(D)	$CH_3CH_2CH_2OH$ and $CH_3 - \underset{\substack{ \\ OH}}{CH} - CH_3$	(iv)	Metamers

1. (A) \rightarrow (iv), (B) \rightarrow (iii), (C) \rightarrow (i), (D) \rightarrow (ii)
2. (A) \rightarrow (i), (B) \rightarrow (iii), (C) \rightarrow (ii), (D) \rightarrow (iv)
3. (A) \rightarrow (iii), (B) \rightarrow (iv), (C) \rightarrow (ii), (D) \rightarrow (i)
4. (A) \rightarrow (iv), (B) \rightarrow (i), (C) \rightarrow (ii), (D) \rightarrow (iii)

CHEMISTRY - SECTION B

86 The molecule, among the following, that has the smallest heat of hydrogenation per mole is:

1. Cis-2-Butene
2. Trans-2-Butene
3. Propene
4. 1-Butene

87

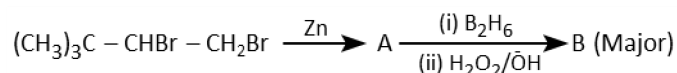
Assertion (A):	Nitration of benzene with nitric acid requires the use of concentrated sulphuric acid.
Reason (R):	The mixture of concentrated sulphuric acid and concentrated nitric acid produces the electrophile, NO_2^+ .

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.	(A) is False but (R) is True.

88 In CH_3CH_2OH , the bond that undergoes heterolytic cleavage most readily is:

1. $C - C$
2. $C - O$
3. $C - H$
4. $O - H$

89 Consider the following reaction sequence:



Major product B is:

1.	$ \begin{array}{c} CH_3 \\ \\ CH_3 - C - CH - CH_2 \\ \quad \quad \\ CH_3 \quad OH \quad OH \end{array} $
2.	$ \begin{array}{c} CH_3 \\ \\ CH_3 - C - CH - CH_3 \\ \quad \\ OH \quad CH_3 \end{array} $
3.	$(CH_3)_3C - CH_2 - CH_2 - OH$
4.	$ \begin{array}{c} (CH_3)_3C - CH - CH_3 \\ \\ OH \end{array} $

90 A compound that cannot give Friedel-Craft's reaction is:

1. Xylene
2. Nitrobenzene
3. Toluene
4. Cumene

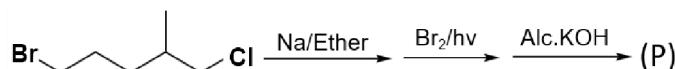
91 The numbers of structural isomers of C_4H_8 (with one double bond) and C_5H_8 (with one triple bond) are:

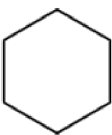
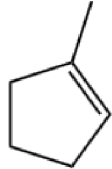
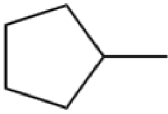
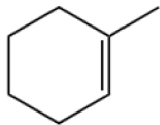
1. $C_4H_8 = 3$; $C_5H_8 = 3$
2. $C_4H_8 = 4$; $C_5H_8 = 4$
3. $C_4H_8 = 3$; $C_5H_8 = 4$
4. $C_4H_8 = 4$; $C_5H_8 = 3$

92 The elimination reaction among the following is:

1. $CH_3CH_3 + Cl_2 \rightarrow CH_3CH_2Cl + HCl$
2. $CH_3Cl + KOH(aq.) \rightarrow CH_3OH + KCl$
3. $CH_2=CH_2 + Br_2 \rightarrow CH_2BrCH_2Br$
4. $C_2H_5Br + KOH(alc.) \rightarrow C_2H_4 + KBr + H_2O$

93 The final product (P) in the following sequence of reactions is:



1.		2.	
3.		4.	

