Aakash
Medical | IIT-JEE | Foundations

FINAL TEST SERIES for NEET-2025

MM : 720

Test - 5

Time : 180 Mins.

Answers

#	Ans	#	Ans	#	Ans	#	Ans	#	Ans
1.	(3)	37.	(3)	73.	(3)	109.	(3)	145.	(3)
2.	(1)	38.	(1)	74.	(3)	110.	(3)	146.	(1)
3.	(4)	39.	(4)	75.	(1)	111.	(3)	147.	(4)
4.	(1)	40.	(4)	76.	(4)	112.	(2)	148.	(4)
5.	(3)	41.	(2)	77.	(3)	113.	(2)	149.	(1)
6.	(1)	42.	(4)	78.	(1)	114.	(2)	150.	(2)
7.	(3)	43.	(1)	79.	(1)	115.	(1)	151.	(3)
8.	(1)	44.	(2)	80.	(1)	116.	(2)	152.	(3)
9.	(3)	45.	(4)	81.	(1)	117.	(3)	153.	(4)
10.	(2)	46.	(3)	82.	(4)	118.	(3)	154.	(2)
11.	(2)	47.	(3)	83.	(3)	119.	(2)	155.	(4)
12.	(3)	48.	(1)	84.	(1)	120.	(4)	156.	(4)
13.	(4)	49.	(4)	85.	(2)	121.	(2)	157.	(3)
14.	(2)	50.	(3)	86.	(2)	122.	(2)	158.	(2)
15.	(3)	51.	(2)	87.	(3)	123.	(4)	159.	(1)
16.	(2)	52.	(1)	88.	(4)	124.	(2)	160.	(2)
17.	(2)	53.	(3)	89.	(3)	125.	(2)	161.	(3)
18.	(1)	54.	(4)	90.	(3)	126.	(3)	162.	(3)
19.	(3)	55.	(4)	91.	(3)	127.	(3)	163.	(2)
20.	(1)	56.	(1)	92.	(2)	128.	(1)	164.	(2)
21.	(3)	57.	(4)	93.	(3)	129.	(2)	165.	(2)
22.	(1)	58.	(3)	94.	(1)	130.	(1)	166.	(4)
23.	(2)	59.	(2)	95.	(1)	131.	(2)	167.	(2)
24.	(2)	60.	(3)	96.	(1)	132.	(3)	168.	(1)
25.	(4)	61.	(3)	97.	(3)	133.	(1)	169.	(3)
26.	(4)	62.	(2)	98.	(4)	134.	(3)	170.	(1)
27.	(3)	63.	(2)	99.	(1)	135.	(2)	171.	(3)
28.	(3)	64.	(3)	100.	(3)	136.	(4)	172.	(1)
29.	(4)	65.	(3)	101.	(3)	137.	(1)	173.	(4)
30.	(2)	66.	(2)	102.	(3)	138.	(1)	174.	(4)
31.	(3)	67.	(4)	103.	(1)	139.	(1)	175.	(3)
32.	(2)	68.	(4)	104.	(4)	140.	(3)	176.	(3)
33.	(3)	69.	(4)	105.	(3)	141.	(2)	177.	(4)
34.	(3)	70.	(1)	106.	(2)	142.	(2)	178.	(3)
35.	(3)	71.	(4)	107.	(1)	143.	(3)	179.	(3)
36.	(3)	72.	(3)	108.	(1)	144.	(1)	180.	(4)

Hints and Solutions

PHYSICS

(1) **Answer :** (3)
Solution:
Electric potential the along angle bisector of an electric dipole is zero.

(2) **Answer :** (1)
Solution:

Rating power $P_S = \frac{V_S^2}{R}$

Since rating voltage for both are same
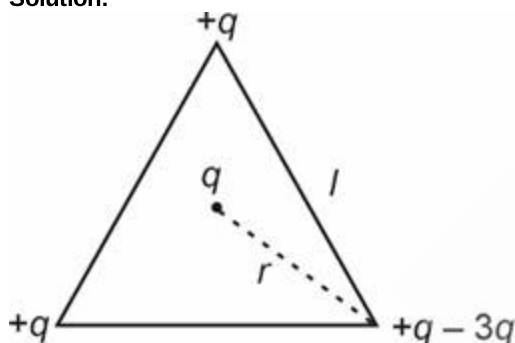
$\therefore \quad R \propto \frac{1}{P_S}$

Hence, $R_{\text{bulb}} > R_{\text{fan}}$

(3) **Answer :** (4)
Solution:
• Capacity of capacitor is independent of charge stored and potential difference applied across it
• The resistance of conducting wire is independent of current flowing through it.

(4) **Answer :** (1)
Solution:

$r = \frac{l}{\sqrt{3}}$

Force on charge on +q placed at centroid is due to –3q charge

$F_q = \frac{K(q)(3q)}{r^2} = \frac{3kq^2}{l^2} \times 3 = \frac{9kq^2}{l^2}$

(5) **Answer :** (3)
Solution:
Value of charge is independent of speed of charge.
A body can have charge $q \pm ne$, n is integer
Charge cannot exist with matter.

(6) **Answer :** (1)
Solution:

$r = \frac{p}{qB} = \frac{\sqrt{2mK}}{qB}$

and area $A = \pi r^2$

$\Rightarrow A = \frac{\pi \times 2mK}{q^2B^2} \quad \Rightarrow \quad A \propto K$

(7) **Answer :** (3)
Solution:
$E = \frac{-dV}{dr} = $ –(slope of V vs r curve)
$E_{\text{at } r = 7} = -(-5) = 5$ V/cm

(8) **Answer :** (1)
Solution:

Distance $\frac{3R}{4}$ lies inside the conducting shell.
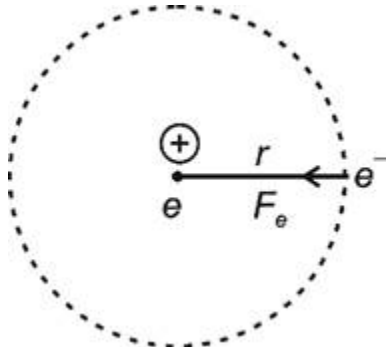
$\therefore E = 0$

(9) **Answer :** (3)

Solution:

Electric field on surface will be due to all the charges present inside and outside the surface.
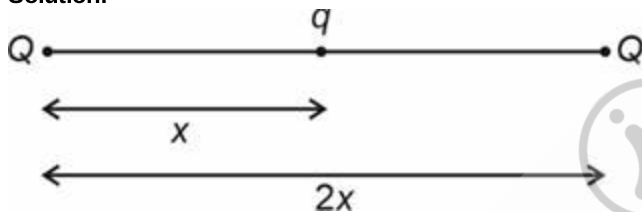
(10) **Answer :** (2)

Solution:

$F_e = \frac{ke^2}{r^2}$

(11) **Answer :** (2)

Solution:

$F_Q = \frac{KQ^2}{4x^2} + \frac{KQq}{x^2} = 0$

$\Rightarrow \quad \frac{Q}{4} + q = 0 \quad \Rightarrow \quad q = \frac{-Q}{4}$

(12) **Answer :** (3)

Solution:

Force on charge one due to another charge is independent of presence and absence of any other charges.

