



Aakash

Medical | IIT-JEE | Foundations

Corporate Office: AESL, 3rd Floor, Incuspaze Campus-2, Plot no. 13, Sector-18, Udyog Vihar, Gurugram, Haryana-122015

FINAL TEST SERIES for NEET-2025

MM : 720

Test - 9

Time : 180 Mins.

Answers

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

Hints and Solutions

PHYSICS

(1) Answer : (4)

Solution:

$$l_2 - l_1 = \frac{\lambda}{2} \Rightarrow \lambda = 2(30 - 10) = 40 \text{ cm}$$

$$v = f\lambda$$

$$f = \frac{v}{\lambda} = \frac{300}{0.4} = 750 \text{ Hz}$$

(2) Answer : (3)

Hint:

Use Boolean Algebra

Solution:

$$Y = (A + B) \cdot \overline{B} = \overline{A\overline{B}} + \overline{B\overline{B}} = \overline{A\overline{B}} \\ = \overline{A} + B$$

(3) Answer : (2)

Solution:

To make sure that different laws of conservation are fulfilled, antineutrino must be emitted in the reaction ${}^1_0\text{n} \rightarrow \text{p} + {}^0_{-1}\text{e} + \bar{\nu}$.

(4) Answer : (4)

Solution:

$$\lambda = \frac{h}{\sqrt{2mk}}$$

 $k \rightarrow 2$ times

$$\lambda' = \frac{\lambda}{\sqrt{2}}$$

(5) Answer : (3)

Solution:

$$I_R = I_1 + I_2 + 2\sqrt{I_1 I_2} \cos \phi$$

$$I_R = I_0 + I_0 + 2I_0 \cos 0 = 4I_0$$

(6) Answer : (1)

Solution:

$$V = \frac{\omega}{k}$$

$$V = \frac{6 \times 10^{11} \pi}{2000 \pi} = 3 \times 10^8$$

$$\Rightarrow E = V \times B$$

$$\Rightarrow E = 3 \times 10^8 \times 6 \times 10^{-7}$$

$$\Rightarrow \boxed{E = 180 \text{ V/m}}$$

(7) Answer : (2)

Hint:

Heat developed in R_1 will be equal to energy stored in the inductor

Solution:

$$H = U = \frac{1}{2} LI^2$$

$$I = \left(\frac{E}{R_2} \right)$$

$$H = \frac{1}{2} \frac{LE^2}{R_2^2}$$

(8) Answer : (3)

Solution:

$$\frac{1}{f}(\mu - 1) \left(\frac{1}{R_1} - \frac{1}{R_2} \right) = \left(\frac{3}{2} - 1 \right) \left(\frac{1}{-40} - \frac{1}{40} \right) = \frac{1}{2} \left(\frac{-2}{40} \right) = -40 \text{ cm}$$

(9) Answer : (3)

Solution:

Magnetic field lines of permanent magnets are continuous but they are not uniform.

(10) Answer : (4)

Hint:Current sensitivity $i_s = \frac{NAB}{C}$ **Solution:**

From the formula, it is clear that by decreasing torsional constant, current sensitivity can be increased.

(11) Answer : (3)

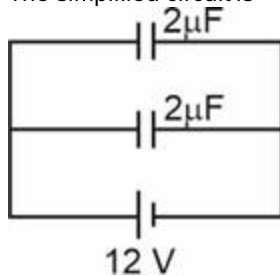
Solution:

General properties of field lines prove the statement to be true.