94 C-H bond that has the highest 's' character, among the following, is:

1. Acetylene
2. Ethylene
3. Methane
4. $\dot{C}H_3$ radical

95 The angle, among the following, associated with the strongest bond formation is:

1. 109°
2. 120°
3. 180°
4. 360°

96 The correct statement(s) among the following is/are:

(A).	The boiling point of 2-methylbutane is greater than n-pentane.
(B).	Petrol and lower fractions of petroleum are used for dry cleaning of clothes to remove grease stains.
(C).	The melting point of 2,2-Dimethylpropane is greater than n-pentane.

1. (B) only
2. (C) only
3. (B) and (C) only
4. (A), (B), and (C)

97 Hyperconjugation involves the delocalization of:

1. σ electron
2. π -electron
3. Both σ and π electrons
4. Proton

98 The dihedral angle of the least stable conformer of ethane is:

1.	60°	2.	0°
3.	120°	4.	180°

99 The maximum -I effect is shown by which one of the following?

1. -F
2. -NO₂
3. -CN
4. -OH

100 $\text{Ph} - \text{C} \equiv \text{C} - \text{CH}_3 \xrightarrow{\text{Hg}^{2+}/\text{H}^+} \text{A}$

In the above reaction, the structure of the product (A) is:

1.		2.	
3.	$\text{Ph} - \text{CH}_2 - \text{C}(\text{H}_2) - \text{CHO}$	4.	$\text{Ph} - \text{CH}_2 - \text{C}(\text{OH}) = \text{CH}_2$

BIOLOGY I - SECTION A

101 Regeneration of NAD⁺ is accomplished by:

- I:** Ethanol fermentation
II: Lactate fermentation
1. Only **I**
 2. Only **II**
 3. Both **I** and **II**
 4. Neither **I** nor **II**

102 For every CO₂ molecule entering the Calvin cycle:

1.	3 molecules of ATP and 3 of NADPH are required.
2.	3 molecules of ATP and 2 of NADPH are required.
3.	3 molecules of ATP and 3 of NADPH are required.
4.	2 molecules of ATP and 2 of NADPH are required

103 The respiratory pathway is best considered as:

1. a pure catabolic pathway
2. a pure anabolic pathway
3. an amphibolic pathway
4. a redundant pathway

104 A net gain of how many ATP molecules occurs during aerobic respiration of one molecule of glucose?

1. 30
2. 32
3. 36
4. 38

105 Sucrose is converted into glucose and fructose by the enzyme:

1.	Sucrase	2.	Glucokinase
3.	Zymase	4.	Invertase

106 Regarding Kranz anatomy, the bundle sheath cells:

1.	are rich in an enzyme Ribulose biphosphate carboxylase-oxygenase (RuBisCO) but lack PEPcase.
2.	are rich in enzymes Ribulose biphosphate carboxylase-oxygenase (RuBisCO) and PEPcase.
3.	lack enzymes Ribulose biphosphate carboxylase-oxygenase (RuBisCO) and PEPcase.
4.	lack enzyme Ribulose biphosphate carboxylase-oxygenase (RuBisCO) but are rich in PEPcase.

107 A molecule of GTP is synthesized in Krebs cycle during:

1. the condensation of acetyl group with oxaloacetic acid
2. isomerization of citrate to isocitrate
3. the conversion of succinyl-CoA to succinic acid
4. the regeneration of oxaloacetic acid

108 The molecule used to fix carbon dioxide in Calvin cycle is:

1.	Acetyl CoA, a 2 carbon molecule
2.	G3P (Glyceraldehyde-3-phosphate), a 3 carbon molecule
3.	RuBP (Ribulose-1,5-bisphosphate), a 5 carbon molecule
4.	Citrate, a 6 carbon molecule

109 In the mitochondrial Electron Transport System, Ubiquinone receives reducing equivalents from:

- I:** Complex I
II: Complex II

1.	Only I	2.	Only II
3.	Both I and II	4.	Neither I nor II

110 Identify the number of correct statements regarding glycolysis:

I:	It occurs in virtually all cells
II:	It is also called as HMP pathway
III:	It occurs in the cytosol
IV:	It is the only process in respiration in anaerobic organisms

1. 1
2. 2
3. 3
4. 4

111 Consider the given two statements:

Assertion (A):	Photosynthesis cannot be carried out in higher plants at very high temperatures.
Reason (R):	Carbon fixation is an enzyme mediated process and the enzymes would be denatured at very high temperatures.