(13) **Answer :** (4)

Solution:

$R = \frac{\rho l}{A} = \frac{\rho l^2}{V}$

for constant volume, $R \propto l^2$

$\therefore R' = 4R = 4 \times 6 = 24 \ \Omega$

(14) **Answer :** (2)

Solution:

$R = \frac{V}{I}$

Potential difference $[\text{V}] = \left[\frac{U}{q}\right] = \left[\frac{FS}{IT}\right] = \left[\frac{ML^2T^{-2}}{IT}\right] = \left[ML^2T^{-3}I^{-1}\right]$

$\therefore \quad [R] = \left[\frac{V}{I}\right] = \left[ML^2T^{-3}I^{-2}\right]$

(15) **Answer :** (3)

Solution:

Circuit can be rearrange as,
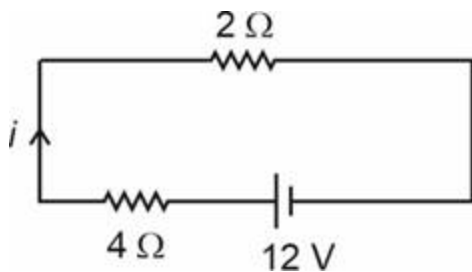
$i = \frac{12}{6} = 2A$

∴ P.D. across 3Ω = P.D. across equivalent resistance 2Ω

∴ $V_3 = i \times 2 = 4$ V

(16) Answer : (2)

Solution:

$M = ml$ ...(i)

Now, $\pi R = l \quad \Rightarrow \quad R = \frac{l}{\pi}$

$M\bullet = m\,(2R) = 2m\left(\frac{l}{\pi}\right)$

$= \frac{2M}{\pi}$ (from equation (i)

(17) Answer : (2)

Solution:

Since deflection is half, that means half current is pass through shunt

∴ $S = G = 80$ Ω

(18) Answer : (1)

Solution:

Force on a current carrying wire $F = \left(\overrightarrow{Il} \times \overrightarrow{B}\right)$ $F \| \left(\hat{k} \times \left(-\hat{j}\right)\right) \| \hat{i}$ *i.e.*, towards east

(19) Answer : (3)

Solution:

Both points are outside the wire i.e., $r > R$, $B \propto \frac{1}{r}$ ∴ $\frac{B_1}{B_2} = \frac{r_2}{r_1} = \frac{3r}{2r} = \frac{3}{2}$

(20) Answer : (1)

Solution:

Nature of force between two parallel wires is attractive when direction of current is in same direction and repulsive when direction of current is in opposite direction.

∴ Net force on wire *B* is towards *A*

(21) Answer : (3)

Solution:

Susceptibility		Material
Negative susceptibility	–	Diamagnetic
Positive and small susceptibility	–	Paramagnetic
Positive and large susceptibility	–	Ferromagnetic

(22) Answer : (1)

Solution:

Curie's Law,

$\chi_m = \frac{C}{T}$

$\Rightarrow \quad \chi_m \times T = $ constant

(23) Answer : (2)

Solution:

$\mu = \frac{B}{H} = \frac{1.5}{9} = 0.167$

(24) Answer : (2)

Solution:

Σ*I* = 0

2 + 4 – 2 – 1.5 – *I* = 0

I = 2.5 A

(25) **Answer :** (4)
Solution:

Current sensitivity $\frac{\phi}{I} = \frac{NAB}{K}$

(26) **Answer :** (4)
Solution:

$\overrightarrow{M} = NIA\left(\hat{k}\right)$ current is anticlockwise.

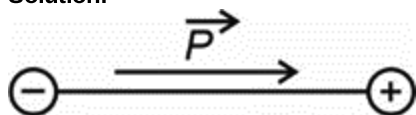$= \left(\frac{I\pi b^2}{2}\right)\left(\hat{k}\right)$

(27) **Answer :** (3)
Solution:

Across a metallic conductor of non-uniform cross section the rate of flow of charge through every cross section is constant, hence current is constant.
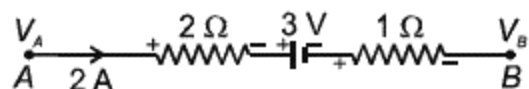
(28) **Answer :** (3)
Solution:

Dipole moment vector points towards the positive charge.

(29) **Answer :** (4)
Solution:

$V_A - V_B = (2 \times 2) + 3 + (2 \times 1)$
$= 4 + 3 + 2$
$= 9$ V

(30) **Answer :** (2)
Solution:
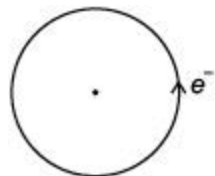
$B = \frac{\mu_0 I}{2r} = \frac{\mu_0 e f}{2r}$

(31) **Answer :** (3)
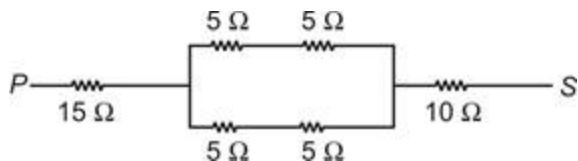**Solution:**
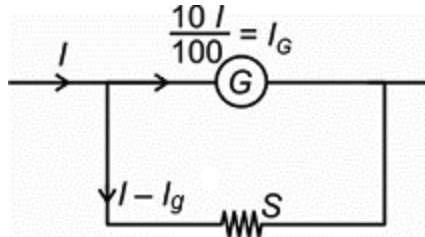
$I_g \times G = (I - I_g) \times S$
$0.1I \times 99 = (0.9)I \times S$
Thus S = 11 Ω

(32) **Answer :** (2)
Solution:

Equivalent circuit

(33) Answer : (3)
Hint:
Slope of graph
$\tan\theta = \frac{I}{V} = \frac{1}{R}$
Solution:
$R = \frac{V}{i}$
$R = R_0 (1 + \alpha\Delta t)$
$R_3 > R_2 > R_1$
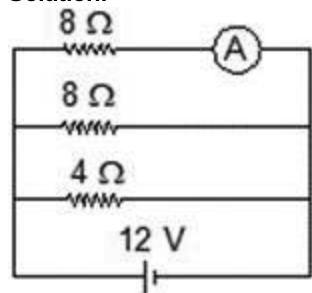$T_3 > T_2 > T_1$

(34) Answer : (3)
Solution:
As the charge +Q is non-symmetrically placed, the surface charge density on inner surface of cavity will be non-uniform.
Due to shielding effect, the charge on outer surface of conductor will be uniform.

(35) Answer : (3)
Hint:
$I = \frac{V}{R}$
Solution:

Reading of ammeter will be current in that branch.
$I = \frac{12}{8} = \frac{3}{2}$ A
$\boxed{I = 1.5A}$

(36) Answer : (3)
Solution:
Potential inside the inner shell is
$V = \frac{KQ}{R} - \frac{2KQ}{2R} = 0$
$E = 0, V = 0$

(37) Answer : (3)
Solution:
$Q = ne$
$48 \times 10^{-6} = n \times 1.6 \times 10^{-19}$
$n = \frac{48 \times 10^{-6} \times 10}{16 \times 10^{-19}}$
$= 3 \times 10^{13} \times 10 = 3 \times 10^{14}$

(38) Answer : (1)
Solution:

Intensity of magnetisation $= \frac{\text{Magnetic moment}}{\text{Volume}}$

$I = \frac{6}{30 \times 10^{-6}} = \frac{10^6}{5} = 2 \times 10^5$

(39) Answer : (4)
Solution:

$M = m\ell$

$m_1\ell_1 = m_2\ell_2$

$\frac{m_1}{m_2} = \frac{\ell_2}{\ell_1}$

(40) Answer : (4)

Solution:

$\frac{1}{C_{eq}} = \frac{1}{1} + \frac{1}{2} + \frac{1}{3} = \frac{11}{6} \Rightarrow C_{eq} = \frac{6}{11} \, \mu\text{F}$

$Q = C_{eq}V = \frac{6}{11} \times 22 = 12 \, \mu\text{C}$

Charge appearing on positive plate of 3 μF capacitor = +Q = +12 μC

(41) Answer : (2)

Solution:

$\frac{mv^2}{r} = \frac{e\lambda}{2\pi\varepsilon_0 r}$

$\Rightarrow v \propto r^0$

(42) Answer : (4)

Solution:

$U = \frac{1}{2}C_{eq}V^2 = \frac{1}{2} \times 8 \times 10^{-6} \times 16$ = 64 × 10^{-6} J = 64 μJ

(43) Answer : (1)

Hint:

Magnetic flux : $\phi = \vec{E} \cdot \vec{A}$

Solution:

Since $\vec{E} \perp \vec{A}$

∴ ϕ = 0

(44) Answer : (2)

Solution:

Given system is equivalent to an isolated spherical conductor

∴ $C_{eq} = 4\pi\varepsilon_0 b$.

(45) Answer : (4)

Solution:

$S_I = \frac{\theta}{I} = \frac{NAB}{C}$

$S_V = \frac{\theta}{V} = \frac{NAB}{RC}$

On inserting ferromagnetic material, magnetic field increases.