(12) Answer : (1)

Hint:Use the formula $Q = C_{eq} V$ **Solution:**

The simplified circuit is



$$C_{eq} = 4 \mu\text{F}$$

$$Q = C_{eq} V = 12 \times 4 = 48 \mu\text{C}$$

(13) Answer : (2)

Solution:

$$\Delta l = \Delta l_1 + \Delta l_2$$

$$\Delta l = \frac{WL}{2AY} + \frac{2WL}{AY} = \frac{5}{2} \frac{WL}{AY}$$

(14) Answer : (4)

Solution:

$$\text{Root mean square speed of gas molecule} = \sqrt{\frac{3RT}{M}}$$

$$\text{Pressure exerted by ideal gas} = \frac{1}{3} Nm\bar{v}^2$$

$$\text{Average kinetic energy of a molecule} = \frac{3}{2} k_B T$$

$$\text{Total internal energy of a gas is } (U) = \frac{1}{2} n f R T$$

Here, $n = 1$

$$f = 5 \quad U = \frac{5}{2} R T$$

Hence, (A) - (Q), (B) - (P), (C) - (S), (D) - (R)

(15) Answer : (3)

Hint:

$$f_{\text{beat}} = |f_2 - f_1|$$

Solution:

$$\omega_1 = 2\pi f_1 = 300\pi$$

$$\Rightarrow f_1 = 150 \text{ Hz}$$

$$\omega_2 = 2\pi f_2 = 306\pi$$

$$\Rightarrow f_2 = 153 \text{ Hz}$$

Beat frequency = 3 beats/s

Hence 180 beats/min.

(16) Answer : (2)

Solution:Time period of spring pendulum is independent of acceleration due to gravity, $T = 2\pi \sqrt{\frac{m}{k}}$

(17) Answer : (2)**Hint:** W_{net} = area under P - V curve**Solution:**

$$W_{\text{net}} = \frac{1}{2} 2P_0 \times V_0 = P_0 V_0$$

(18) Answer : (4)**Solution:**

When tube length is smaller than height of capillary rise, the water will rise to the end of tube and adjust its meniscus accordingly.

(19) Answer : (4)**Solution:**

$$v_{\text{cm}} = \frac{m_1 v_1 + m_2 v_2}{m_1 + m_2} = \frac{(2 \times 2) + (4 \times -1)}{2 + 4} = 0$$

(20) Answer : (4)**Solution:**

$$\therefore x = \frac{t}{3}$$

$$v = \frac{dx}{dt} = \frac{1}{3}$$

$$a = \frac{dv}{dt} = 0$$

$$\therefore W = F \cdot x = 0$$

(21) Answer : (3)**Hint:**

$$v_e = R_e \sqrt{\frac{4}{3} \pi \rho G}$$

Solution:

$$\frac{v_e}{v'_e} = \frac{R_e \sqrt{\rho}}{\frac{R_e}{2} \cdot \sqrt{2\rho}} = \frac{1}{\sqrt{2}}$$

$$v'_e = \frac{v_e}{\sqrt{2}}$$

(22) Answer : (1)**Hint:**

$$\Delta L = \frac{FL}{AY} \Rightarrow A = \frac{FL}{Y \Delta L}$$

Solution:

$$\frac{A_B}{A_S} = \frac{Y_S}{Y_B} \Rightarrow \left(\frac{R_B}{R_S} \right)^2 = \frac{2}{1} \Rightarrow \frac{R_B}{R_S} = \sqrt{2}$$

(23) Answer : (2)**Solution:**Planck's Constant (h)Moment of inertia (I)

$$= \frac{ML^2 T^{-1}}{ML^2} = T^{-1} = \text{Frequency}$$

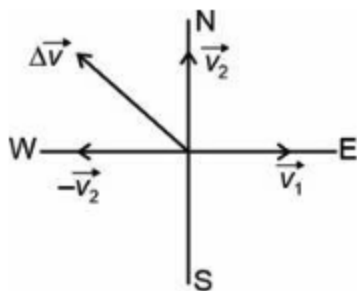
(24) Answer : (3)**Solution:**Using $v = u + at$