1.	Both (A) and (R) are True and (R) correctly explains the (A).
2.	(A) is True; (R) is False
3.	(A) is False; (R) is False
4.	Both (A) and (R) are True but (R) does not correctly explain the (A).

112 What is the site of the light-dependent reactions in photosynthesis in higher plants?

1. Stroma of chloroplasts
2. Thylakoid membrane
3. Lumen of thylakoid
4. Intermembrane space

113 Consider the two statements:

Statement I:	In the photorespiratory pathway, there is synthesis of sugars, but not of ATP.
Statement II:	Photorespiratory pathway results in the release of CO ₂ with the utilization of ATP.

1.	Statement I is correct; Statement II is correct
2.	Statement I is incorrect; Statement II is correct
3.	Statement I is correct; Statement II is incorrect
4.	Statement I is incorrect; Statement II is incorrect

114 If fatty acids were to be respired, they would enter the respiratory pathway as:

1. 2 carbon molecules
2. 3 carbon molecules
3. 4 carbon molecules
4. 6 carbon molecules

115 Identify the correct statements:

I:	The primary carbon dioxide acceptor in C ₃ plants is Phospho enol pyruvate [PEP].
II:	The primary carbon fixation product in C ₃ plants is Oxalo acetic acid [OAA].

1. Only I
2. Only II
3. Both I and II
4. Neither I nor II

116 For each ATP molecule produced, the number of H⁺ ions that must pass through F₀ from the intermembrane space to the matrix down the electrochemical proton gradient, is most likely:

1. 2
2. 3
3. 4
4. 6

117 Yeasts carry out ethanol fermentation but poison themselves to death when the concentration of alcohol reaches about:

1. 5 per cent.
2. 13 per cent.
3. 20 per cent.
4. 45 per cent.

118 The correct chronology of steps of formation of the given metabolites in TCA cycle is:

1.	Isocitrate – Citrate – Succinyl CoA – α ketoglutarate
2.	Citrate – Isocitrate – Succinyl CoA – α ketoglutarate
3.	Citrate – Isocitrate – α ketoglutarate – Succinyl CoA
4.	Isocitrate – Citrate – α ketoglutarate – Succinyl CoA

119 During aerobic respiration, the passing on of the electrons removed, as part of the hydrogen atoms, to molecular O₂ with simultaneous synthesis of ATP takes place:

1. In the cytoplasm
2. In the mitochondrial matrix
3. In the intermembrane space
4. In the inner membrane of mitochondria

120 The net number of ATP and NADH molecules produced because of glycolysis of one glucose molecule respectively will be:

1. 2 and 2
2. 2 and 4
3. 4 and 2
4. 4 and 4

121 During oxygenic photosynthesis in higher plants, in the light reactions, the source of replacement electrons for Photosystem II is:

1. Glucose
2. Water
3. NADPH
4. Photosystem I

122 Fe-S proteins, involved in oxidation-reduction reactions of electron transport in mitochondria, are a part of all of the following except:

1. Complex I
2. Complex II
3. Complex III
4. Complex IV

123 Consider the two statements:

Statement I:	In C_4 plants, photorespiration does not occur.
Statement II:	C_4 plants have a mechanism that increases the concentration of CO_2 at the RuBisCO enzyme site.

1.	Statement I is correct; Statement II is correct
2.	Statement I is incorrect; Statement II is correct
3.	Statement I is correct; Statement II is incorrect
4.	Statement I is incorrect; Statement II is incorrect

124 A plant is growing in an open field during a hot summer day. Which of the following limiting factor will have the greatest effect on photosynthesis carried out by this plant?