CHEMISTRY

(46) Answer : (3)

Solution:

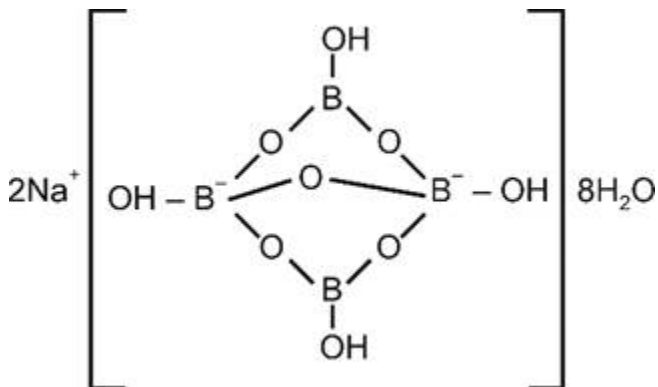CCl_4 does not hydrolyse while $SilCl_4$ hydrolyses readily by water

(47) Answer : (3)

Solution:

The order of decreasing first ionisation enthalpy

C > Si > Ge > Pb > Sn

(48) Answer : (1)

Solution:

(49) Answer : (4)

Solution:

$$\text{LiAlH}_4 + \text{BF}_3 \rightarrow \underset{X}{2\text{B}_2\text{H}_6} + \underset{Y}{3\,\text{AlF}_3} + \underset{Z}{3\,\text{LiF}}$$

$$\text{B}_2\text{H}_6 + 6\text{H}_2\text{O} \rightarrow 2\text{H}_3\,\text{BO}_3 + 6\text{H}_2$$
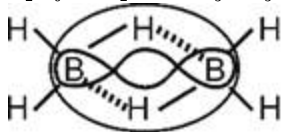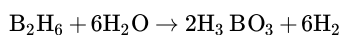
$\Rightarrow$ 2 Banana bonds
(3 centre 2 electron bond)

(50) Answer : (3)

Solution:

Orthoboric acid is a monobasic acid and it does not lose H^+ ions while it accepts one lone pair of electrons from H_2O.

(51) Answer : (2)

Solution:

Kernite	$Na_2B_4O_7 \cdot 4H_2O$
Bauxite	$Al_2O_3 \cdot 2H_2O$
Cryolite	Na_3AlF_6
Borax	$Na_2B_4O_7 \cdot 10H_2O$

(52) Answer : (1)

Solution:

The correct order of atomic radii is
In > Ga > Al > B

(53) Answer : (3)

Solution:

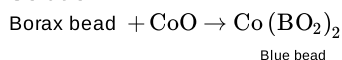Tl^{3+} is unstable is aqueous solution and it is a powerful oxidising agent.

(54) Answer : (4)

Solution:

$AlCl_3$ in acidified aqueous solution forms octahedral complex ion $[Al(H_2O)_6]^{3+}$ ion in which hybridisation of Al is sp^3d^2.

(55) Answer : (4)

Solution:

$$\text{Borax bead} + \text{CoO} \rightarrow \underset{\text{Blue bead}}{\text{Co}\,(\text{BO}_2)_2}$$

(56) Answer : (1)

Solution:

Order of first ionisation enthalpy of group 14 elements is

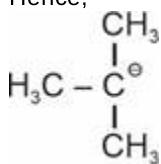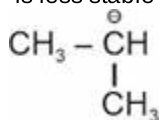| Element	C	Si	Ge	Pb	Sn
ΔiH (kJ mol^{-1})	1086	786	761	715	708

(57) Answer : (4)

Solution:

$[SiCl_6]^{2-}$ is not known because Si^{4+} ion is too small to hold 6 large chloride ions.

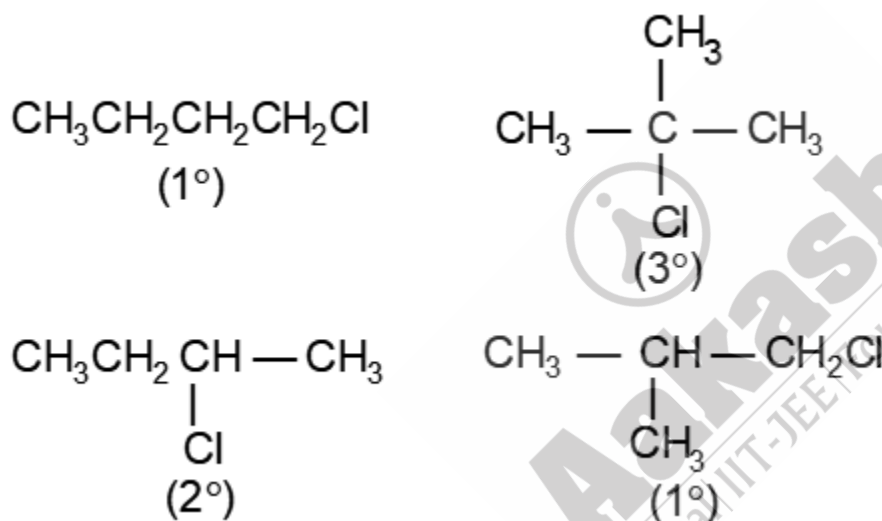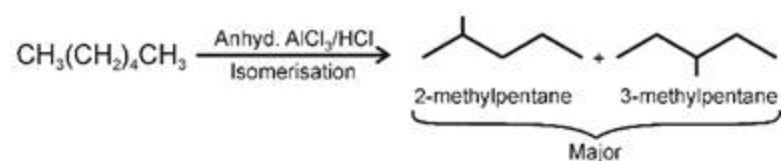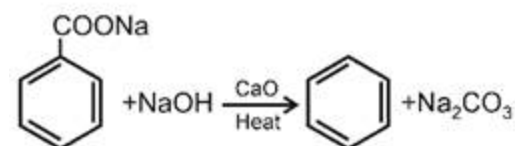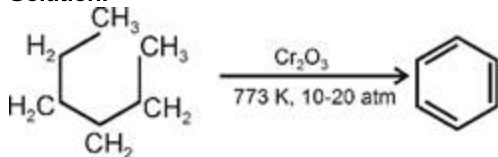**(58) Answer : (3)**
Solution:

As methyl group has +I effect so, it increases electron density on carbon atom of anion and destabilize it.
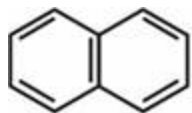
Hence,

is less stable than

and $\overset{\ominus}{C}H_3$ is more stable as compared to $H_3C - \overset{\ominus}{C}H_2$.

(59) Answer : (2)
Solution:

(60) Answer : (3)
Solution:

(61) Answer : (3)
Solution:

12

Naphthalene

(62) Answer : (2)
Solution:

	—	Cyclic planar system with $2\pi e^-$ → Aromatic
	—	Cyclic planar system with $6\pi e^-$ Aromatic
	—	Cyclic planar system with $4\pi e^-$ Anti-aromatic
	—	Cyclic planar system with $6\pi e^-$ Aromatic

(63) Answer : (2)
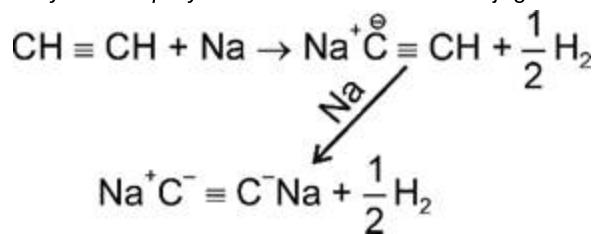**Solution:**

Propanone   Butan-2-one
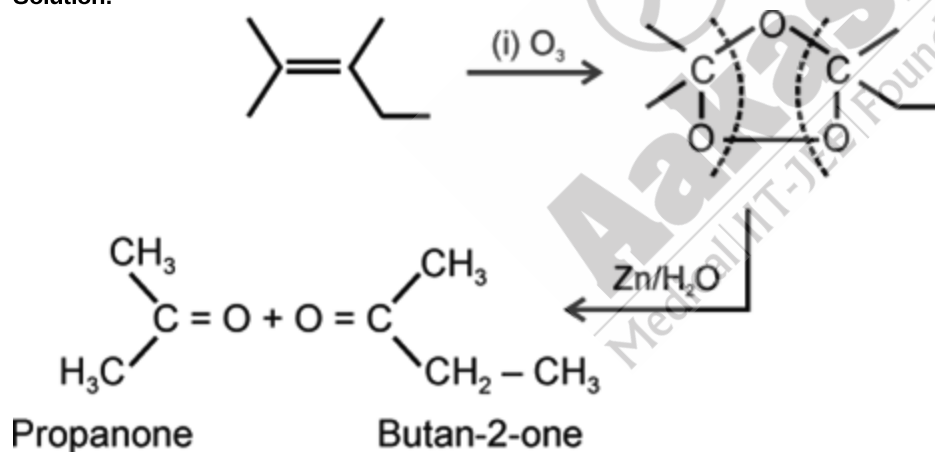
(64) Answer : (3)
Solution:
Ethyne has *sp* hybridised carbon and its conjugate base is very stable. It reacts easily with sodium to evolve H_2 gas