$$a = \frac{v}{t} = \frac{40 \text{ m/s}}{20 \text{ s}} = 2 \text{ m/s}^2$$

$$\text{Again } s = ut + \frac{1}{2} at^2$$

$$= \frac{1}{2} \times 2 \times (20)^2 = 400 \text{ m}$$

(25) Answer : (3)**Solution:**



$$\vec{a}_{avg} = \frac{\text{Change in velocity}}{\text{Time interval}} = \frac{|\vec{v}_2 - \vec{v}_1|}{10}$$

$$|\vec{v}_2 - \vec{v}_1| = |40\hat{j} - 30\hat{i}| = 50 \text{ m/s}$$

$$\therefore a_{avg} = \frac{50 \text{ m/s}}{10 \text{ s}} = 5 \text{ m/s}^2$$

(26) Answer : (3)

Solution:

EMF is due to changing magnetic flux whether the circuit is open or closed.
In closed circuit, there will be induced current due to changing magnetic flux.

(27) Answer : (3)

Solution:

$$\text{As } \omega_0 = 2\pi \left(\frac{60}{60}\right), \omega = 0$$

$$\frac{2\pi}{60} = \alpha \text{ (angular retardation)} = \frac{\pi}{30}$$

$$\therefore \tau = I\alpha = 5 \times \frac{\pi}{30} = \frac{\pi}{6} \text{ N m}$$

(28) Answer : (1)

Solution:

$$\text{Force} = \frac{\text{Change in momentum}}{\text{impact time}}$$

$$|\Delta \vec{p}_y| = 0 \quad |\Delta \vec{p}_x| = |-mv_2 \sin \theta - mv_1 \sin \theta|$$

$$= 2mv \sin \theta$$

$$\text{Force} = \frac{|\Delta \vec{p}_x|}{\Delta t} = \frac{2mv \sin \theta}{\Delta t} = \frac{2 \times 3}{0.2} \times 10 \times \frac{\sqrt{3}}{2}$$

$$= 150\sqrt{3}$$

(29) Answer : (1)

Solution:

$$V = \frac{-Gm}{(R+h)}$$

$$-4.45 \times 10^7 = \frac{-6.67 \times 10^{-11} \times 6 \times 10^{24}}{(6400 + h) \times 10^3}$$

$$h = 2600 \text{ km}$$

(30) Answer : (4)

Solution:

According to Torricelli's theorem.

$$v = \sqrt{2gh} = \sqrt{2 \times 10 \times 5} = 10 \text{ m/s}$$

As per equation of continuity

Rate of flow of liquid = Av.

$$= 2 \times 10^{-6} \times 10 = 20 \times 10^{-6} \text{ m}^3/\text{s}$$

(31) Answer : (3)

Solution:

By Stefan's law

(Q) Rate of heat \propto (temperature)⁴

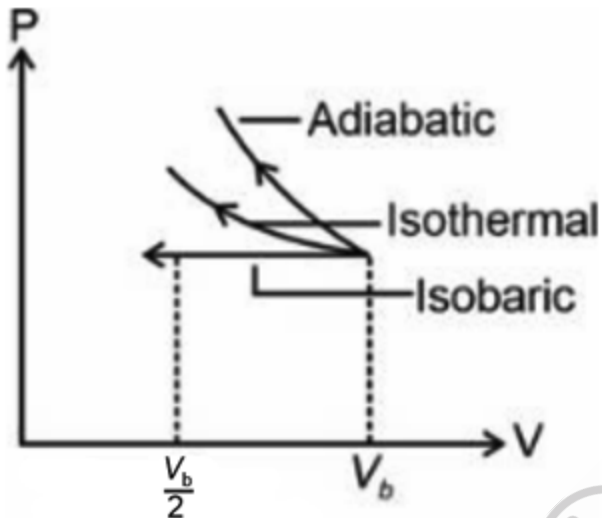
$$\frac{7}{Q} = \frac{(500K)^4}{(1000K)^4}$$

$$7 \times 2^4 \frac{\text{Cal}}{\text{cm}^2 \text{ s}} = Q$$

$$\therefore Q = 112 \frac{\text{Cal}}{\text{cm}^2 \text{ s}}$$

(32) Answer : (3)

Solution:



Work done on the gas = Area under P-V curve which is maximum for adiabatic curve.