1. Carbon dioxide concentration
2. Light intensity
3. Temperature
4. Oxygen

125 The RQ [respiratory quotient]:

I:	is 1, when carbohydrates are used as substrate and are completely oxidized
II:	is less than 1, when fats are used as substrate and are completely oxidized
III:	is more than 1, when proteins are used as substrate and are completely oxidized

1. Only **I** and **II** are correct
2. Only **I** and **III** are correct
3. Only **II** and **III** are correct
4. **I**, **II** and **III** are correct

126 Consider the two statements:

Statement I:	Current availability of CO_2 levels is limiting to the C_3 plants.
Statement II:	C_3 plants show saturation at about $360 \mu L^{-1}$

1.	Statement I is correct; Statement II is correct
2.	Statement I is incorrect; Statement II is correct
3.	Statement I is correct; Statement II is incorrect
4.	Statement I is incorrect; Statement II is incorrect

127 In PS I, the reaction centre chlorophyll a has an absorption peak at:

1.	660 nm	2.	680 nm
3.	700 nm	4.	730 nm

128 In cellular respiration, oxygen is directly used in:

1.	Glycolysis	2.	Fermentation
3.	Krebs cycle	4.	Electron transport

129 The term 'Complex III' in the mitochondrial electron transport system refers to:

1.	Cytochrome bc_1 complex	2.	Cytochrome b_6f complex
3.	Cytochrome c oxidase	4.	Cytochrome c

130 The primary pigment molecule responsible for capturing light energy during photosynthesis in higher plants is:

1. Chlorophyll
2. Carotenoid
3. Bacteriochlorophyll
4. Xanthophyll

131 In the mitochondrial Electron Transport System, Cytochrome c:

1.	is a small protein attached to the inner surface of the outer membrane and acts as a mobile carrier for transfer of electrons between complex III and IV.
2.	is a small protein attached to the outer surface of the inner membrane and acts as a mobile carrier for transfer of electrons between complex III and IV.
3.	is a lipid present within the inner membrane and acts as a mobile carrier for transfer of electrons between complex I and II.
4.	is a lipid present within the inner membrane and acts as a mobile carrier for transfer of electrons between complex II and III.

132 Which enzyme is associated with Complex II of the mitochondrial Electron Transport System?

1. NADH dehydrogenase
2. Succinate dehydrogenase
3. Pyruvate dehydrogenase
4. Malate dehydrogenase

133 A molecule of ATP is produced in glycolysis during:

I:	The conversion of glucose into glucose 6-phosphate.
II:	The conversion of fructose 6-phosphate to fructose 1, 6-bisphosphate.

1. Only I
2. Only II
3. Both I and II
4. Neither I nor II

134 Photosynthesis is carried out by green plants most effectively in what wavelength range of light?

1. Green	2. Infrared
3. Blue and red	4. Ultraviolet

135 Consider the given two statements:

Assertion (A):	The protons or hydrogen ions that are produced by the splitting of water accumulate within the lumen of the thylakoids.
Reason (R):	Splitting of the water molecule takes place on the inner side of the thylakoid membrane

1.	Both (A) and (R) are True and (R) correctly explains the (A).
2.	(A) is True; (R) is False
3.	(A) is False; (R) is False
4.	Both (A) and (R) are True but (R) does not correctly explain the (A).