$$CH \equiv CH + Na \rightarrow Na^+ \overset{\ominus}{C} \equiv CH + \frac{1}{2}H_2$$

$$Na^+ C^- \equiv C^- Na + \frac{1}{2}H_2$$
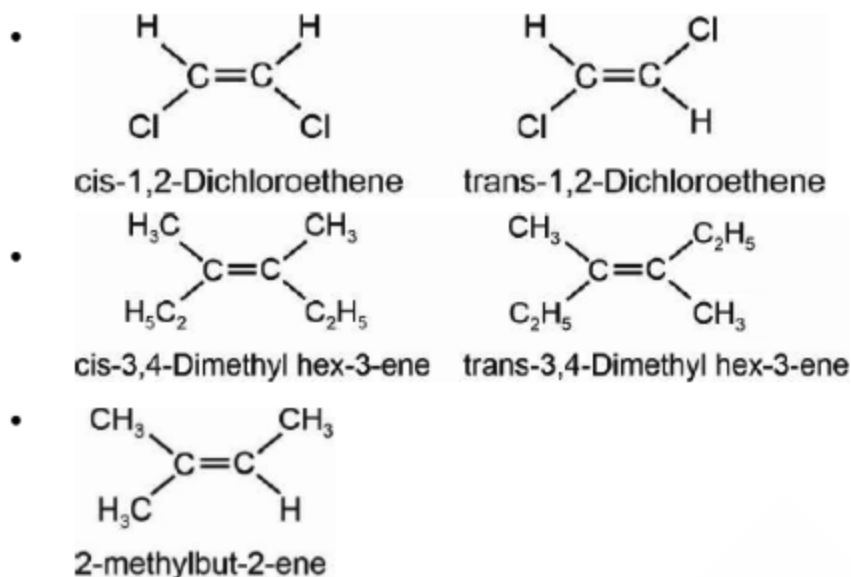
(65) Answer : (3)
Solution:
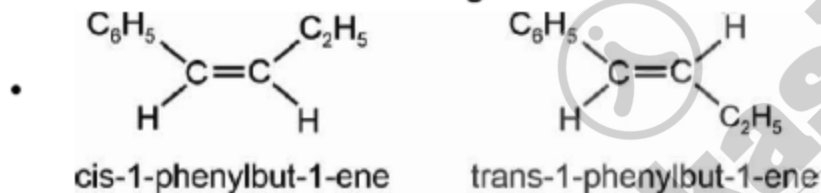$AlCl_3$ is an electrophile due to the vacant orbital in Al.

(66) Answer : (2)

Hint:
If two identical groups are attached to one of the doubly bonded carbon atoms, then there is no possibility of geometrical isomerism in alkene.
Solution:

cis-1,2-Dichloroethene   trans-1,2-Dichloroethene

cis-3,4-Dimethyl hex-3-ene   trans-3,4-Dimethyl hex-3-ene

2-methylbut-2-ene

Presence of the same group at double bonded carbon leads to absence of geometrical isomerism.

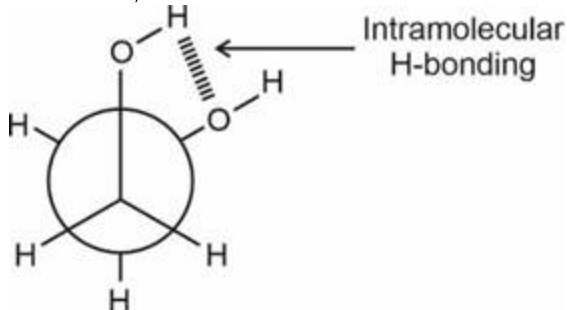cis-1-phenylbut-1-ene   trans-1-phenylbut-1-ene

(67) Answer : (4)
Hint:
The possibility of intramolecular hydrogen bonding in a conformer makes it stable.
Solution:
In the Gauche form of ethane-1,2-diol, intramolecular hydrogen bonding is possible which makes it the most stable isomer of ethane-1,2-diol.

Intramolecular H-bonding

(68) Answer : (4)
Solution:
Soda lime is CaO + NaOH

$$CH_3COOH \xrightarrow{NaOH\ (aq)} \underset{A}{CH_3COONa} \xrightarrow[\Delta]{Soda\ lime} \underset{B}{CH_4}$$
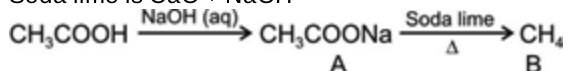
(69) Answer : (4)
Hint:
Substitution product is formed by saturated hydrocarbon.
Solution:
Possible isomers are

$CH_3 — CH_2 — CH_2 — CH_2 — CH_2 — CH_3 \rightarrow$ 3 products

$$CH_3 — CH_2 — CH_2 — \underset{\overset{|}{CH_3}}{CH} — CH_3 \rightarrow 5 \text{ products}$$

$$CH_3 — \underset{\overset{|}{CH_3}}{CH} — \underset{\overset{|}{CH_3}}{CH} — CH_3 \rightarrow 2 \text{ products}$$
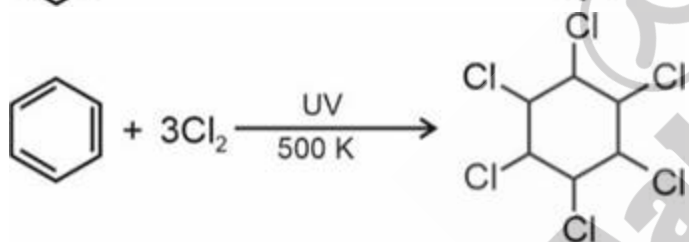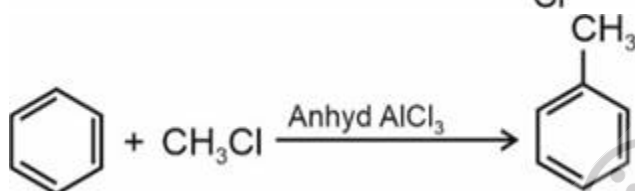
(70) **Answer :** (1)
Hint:
Presence of excess of electrophilic reagent (anhydrous $AlCl_3$ and Cl_2) causes displacement of all six hydrogen atoms of benzene.

The electrophile in Friedel Craft reaction is $\overset{+}{CH_3}$.
Solution:
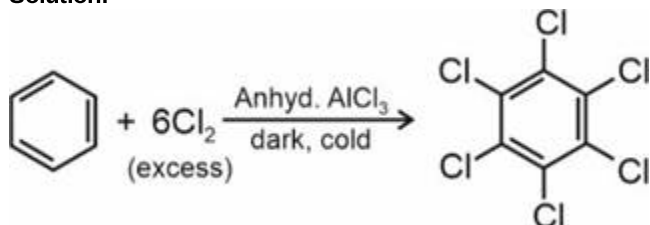
(71) **Answer :** (4)
Solution:
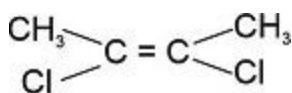
Cis-1,2-dichlorobutene
$\mu \neq 0$

(72) **Answer :** (3)
Hint:
The replacement of a hydrogen atom by a sulphonic acid group in a ring is called sulphonation.
Solution:
• Sulphonation is carried out by heating benzene with fuming sulphuric acid (oleum)

• Electrophile in the reaction is SO_3.