(33) Answer : (2)

Solution:

Translational degrees of freedom for a diatomic gas is 3 where as rotational degrees of freedom for a diatomic gas is 2.

(34) Answer : (3)

Solution:

In series LCR circuit, current is maximum at resonance.

Resonance frequency $\omega = \frac{1}{\sqrt{LC}}$

$$\omega^2 = \frac{1}{LC}, \quad L = \frac{1}{\omega^2 C}$$

$$\frac{1}{10^6 \times 10 \times 10^{-6}} = 0.1 \text{ H}$$

$$= 100 \text{ mH}$$

(35) Answer : (3)

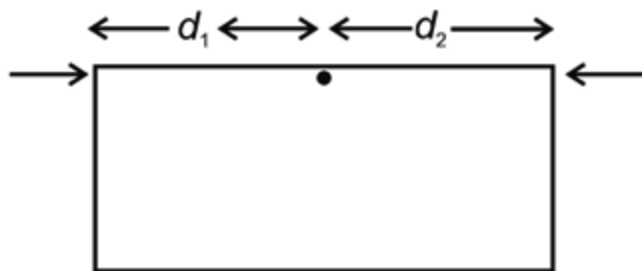
Solution:

Infrared waves are primarily responsible for greenhouse effect.

(36) Answer : (3)

Solution:

Real depth = Apparent depth $\times \mu$



$$d_1 = 5 (\mu)$$

$$d_2 = 3 (\mu)$$

Thickness = $5\mu + 3\mu = 8\mu = 8(1.5) = 12$ cm.

(37) Answer : (4)

Solution:

Einstein photoelectric equation

$$h\frac{c}{\lambda} = \phi_0 + \frac{1}{2}mv^2$$

$$\frac{6.6 \times 10^{-34} \times 3 \times 10^8}{3000 \times 10^{-10}} = 1.6 \times 10^{-19} + \frac{1}{2} (9.1 \times 10^{-31}) v^2$$

$$6.6 \times 10^{-19} - 1.6 \times 10^{-19} = \frac{1}{2} (9.1 \times 10^{-31}) v^2$$

$$v = 10^6 \text{ m/s}$$

(38) Answer : (2)

Solution:

A plane mirror forms real image of virtual object and virtual image of real object.

Virtual image can't be obtained on screen.

(39) Answer : (3)

Solution:

For stable equilibrium,

P.E. is $U = -mB \cos\theta$

$$= -\left(0.4 \frac{\text{J}}{\text{T}}\right) (0.24) = -0.096 \text{ J}$$

(40) Answer : (2)

Solution:

Input power = Output power

$$I_P E_P = I_S E_S$$

$$200 \times I_P = 44, I_P = \frac{44}{220} = 0.2$$

(41) Answer : (2)

Solution:

$$P_{\text{output}} = \frac{V^2}{(R+r)^2} R$$

For maximum power $r = R$

$$P_{\text{max}} = \frac{V^2}{4R} = \frac{V^2}{4r}$$

$$\therefore R = r = 0.5 \Omega$$

(42) Answer : (2)

Solution:

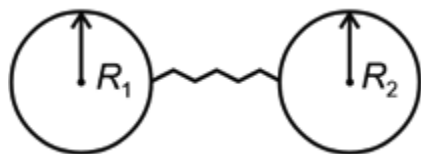
Light being an EM wave can travel through vacuum but sound being mechanical wave need medium. Only transverse wave can be polarised. Light is a transverse wave.