BIOLOGY I - SECTION B

136 A plant hormone least likely to be classified a growth promoter in plants will be:

1. auxins	2. gibberellins
3. cytokinins	4. abscisic acid

137 Plant hormones that affects stem elongation to the greatest extent would be:

1. gibberellin	2. cytokinin
3. abscisic acid	4. ethylene

138 Auxins:

- I:** promote flowering in tomatoes.
II: induce parthenocarp in pineapples.
1. Only I
 2. Only II
 3. Both I and II
 4. Neither I nor II

139 The names of Skoog and Miller are associated with the discovery of:

1. Cytokinins	2. Ethylene
3. Jasmonates	4. GAs

140 Opening and closing of stomata in response to environmental conditions is mainly regulated by:

1. gibberellins	2. cytokinins
3. abscisic acid	4. auxins

141 "Bakane" – "Foolish seedling" disease in rice is caused by:

1. auxins	2. gibberellins
3. cytokinins	4. ethylene

142 Which plant growth regulators are terpenes?

1. Auxins	2. GAs
3. ABA	4. Cytokinins

143 The phenomenon of heterophylly in plants is an example of:

1. Pleiotropy	2. Plasticity
3. Convergence	4. Saltation

144 Consider the two statements:

Statement I:	Plant growth and development is intimately linked to the water status of the plant.
Statement II:	The plant cells grow in size by cell enlargement which in turn requires water.

pl

1.	Statement I is correct; Statement II is correct
2.	Statement I is incorrect; Statement II is correct
3.	Statement I is correct; Statement II is incorrect
4.	Statement I is incorrect; Statement II is incorrect

145 Which of the following plant growth regulators enhances the respiration rate during ripening of the fruits?

1. ABA	2. Ethylene
3. Auxins	4. Cytokinins

146 Identify the correct statements:

I:	Wheat, rice and oat plants represent C ₃ plants.
II:	Sugarcane and corn represent C ₄ plants.

1. Only I
2. Only II
3. Both I and II
4. Neither I nor II

147 Consider the given two statements:

Assertion (A):	Unlike animals, plants retain the capacity for unlimited growth throughout their life.
Reason (R):	Unlike animals, there is presence of meristems at certain locations in their body.

1.	Both (A) and (R) are True and (R) correctly explains the (A).
2.	(A) is True; (R) is False
3.	(A) is False; (R) is False
4.	Both (A) and (R) are True but (R) does not correctly explain the (A).

148 Who predicted that plants give off oxygen as a result of splitting of water molecules during photosynthesis, not of carbon dioxide molecules as thought before?

1. Priestley	2. C. B. van Neil
3. T. W. Engelmann	4. Arnon and his co-workers

149 The zone of elongation at the root tip is:

1.	proximal to meristematic zone and maturation zone
2.	distal to meristematic zone and maturation zone
3.	proximal to meristematic zone and distal to maturation zone
4.	distal to meristematic zone and proximal to maturation zone

150 Formation of interfascicular cambium and cork cambium in certain plants is an example of:

1. Differentiation	2. De-differentiation
3. Re-differentiation	4. Anti-differentiation

BIOLOGY II - SECTION A

151 An amino acid is important in the biosynthesis of iodothyronines and catecholamines. Which amino acid is this?

1. Tryptophan	2. Tyrosine
3. Methionine	4. Glycine

152 Which of the following part of the limbic system plays important role in consolidating short term memory into long term memory?

1. Amygdala	2. Septum
3. Hippocampus	4. Olfactory bulbs

153 Which of the following parts of the scapula forms a joint with the clavicle?

1. acromion	2. glenoid cavity
3. spine	4. scapular notch

154 The sympathetic neural system and parasympathetic neural system are the subdivisions of:

1. Central neural system
2. Somatic neural system
3. Visceral neural system
4. Autonomic neural system

155 What restores the resting potential of the axonal membrane at the site of excitation after depolarisation?

1. Influx of sodium ions
2. Influx of potassium ions
3. Efflux of sodium ions
4. Efflux of potassium ions

156 The hypothalamus in the human brain does not play a direct role in:

1. Thermoregulation
2. Osmoregulation
3. Endocrine functions
4. Gastric secretions

157 Bundles of skeletal muscle fibres called fascicles are enclosed by a connective tissue known as:

1. Fascia	2. Perimysium
3. Endomysium	4. Epimysium

158 Identify the correct statements:

I:	Macrophages in body and leucocytes in blood exhibit amoeboid movement.
II:	Passage of ova through the female reproductive tract is facilitated by the ciliary movement.
III:	Human sperm moves with the help of flagellum