(73) **Answer :** (3)
Hint:
Kolbe's electrolysis of sodium acetate produces ethane, carbon dioxide, hydrogen and sodium hydroxide.
Solution:

$$2CH_3COONa \rightleftharpoons 2CH_3 - \overset{\overset{\displaystyle O}{\|}}{C} - O^- + 2Na^+$$

At anode:

$$2CH_3COO^- \xrightarrow{-2e^-} 2CH_3 - \overset{\overset{\displaystyle O}{\|}}{C} - \dot{O} \longrightarrow 2\dot{C}H_3 + 2CO_2\uparrow$$

$$H_3\dot{C} + \dot{C}H_3 \longrightarrow CH_3 - CH_3\uparrow$$

At Cathode:

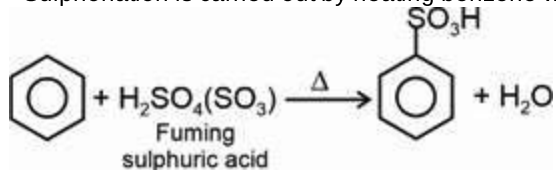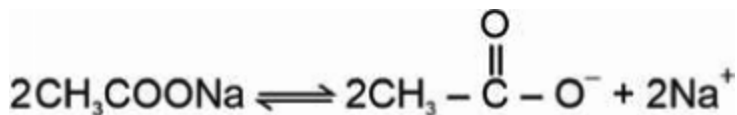$$H_2O + e^- \longrightarrow OH^- + \dot{H}$$

$$2\dot{H} \longrightarrow H_2\uparrow$$
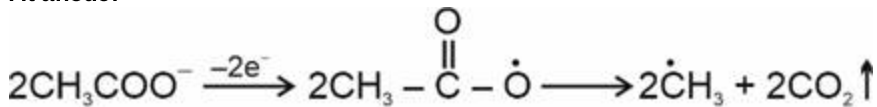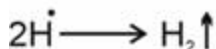
(74) Answer : (3)
Hint:
Alkanes can exhibit chain isomerism.
Solution:
Hexane (C_6H_{14}) has 5 structural isomers:
n-hexane, 2-methylpentane, 2,2-dimethylbutane, 2,3-dimethylbutane, 3-methylpentane

(75) Answer : (1)
Solution:
HBr in presence of peroxides $(C_6H_5CO)_2O_2$ generates Br • (free radical)
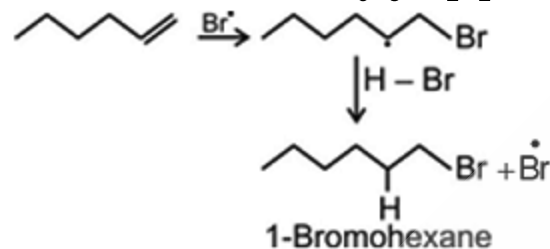
(76) Answer : (4)
Hint:
But-2-yne on reduction with partially deactivated palladised charcoal gives cis-but-2-ene.
Solution:
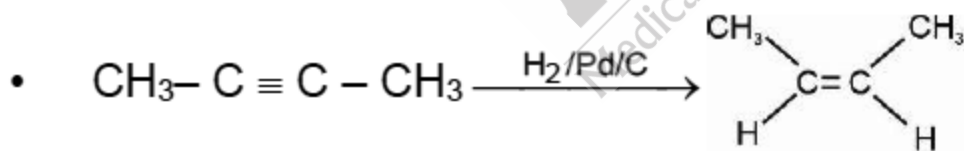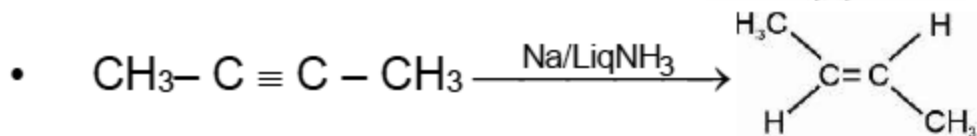
• Cis and trans isomers are geometrical isomers
• Boiling point of cis-*isomer* > trans-isomer because the cis-isomer is more polar than the trans-isomer
• Melting point of trans-isomer > cis-isomer because of symmetry

(77) Answer : (3)

Hint:
Bridge head H-atom and Vinylic H-atom do not show tautomerism.
Solution:
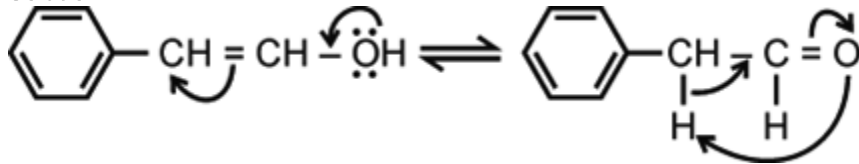
(78) Answer : (1)
Hint:
Lesser the stability of alkene, higher is the heat of hydrogenation.
Solution:
More the number of hyperconjugation structure, higher is the stability of alkene.

4 αH   7 αH   9 αH   10 αH

Stability increases and heat of hydrogenation decreases
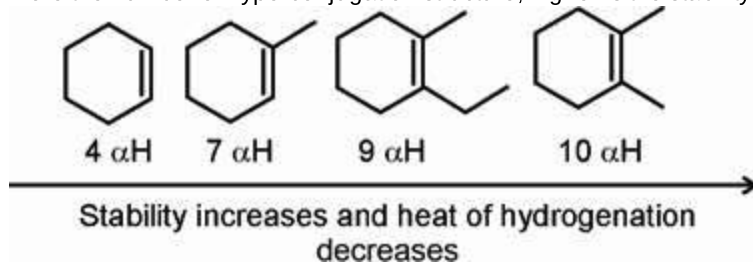
(79) Answer : (1)
Hint:
Alkynes on hydrolysis give carbonyl compound.
Solution:
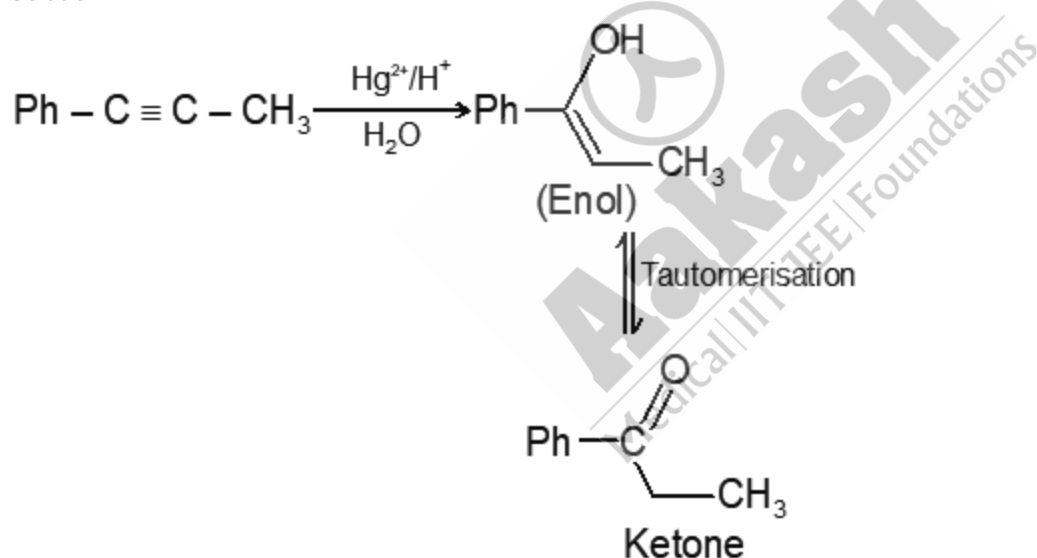
(80) Answer : (1)
**Solution:**

$\overset{+}{N}O_2$ is an electron deficient species, hence it is an electrophile.