(43) Answer : (3)

Solution:

$$V_1 = V_2$$

$$\frac{q_1}{R_1} = \frac{q_2}{R_2}$$



$$\frac{\sigma_1}{\sigma_2} = \frac{\frac{q_1}{4\pi R_1^2}}{\frac{q_2}{4\pi R_2^2}} = \frac{q_1}{q_2} \frac{R_2^2}{R_1^2}$$

$$\frac{V_1}{V_2} = \frac{R_1}{R_2} \frac{R_2^2}{R_1^2} = \frac{R_2}{R_1}$$

(44) Answer : (3)

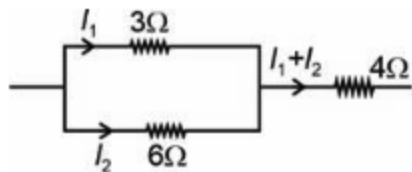
Solution:

$$R_{\max} = \frac{U^2}{g} \text{ at } \theta = 45^\circ$$

$$H_{\max} = \frac{U^2}{4g} = \frac{R_{\max}}{4}$$

(45) Answer : (3)

Solution:



$$3I_1 = 6I_2$$

$$3(0.8) = 6I_2$$

$$I_2 = 0.4 \text{ A}$$

Potential drop across 4-Ω

$$= (I_1 + I_2) 4 - \Omega$$

$$= (1.2)(4) = 4.8 \text{ V}$$

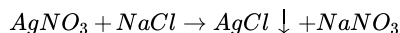


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CHEMISTRY

(46) Answer : (3)

Hint:



Precipitate formed is of AgCl

Solution:

Molarity of AgNO₃ solution

$$= \frac{34 \times 1000}{170 \times 100} = 2 \text{ M}$$

$$\text{Molarity of NaCl solution} = \frac{11.7 \times 1000}{58.5 \times 100} = 2 \text{ M}$$



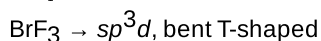
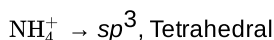
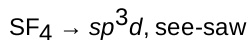
Initial	100×2	100×2		
	200 m mol	200 m mol		

Final	0	0	200 m mol	200 m mol
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$$\text{Mass of AgCl precipitated} = 200 \times 143.5 \times 10^{-3} = 28.7 \text{ g}$$

(47) Answer : (4)

Solution:



$\text{XeF}_4 \rightarrow sp^3d^2$, Square planar

(48) Answer : (1)

Solution:

Species	Bond order
O_2^+	2.5
O_2	2
O_2^-	1.5

(49) Answer : (1)

Hint:

$$\Delta H = \Delta U + \Delta n_g RT.$$

Solution:

Reaction for which Δn_g is maximum, will have large difference of ΔH and ΔU .

(50) Answer : (3)

Hint:

$$w = -2.303 nRT \log \frac{V_f}{V_i}$$

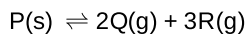
Solution:

$$\begin{aligned} w &= -2.303 \times 3RT \log \frac{100}{10} \\ &= -6.909 \times 300R \log 10 \\ &= -2.07 \times 10^3 R \end{aligned}$$

(51) Answer : (3)

Solution:

With change of pressure, K_p remain constant.



$$K_P = (P_Q)^2 (P_R)^3 - (P_Q)^2 (3P_R)^3$$

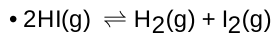
$$P_Q^2 P_R^3 = P_Q'^2 \times 27P_R^3$$

$$\frac{P_Q^2}{27} = P_Q'^2$$

$$P_Q' = \frac{P_Q}{3\sqrt{3}}$$

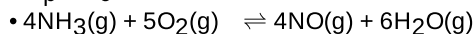
(52) Answer : (2)

Solution:



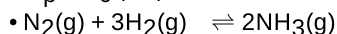
$$\Delta n_g = 0$$

$$K_p = K_c$$



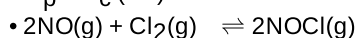
$$\Delta n_g = 1$$

$$K_p = K_c (RT)$$



$$\Delta n_g = -2$$

$$K_p = K_c (RT)^{-2}$$



$$\Delta n_g = -1$$

$$K_p = K_c (RT)^{-1}$$

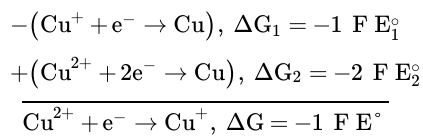
(53) Answer : (2)

Hint:

On adding two reaction their ΔG will be added to obtain ΔG for final reaction.