1. Only I and II
2. Only I and III
3. Only II and III
4. I, II and III

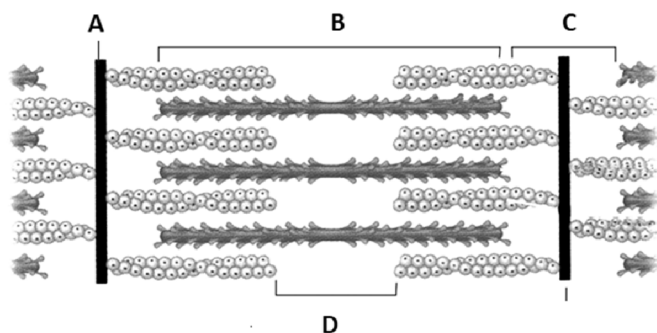
159 Under resting conditions, the axonal membrane is:

1.	impermeable to Na^+ ions and relatively more permeable to K^+ ions.
2.	impermeable to Na^+ ions and K^+ ions.
3.	freely permeable to Na^+ ions and relatively more impermeable to K^+ ions.
4.	freely permeable to Na^+ ions and K^+ ions.

160 An autoimmune disease resulting in muscle weakness because of abnormal functioning of the neuromuscular junction is:

1. poliomyelitis	2. myasthenia gravis
3. multiple sclerosis	4. Duchenne muscular dystrophy

161 Identify A, B, C and D in the given diagram:



	A	B	C	D
1.	Z line	A band	H zone	I band
2.	Z line	A band	I band	H zone
3.	M line	A band	H zone	I band
4.	M line	H zone	A band	I band

162 How many of the given statements are correct?

I:	Hind brain and midbrain make up the brain stem.
II:	The hindbrain comprises pons, cerebellum and medulla.
III:	The forebrain consists of cerebrum, thalamus and hypothalamus.

1. 0
2. 1
3. 2
4. 3

163 To form the largest ball and socket joint in our body, the head of the femur articulates with the:

1. glenoid cavity
2. acetabulum
3. obturator foramen
4. patella

164 Which of the following hormones is secreted by the pars intermedia of pituitary gland?

1. Melatonin
2. Melanin
3. Melanocyte Stimulating Hormone
4. somatomammotropin

165 The dorsal root of the spinal nerves:

1.	transmits sensory information
2.	transmits motor information
3.	is the only location of unipolar neurons in the human body
4.	is the site of coordination of the autonomic neural system

166 How many of the given statements are correct?

I.	There are 8 cranial bones in human skull.
II.	There are 7 cervical vertebrae in Giraffe.
III.	There are 7 tarsal bones in human ankle.
IV.	There are 8 carpal bones in human wrist.
V.	There are 30 bones in each human limb.
VI.	There are 26 vertebrae in human adults.

1. 3
2. 4
3. 5
4. 6

167 The smallest, functional unit of contraction in a skeletal muscle is the:

1.	muscle fiber	2.	sarcomere
3.	myofilament	4.	myofibril

168 In the peripheral neural system, Schwann cells surround the axons of:

- I:** Myelinated nerve fibres
II: Unmyelinated nerve fibres
1. Only **I**
 2. Only **II**
 3. Both **I** and **II**
 4. Neither **I** nor **II**

169 Consider the given two statements:

Assertion (A):	Hormones act only on their target cells.
Reason (R):	Hormones are transported to their target organs by ducts.

1.	Both (A) and (R) are True and (R) correctly explains the (A).
2.	(A) is True; (R) is False
3.	(A) is False; (R) is False
4.	Both (A) and (R) are True but (R) does not correctly explain the (A).