(81) Answer : (1)
Solution:

$$\% \text{ of } Cl = \frac{35.5 \times \text{wt. of AgCl}}{143.5 \times \text{wt. of compound}} \times 100$$

$$= \frac{35.5 \times 0.1435 \times 100}{143.5 \times 0.355} = 10\%$$

(82) Answer : (4)
Hint:
Methoxy benzene is known as Anisole.
Solution:

→ Furan
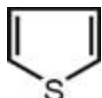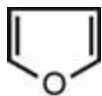
→ Thiophene
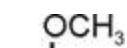
→ Anisole
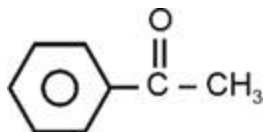
→ Acetophenone

(83) **Answer :** (3)
Hint:
Chloroform and aniline can be separated by simple distillation.
Solution:
The fractions of crude oil in petroleum industry is separated using fractional distillation due to less difference in boiling points.
Glycerol can be separated from spent-lye using distillation under reduced pressure.
Aniline is separated by steam distillation from aniline-water mixture

(84) **Answer :** (1)
Solution:
The correct name of the compound is (E)-2-chloro-3-methyl-2-penten-1-ol

(85) **Answer :** (2)
Solution:
Adsorption chromatography is based on the fact that different compounds are adsorbed on an adsorbent to different degrees.
• Paper chromatography is a type of partition chromatography.
• TLC is another type of adsorption chromatography.

(86) **Answer :** (2)
Solution:
The more the number of important contributing structures, the more is resonance energy.

(87) **Answer :** (3)
Hint:
Electrometric effect is a temporary effect
Solution:
During +E effect π-electron transfers to that carbon to which attacking reagent gets attached.

(88) **Answer :** (4)
Solution:
—COOR group is an electron withdrawing (–I) group

(89) **Answer :** (3)
Solution:
Kjeldahl's method is not applicable to compounds containing nitrogen in cyclic ring as nitrogen of these compounds does not change to ammonium sulphate.

(90) **Answer :** (3)
Solution:
Order of stability :

$< CH_2 = CH - \overset{\centerdot}{C}H_2$
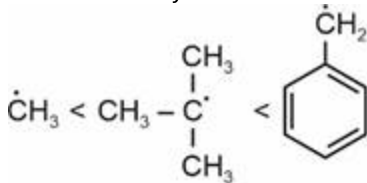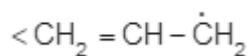
BOTANY

(91) Answer : (3)
Solution:
On the basis of position of centromere, chromosomes can be divided into four types. Chromatin contains DNA and some basic proteins called histones, some non-histone proteins and also RNA.

(92) Answer : (2)
Solution:
Robert Hooke – Dead cell
Robert Brown – Nucleus
Singer and Nicolson – Fluid mosaic model
Flemming – Chromatin

(93) Answer : (3)
Solution:
The organelles which function in a co-ordinated manner constitute an endomembrane system.
The organelles included in this system are endoplasmic reticulum, golgi complex, lysosomes and vacuoles.

(94) Answer : (1)
Solution:
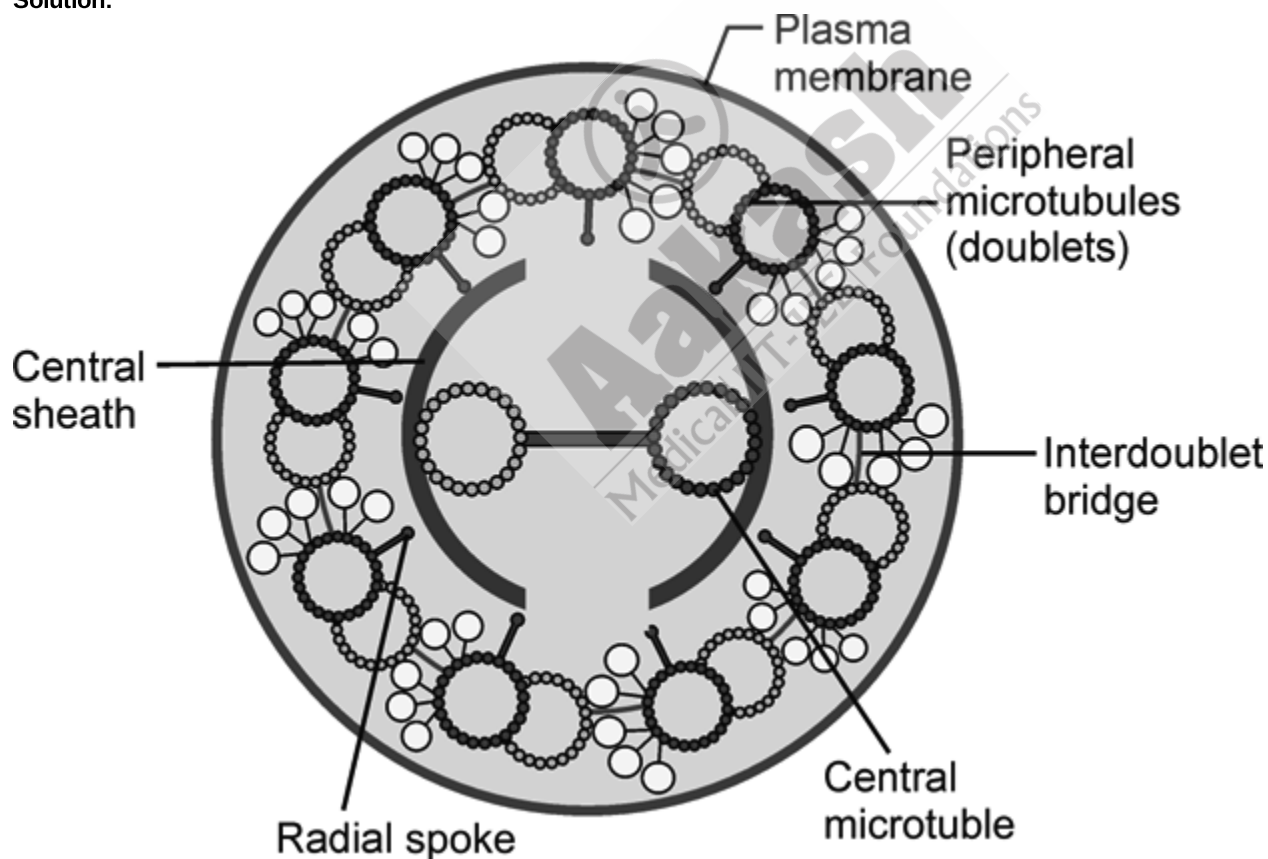
(95) Answer : (1)
Solution:
The lipids are arranged within the membrane with the polar head towards the outer sides and the non-polar tails towards the inner sides.

(96) Answer : (1)
Solution:
Tonoplast membrane facilitates the transport of a number of ions and other materials against concentration gradient into the vacuole thus their concentration is significantly higher in the vacuole than in the cytoplasm.

(97) Answer : (3)
Solution:
In acrocentric chromosome the centromere is present very close to one end of the chromosome.

(98) Answer : (4)
Solution:
In some photosynthetic prokaryotes, there are other membranous extensions into the cytoplasm called chromatophores which contain pigments.

(99) Answer : (1)
Solution:
Cell cycle is the period between the formation of new daughter cells and their further division. Interphase is a phase between two successive M phase, where the cell prepare itself for cell division.

(100) Answer : (3)
Solution:
Anaphase is the best stage to study shape of chromosomes.
Prophase – Spireme stage
Metaphase – Congression of chromosome
Telophase – Chromosome loose their discrete identity.

(101) Answer : (3)
Solution:
Terminalisation of chiasmata occurs in diakinesis.

(102) Answer : (3)
Solution:
In 'S' phase the amount of DNA doubles but the number of chromosomes remains same.

(103) Answer : (1)
Solution:
The exchange of genetic material between the non-sister chromatids of the homologous chromosome is known as crossing over.

(104) Answer : (4)
Solution:
Meiosis provides a chance for the formation of new combinations of chromosomes. This brings out variations.

(105) Answer : (3)
Solution:
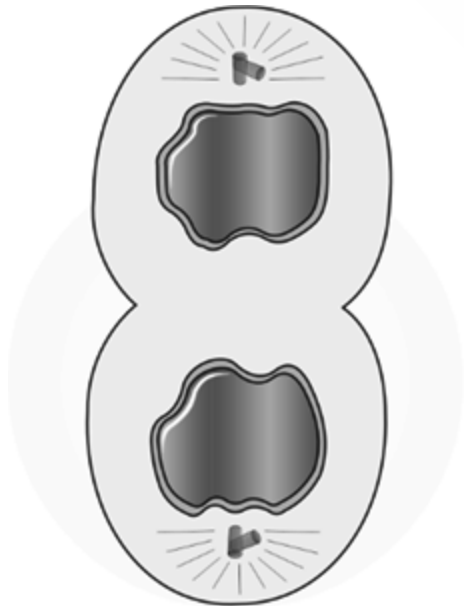
This given figure represents telophase and it is the end stage of karyokinesis.