Solution:

Reverse equation (i) and add it to equation (ii).



$$\Delta G = \Delta G_2 - \Delta G_1$$

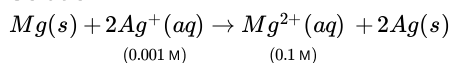
$$-1 F E^\circ = -2 F E_2^\circ + 1 F E_1^\circ$$

$$E^\circ = 2 E_2^\circ - E_1^\circ$$

$$= 0.674 - 0.52 = 0.154 \text{ V}$$

(54) Answer : (2)

Solution:



$$E_{\text{cell}} = E_{\text{cell}}^\circ - \frac{0.0591}{2} \log \frac{[\text{Mg}^{2+}]}{[\text{Ag}^+]^2}$$

$$= 3.17 - \frac{0.0591}{2} \log \frac{(0.1)}{(0.001)^2}$$

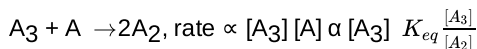
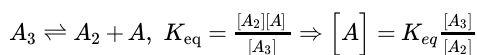
$$= 3.0225 \text{ V} \approx 3 \text{ V}$$

(55) Answer : (3)

Hint:

$$\text{Rate of reaction} \propto [\text{A}_3]^x [\text{A}_2]^y$$

Solution:



$$\text{Rate} \propto [\text{A}_3]^2 [\text{A}_2]^{-1}$$

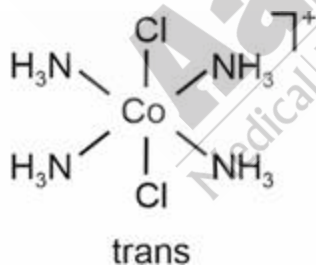
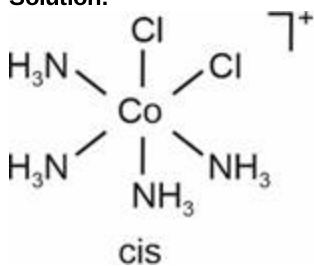
$$\therefore \text{Overall order} = (2) + (-1) = 1$$

(56) Answer : (1)

Hint:

Octahedral complex of type $[\text{MX}_2\text{L}_4]$ shows geometrical isomerism.

Solution:



• Trans isomers contains plane of symmetry hence they are optically inactive species.

(57) Answer : (4)

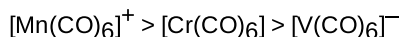
Hint:

More is the electron density on metal, more will be the back donation from metal to π^* orbital of CO

Solution:

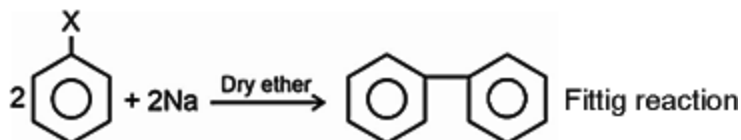
More is the back donation from metal to the π^* orbital of CO, stronger is M–C bond and weaker is C–O bond strength.