170 The two cerebral hemispheres in the human brain are connected by a tract of nerve fibres called:

1.	corpus striatum	2.	corpus callosum
3.	corpus luteum	4.	corpus unigemina

171 The first carpometacarpal joint at the base of the thumb is an example of:

1.	saddle joint	2.	pivot joint
3.	hinge joint	4.	condyloid joint

172 Which of the following events is likely to happen if diffusion of ions is allowed in a resting polarized axonal membrane?

1. Na^+ will move out of the cell
2. Na^+ will move into the cell
3. K^+ will move into the cell
4. Na^+ and K^+ will both move out of the cell

173 What type of arthritis is a metabolic disorder in which an abnormal amount of uric acid crystals is deposited in the joint?

1.	gouty	2.	rheumatoid
3.	osteo	4.	psoriatic

174 Consider the given two statements:

Assertion (A):	The receptors for insulin are located inside the cell.
Reason (R):	Insulin is lipid soluble.

1.	Both (A) and (R) are True and (R) correctly explains the (A).
2.	(A) is True; (R) is False
3.	(A) is False; (R) is False
4.	Both (A) and (R) are True but (R) does not correctly explain the (A).

175 During the contraction of a skeletal muscle, calcium ions released from the sarcoplasmic reticulum bind with:

1.	F actin	2.	G actin
3.	troponin	4.	tropomyosin

176 The direct source of energy for myosin to allow the filaments to contract is:

1. adenosine diphosphate
2. ATP
3. creatine phosphate
4. creatinine

177 The joint between the adjacent vertebrae in the vertebral column:

- I:** is a fibrous joint
II: permits limited movements
1. Only **I** is correct
 2. Only **II** is correct
 3. Both **I** and **II** are correct
 4. Both **I** and **II** are incorrect

178 Consider the given two statements:

Assertion (A):	Electrical synapse are rarer than chemical synapse in human body.
Reason (R):	Electrical synapse are faster than the chemical synapse.

1.	Both (A) and (R) are True and (R) correctly explains the (A).
2.	(A) is True; (R) is False
3.	(A) is False; (R) is False
4.	Both (A) and (R) are True but (R) does not correctly explain the (A).

179 The combination of a motor neuron and all the muscle fiber in a muscle it associates with is called a:

1.	fascicle	2.	motor end plate
3.	motor unit	4.	myoneural junction

180 The cerebral aqueduct is a narrow 15 mm conduit for cerebrospinal fluid (CSF) that passes through the:

1. Corpus callosum
2. Diencephalon
3. Mid brain
4. Medulla oblongata

181 Consider the given two statements:

Assertion (A):	Deficiency of ADH causes diabetes insipidus.
Reason (R):	ADH promotes the expulsion of water from the collecting duct, a portion of the nephron.

1.	Both (A) and (R) are True and (R) correctly explains the (A).
2.	(A) is True; (R) is False
3.	(A) is False; (R) is False
4.	Both (A) and (R) are True but (R) does not correctly explain the (A).

182 Nissl's granules are found in:

- I:** Soma of the neuron
II: Dendrites of the neuron
III: Axon of the neuron
1. Only **I** and **II**
 2. Only **I** and **III**
 3. Only **II** and **III**
 4. **I, II** and **III**

183 All the following regarding visceral muscles in our body will be true except:

1.	They are located in the inner walls of hollow visceral organs of the body like the alimentary canal, reproductive tract, etc.
2.	They do not exhibit any striation and are smooth in appearance, hence, they are called smooth muscles (nonstriated muscle).
3.	Their activities are under the voluntary control of the nervous system and are therefore, known as voluntary muscles.
4.	They assist in the transportation of food through the digestive tract and gametes through the genital tract.