(106) Answer : (2)
Solution:

	Pigments		Color in chromatography
(1)	Chlorophyll a	–	Bright or blue green

(2)	Chlorophyll b	–	Yellow green
(3)	Xanthophylls	–	Yellow
(4)	Carotenoids	–	Yellow to yellow orange

(107) Answer : (1)
Solution:

In Non-cyclic photophosphorylation both ATP and NADPH + H$^+$ are synthesised.

(108) Answer : (1)
Solution:

In C_4 plants, photorespiration does not occur and in the photosynthesis there is synthesis of NADPH.

(109) Answer : (3)
Solution:

Carboxylation is the most crucial step of the Calvin cycle where CO_2 is utilised for the carboxylation of RuBP.

(110) Answer : (3)
Solution:

Kranz anatomy is one of the characteristics of C_4 plants e.g. *Sorghum*, maize etc.

(111) Answer : (3)
Solution:

The material of the nucleus stained by basic dyes was given the name chromatin by Flemming.
SAT-chromosomes are marker chromosomes that have secondary constriction at a constant location.

(112) Answer : (2)
Solution:

Carotenoid containing plastids are chromoplasts.

(113) Answer : (2)
Solution:

Rudolf Virchow first explained that new cells arise from pre-existing cells.

(114) Answer : (2)
Solution:

In electron transport chain, transfer of electron from PS II to cyt b$_6$f complex occur via plastoquinone. Cytochrome b$_6$f complex to PS I electrons are facilitated by plastocyanin.

(115) Answer : (1)
Solution:

Mitochondria are the site of aerobic respiration.

(116) Answer : (2)
Solution:

A short lived phase between meiosis I and II is called interkinesis

(117) Answer : (3)
Solution:

The microtubules of the spindle fibres attach to the kinetochore during metaphase.

(118) Answer : (3)
Solution:

In both anaphase-I and mitotic anaphase, chromosomes move towards opposite poles with the help of spindle fibres.

(119) Answer : (2)
Solution:

The two asters together with spindle fibre forms mitotic apparatus.

(120) Answer : (4)
Solution:

Interkinesis-centrioles replicate.
Metaphase I – Formation of double metaphasic plate
Anaphase II – Centromere splits
Prophase II – Nucleolus disintegrates.

(121) Answer : (2)
Hint:

Peripheral proteins lie on the surface of membrane.

Solution:
Depending on the ease of extraction, membrane proteins can be classified as integral and peripheral.

(122) Answer : (2)
Solution:
C_4 plant requires 5 ATP and 2 NADPH for the fixation of one CO_2 molecule.

(123) Answer : (4)
Solution:
The plant internal factors include the number, size, age and orientation of leaves, mesophyll cells, internal CO_2 concentration etc.

(124) Answer : (2)
Solution:
Jan Ingenhousz showed that sunlight is essential to the plant process that somehow purifies the air fouled by burning candles or breathing animals.

(125) Answer : (2)
Solution:
Calvin pathway occurs in all the photosynthetic plants.

(126) Answer : (3)
Solution:
Maize is C_4 plant and its first stable product is oxaloacetic acid.

(127) Answer : (3)
Solution:
The C_4 pathway (Hatch and Slack pathway) requires the presence of two types of cells i.e. mesophyll cells and bundle sheath cells to fix a CO_2. However for fixation of 6 CO_2 molecules 12 times carboxylation reaction occurs.

(128) Answer : (1)
Hint:
Chitinous cell wall is mainly seen in fungi.
Solution:
Algal cell wall has cellulose, galactans and mannans.

(129) Answer : (2)
Solution:
The layer of bacterial cell envelop which contain peptidoglycan is cell wall.
Capsule help bacteria to hide from host immune system. Glycocalyx protects the cell and also helps in adhesion.

(130) Answer : (1)
Hint:
The cells that do not divide further exit a resting phase.
Solution:
The cells that do not divide further exit the G_1 phase.

(131) Answer : (2)
Solution:
Synapsis is seen in zygotene while, crossing over takes place in pachytene. X-shaped structure of chiasmata is seen during diplotene whereas, terminalisation of chiasmata is seen in diakinesis.

(132) Answer : (3)
Solution:
Haploid cells never undergo meiosis. These cells divide by mitosis.

(133) Answer : (1)
Solution:
In C_4 plants first product is a C_4 acid, OAA formed in mesophyll cells.

(134) Answer : (3)
Solution:
Oxygen evolving complex is attached to the PS II and is involved in photolysis of water molecule.

(135) Answer : (2)
Solution:
The membrane or lamellae of the grana have both PS I and PS II. The stroma lamellae membranes lack PS II as well as NADP reductase enzyme. Within the chloroplast, protons in the stroma decrease in number, while in the lumen there is

accumulation of protons. This creates a proton gradient across the thylakoid membrane as well as a measurable decrease in pH in the lumen.

ZOOLOGY

(136) **Answer :** (4)
Solution:
Both blood and lymph are fluid connective tissues which come in the category of specialised connective tissues.

(137) **Answer :** (1)
Solution:
Terrestrial adaptation necessitated the production of lesser toxic nitrogenous wastes like urea and uric acid.
Reptiles, birds, land snails and insects excrete uric acid as nitrogenous wastes in the form of pellet or paste with a minimum loss of water and are called uricotelic animals.

(138) **Answer :** (1)
Solution:
A bundle of nodal fibres, atrio ventricular bundle (AV bundle), continues from the AVN which passes through the atrio-ventricular septum to emerge on the top of the inter-ventricular septum and immediately divides into a right and left bundle. These branches give rise to minute fibres throughout the ventricular musculature of the respective sides and are called Purkinje fibres.

(139) **Answer :** (1)
Solution:
Arteries, carry blood away from the heart while the veins carry blood towards the heart. Each artery and vein consists of three layers(inner to outer): the tunica intima, tunica media, and the tunica externa. The tunica media is comparatively thin in the veins.

(140) **Answer :** (3)
Solution:
On ventricular systole, deoxygenated blood from right ventricle is pumped into pulmonary artery while oxygenated blood from left ventricle is pumped into aorta.

(141) **Answer :** (2)
Solution:
An excessive loss of fluid from the body can activate osmoreceptors which stimulate the hypothalamus to release antidiuretic hormone (ADH) or vasopressin from the neurohypophysis *i.e.*, posterior pituitary. Thus, ADH is synthesised in hypothalamus but released from posterior pituitary.

(142) **Answer :** (2)
Solution:
A comparison of the volume of the filtrate formed per day (180 litres per day) with that of the urine released (1.5 litres), suggest that nearly 99 per cent of the filtrate has to be reabsorbed by the renal tubules.

(143) **Answer :** (3)
Solution:
Mammals, many terrestrial amphibians and marine fishes mainly excrete urea and are called ureotelic animals. Ammonia produced by metabolism is converted into urea in the liver of these animals and released into the blood which is filtered and excreted out by the kidneys.

(144) **Answer :** (1)
Solution:
Neutrophils: 60-65% of the total WBCs
Basophils: 0.5-1% of the total WBCs
Eosinophils: 2-3% of the total WBCs
Lymphocytes: 20-25% of the total WBCs

(145) **Answer :** (3)
Solution:
Tunica media- Possesses layer of smooth muscle and elastic fibres.
PCT – Brush border cuboidal epithelium.

(146) **Answer :** (1)
Solution:
Normal activities of the heart are regulated intrinsically *i.e.*, auto-regulated by specialised muscles (nodal tissue), hence, the heart is called myogenic. The nodal musculature has the ability to generate action potentials without any external stimuli

i.e., it is autoexcitable.

(147) Answer : (4)
Hint:
Yellow elastic fibres are made up of this protein.
Solution:
Fibrinogens, globulins and albumins are major plasma proteins and constitute about 6-8 percent of it. In all connective tissues except blood, the cells secrete fibres made of structural proteins called collagen or elastin.