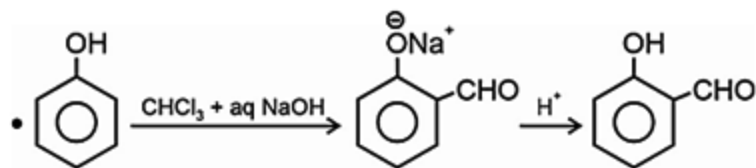
Correct order of C–O bond strength:



(58) Answer : (3)

Solution:

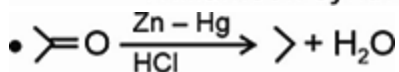




Reimer-Tiemann reaction



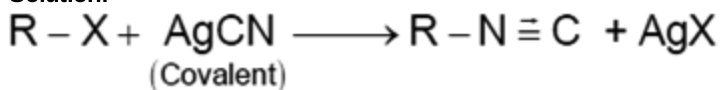
Williamson synthesis



Clemmensen reduction

(59) Answer : (1)

Solution:



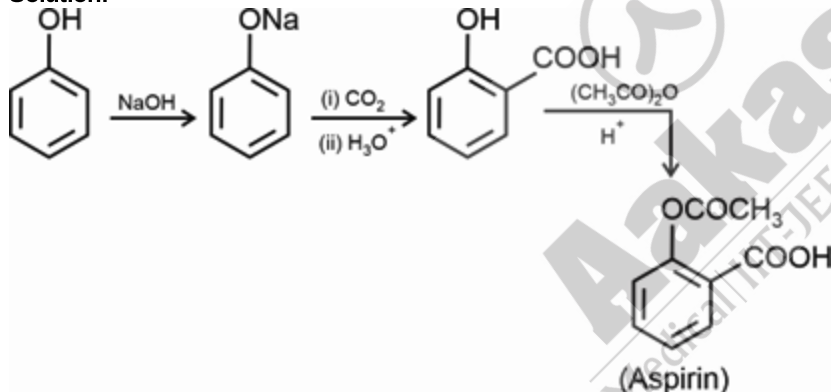
(60) Answer : (4)

Solution:

Acid which is stronger than carbonic acid will evolve CO_2 on reaction with NaHCO_3 . Picric acid is stronger acid than carbonic acid but phenol is weaker than carbonic acid.

(61) Answer : (2)

Solution:



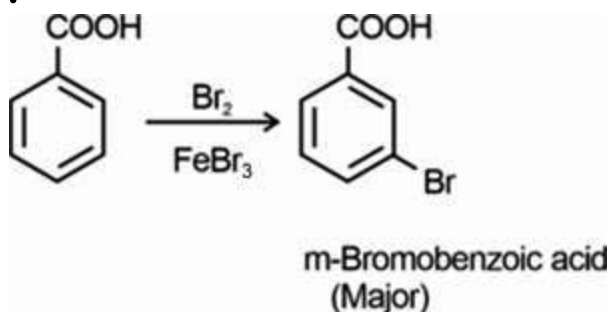
(62) Answer : (3)

Hint:

Carboxyl group is deactivating in nature.

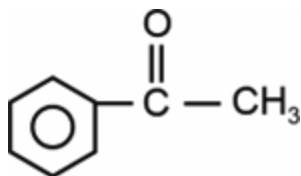
Solution:

• Benzoic acid does not undergo Friedel-Crafts reaction because the carboxyl group is deactivating and the catalyst AlCl_3 [Lewis acid] gets bonded to the carboxyl group.

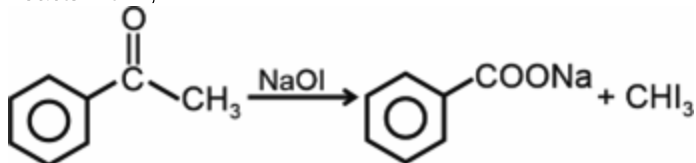


(63) Answer : (2)

Solution:



reacts with 2, 4 DNP.