184 Which regions of the adult human vertebral column is formed by fusion of some vertebrae?

1. cervical and thoracic
2. thoracic and lumbar
3. lumbar and sacral
4. sacral and coccygeal

185 A neural signal reaching the neuro-muscular junction releases a neurotransmitter called:

1. Epinephrine
2. Substance P
3. Acetylcholine
4. Serotonin

BIOLOGY II - SECTION B

186 All the following functions will be carried out by adrenaline except:

1. an increase in heart rate and strength of heart beat
2. pupil dilation
3. stimulation of gastrointestinal activity
4. increased blood glucose level

187 Steroid hormones are produced in human body by:

1. GIT and Adrenal medulla
2. Adrenal cortex and Thyroid
3. Adrenal cortex and Gonads
4. Gonads and Thymus

188 Aldosterone causes:

I:	Reabsorption of sodium ions by the distal parts of the tubules.
II:	Secretion of potassium ions by the distal parts of the tubules.

1.	Only I	2.	Only II
3.	Both I and II	4.	Neither I nor II

189 Deaf-mutism and mental retardation is seen in the deficiency of:

1.	Iron	2.	Calcium
3.	B ₁₂	4.	Iodine

190 Consider the given two statements:

Assertion (A):	Cortisol increases blood glucose levels.
Reason (R):	Cortisol increases the glucose uptake by the body cells.

1.	Both (A) and (R) are True and (R) correctly explains the (A).
2.	(A) is True; (R) is False
3.	(A) is False; (R) is False
4.	Both (A) and (R) are True but (R) does not correctly explain the (A).

191 The anterior pituitary gland in humans:

I:	is the storage and release centre for neurohormones produced elsewhere
II:	is connected to hypothalamus by a portal circulation
III:	is also called as adenohypophysis

1. Only II is correct
2. Only III is correct
3. Only I and III are correct
4. Only II and III are correct

192 Addison's disease is:

1.	hypothyroidism	2.	hyperthyroidism
3.	hypoadrenalism	4.	hypopituitarism

193 An autoimmune disorder that targets the alpha cells of pancreas will cause:

I: an increase in secretion of insulin

II: a decrease in secretion of glucagon

1.	Only I	2.	Only II
3.	Both I and II	4.	Neither I nor II

194 Identify the correct statement:

1. Pineal is stimulated by bright light
2. Pineal secretes melanin
3. Pineal is present in the mediastinum
4. Pineal plays a very important role in diurnal rhythm

195 Consider the given two statements:

Assertion (A):	The deficiency of growth hormone in adults is not very significant.
Reason (R):	The deficiency of growth hormone in childhood causes dwarfism.

1.	Both (A) and (R) are True and (R) correctly explains the (A).
2.	(A) is True; (R) is False
3.	(A) is False; (R) is False
4.	Both (A) and (R) are True but (R) does not correctly explain the (A).

196 A patient suffering from hyperparathyroidism may have:

I: increased bone deposition

II: increased risk of fractures

1.	Only I	2.	Only II
3.	Both I and II	4.	Neither I nor II

197 Which hormone produced by the intestinal mucosa causes the secretion of enzymes from the pancreas and the contraction of gall bladder?

1.	cholecystokinin	2.	gastric inhibitory peptide
3.	secretin	4.	gastrin

198 What physiological change is brought about by the Renin Angiotensin Aldosterone System in the end?

1. a reduced blood volume
2. an increased blood glucose level
3. a reduced blood pressure
4. an increased blood pressure

199 Thyroid gland in humans play an important role in:

I: Regulation of basal metabolic rate.

II: Mental development

III: Calcium homeostasis

1.	Only I and II	2.	Only I and III
3.	Only II and III	4.	I, II and III

200 Blood doping is the use of synthetic EPO [erythropoietin] by some athletes to boost their:

1. blood calcium levels
2. secretion of growth hormone
3. blood oxygen levels
4. muscle mass

Fill OMR Sheet*

*If above link doesn't work, please go to test link from where you got the pdf and fill OMR from there. After filling the OMR, you would get answers and explanations for the questions in the test.

[CLICK HERE](#) to get
FREE ACCESS for 2
days of **ANY**
NEETprep course