(148) Answer : (4)
Solution:
Pisces have a 2-chambered heart. Amphibians and reptiles (except crocodiles) have 3-chambered heart while birds and mammals have a 4-chambered heart. All chordates (except urochordates) have a circulatory system in which the blood pumped by the heart is always circulated through a closed network of blood vessels *i.e.*, closed circulatory system.

(149) Answer : (1)
Solution:
Neutrophils, eosinophils and basophils are the three different types of granulocytes, while lymphocytes and monocytes are the agranulocytes. Eosinophils (2-3 per cent) resist infections and are also associated with allergic reactions.

(150) Answer : (2)
Solution:
The circulatory patterns are of two types – open or closed. Open circulatory system is present in arthropods and molluscs in which blood pumped by the heart passes through large vessels into open spaces or body cavities called sinuses. Annelids and chordates have a closed circulatory system in which the blood pumped by the heart is always circulated through a closed network of blood vessels.

(151) Answer : (3)
Solution:
Maximum filling of ventricles takes place during joint diastole.
The SAN generates an action potential which stimulates both the atria to undergo a simultaneous contraction – the atrial systole. This increases the flow of blood into the ventricles by about 30 per cent. Ventricles are in relaxed state at this time.

(152) Answer : (3)
Solution:
Angiotensin II activates the adrenal cortex to release aldosterone which causes reabsorption of Na^+ and water from the distal parts of the tubule.

(153) Answer : (4)
Solution:
'Dub' is caused by blood turbulence associated with the closure of the semilunar valves at the beginning of ventricular diastole.

(154) Answer : (2)
Solution:
The proximity between the Henle's loop and vasa recta, as well as the counter current in them, help in maintaining an increasing osmolarity towards the inner medullary interstitium *i.e.*, from 300 $mOsmolL^{-1}$ in the cortex to about 1200 $mOsmolL^{-1}$ in the inner medulla.

(155) Answer : (4)
Solution:
Sweat produced by the sweat glands is a watery fluid containing NaCl, small amounts of urea, lactic acid, *etc*. Sebaceous glands eliminate certain substances like sterols, hydrocarbons and waxes through sebum.
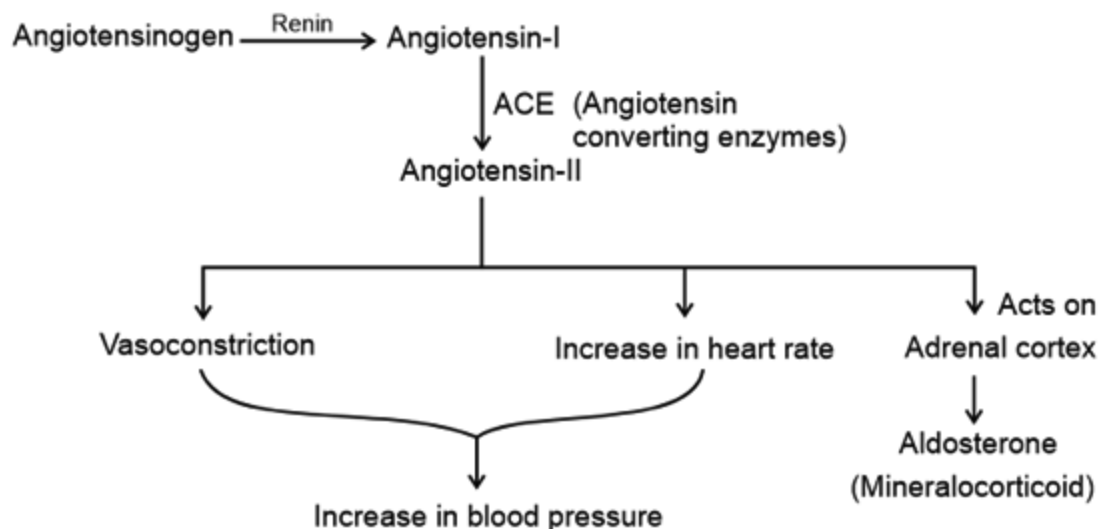
(156) Answer : (4)
Hint:
JGA secretes renin in response to fall in GFR.
Solution:
Angiotensin II, being a powerful vasoconstrictor, increases the glomerular blood pressure and thereby GFR.

ACE is produced by endothelial cells of lung capillaries.

(157) Answer : (3)
Solution:
AV valves on right and left side in heart will close at the onset of ventricular systole.

(158) Answer : (2)
Solution:
Coronary artery disease is blockage in coronary artery.

(159) Answer : (1)
Solution:
Platelets, also called thrombocytes (enucleated), are cell fragments produced from megakaryocytes.

(160) Answer : (2)
Solution:
A – Afferent arteriole
B – Bowman's capsule formed by simple squamous cells.
C – PCT – Formed by simple cuboidal epithelium containing microvilli giving brush border appearance.
D – Efferent arteriole formed by simple squamous epithelium.

(161) Answer : (3)
Solution:
Tricuspid valve is present between right atrium and right ventricle. Due to damage to chordae tendinae of tricuspid valve, flow of blood will immediately get reduced into pulmonary artery; blood may flow backward into the atria.

(162) Answer : (3)
Solution:
JGA is formed by cellular modifications in DCT and afferent arteriole at the location of their contact.

(163) Answer : (2)
Solution:
Coronary system circulates blood to and from the cardiac musculature.

(164) Answer : (2)
Hint:
Rh antigen is present on RBCs surface.
Solution:
When Rh^- mother conceives for the first time and foetus is Rh^+, then during parturition, blood of Rh + ve foetus gets mixed with mother's blood. Then, the mother develops anti Rh antibodies. During second pregnancy, if the foetus is again Rh^+, then these antibodies cross through placenta to foetus and destroy the foetal RBCs. This condition is known as erythroblastosis foetalis.

(165) Answer : (2)
Solution:
In total, blood flows 72 times per minute both in pulmonary and systemic circulation in a normal resting human.

(166) Answer : (4)
Solution:

SA node initiates the cardiac impulse.

(167) Answer : (2)
Hint:
Blood group AB has 2 antigens.
Solution:
Blood group antigens are present on surface of RBCs. There are two surface antigens namely A and B antigen. Plasma contains proteins produced in response to antigens *i.e.*, antibodies. There are two different types of antibodies produced against blood group antigens.

(168) Answer : (1)
Solution:
Kidneys are located between the levels of last thoracic and third lumbar vertebra.

(169) Answer : (3)
Solution:
T-wave represents ventricular repolarisation and end of T-wave represents end of ventricular systole.

(170) Answer : (1)
Solution:
ADH/Vasopressin can affect the kidney function by its constrictory effects on blood vessels. It increases permeability of DCT and CD for water.

(171) Answer : (3)
Solution:
Plasma is a straw coloured viscous fluid constituting about 55% part of blood.

(172) Answer : (1)
Solution:
An adult human excretes, on an average, 1 to 1.5 litres of urine per day.

(173) Answer : (4)
Solution:
Blood is a specialized (fluid) connective tissue which is devoid of fibres.

(174) Answer : (4)
Hint:
Acetylcholine has inhibitory effect on cardiac musculature.
Solution:
Parasympathetic nerve endings release acetylcholine which decreases the rate of heart beat, speed of conduction of action potential and cardiac output.

(175) Answer : (3)
Solution:
Parasympathetic neural signals decrease the rate of heart beat, speed of conduction of action potential and thereby the cardiac output.

(176) Answer : (3)
Solution:
A^{-ve} blood group person can receive blood from A^{-ve} blood group person and O^{-ve} blood group person.

(177) Answer : (4)
Solution:
Bile formation and its elimination is the function of liver.

(178) Answer : (3)
Solution:
Glomerular filtration rate (GFR) in a healthy individual is approximately 125 mL/minute *i.e.*, 180 litres per day.

(179) Answer : (3)
Hint:
Also called concentrating limb
Solution:
Reabsorption is minimum in ascending limb of loop of Henle. Conditional reabsorption of Na^+ and water takes place in DCT.
The ascending limb is impermeable to water but allows transport of electrolytes actively or passively. So, minimum reabsorption takes place in ascending limb.

(180) Answer : (4)
Solution:

Elimination of waxes through sebum is a function of sebaceous gland.