(64) Answer : (1)

Hint:

Dipole moment = Charge \times bond length

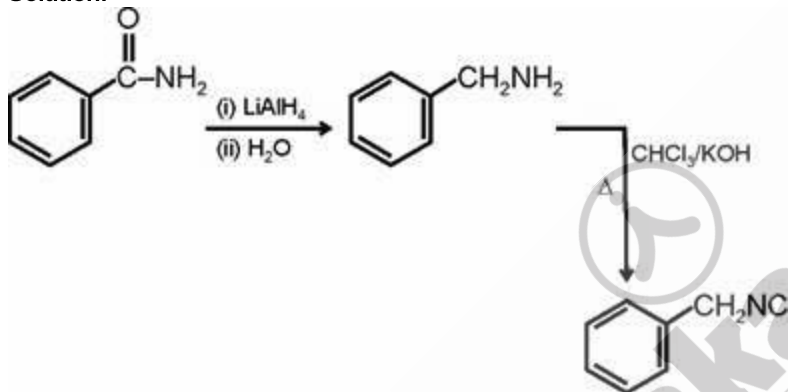
Solution:

Since C – Cl bond length > C – F bond length

\therefore CH_3Cl has greater dipole moment than that of CH_3F .

(65) Answer : (3)

Solution:



(66) Answer : (2)

Solution:

Element	Mass percent	Mole	Mole ratio
C	26.67%	2.22	1
O	71.11%	4.44	2
H	2.22%	2.22	1

(67) Answer : (2)

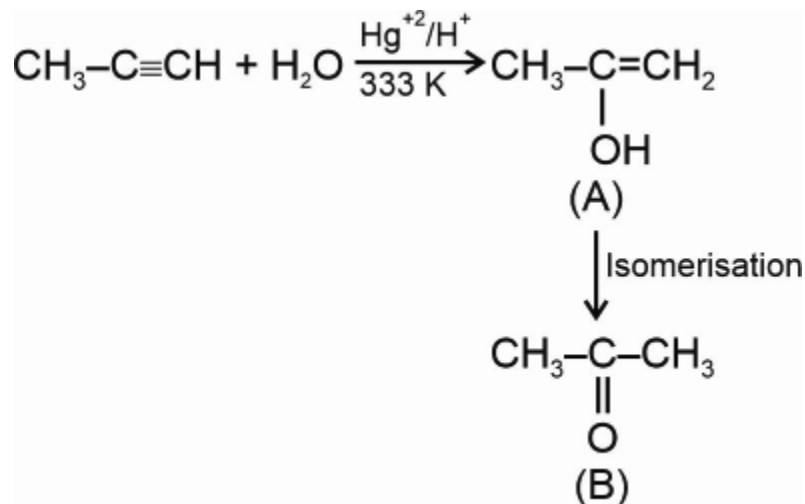
Solution:

Option (1) violates Aufbau principle as without filling 2s completely, electrons are filled in 2p

Option (2) violates Pauli's exclusion principle as an atomic orbital can accommodate 2 electrons with opposite spins and violates Hund's rule

(68) Answer : (4)

Solution:



(69) Answer : (2)

Hint:

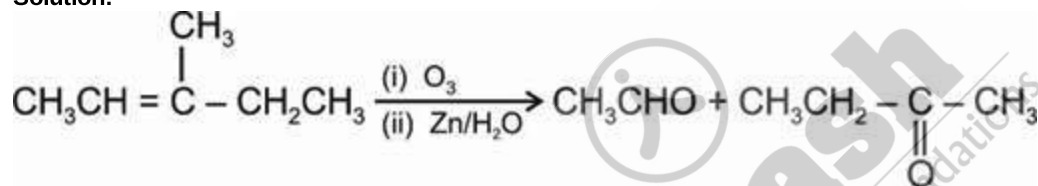
Methanal is gas at room temperature

Solution:

Due to dipole-dipole interaction, the boiling point of aldehydes and ketones are higher than hydrocarbons and ether of comparable molecular mass.

(70) Answer : (2)

Solution:



(71) Answer : (1)

Solution:

Atomic No.	IUPAC official name
101	Mendelevium
103	Lawrencium
105	Dubnium
107	Bohrium

(72) Answer : (3)

Solution:

$$r = a_0 \frac{n^2}{z}$$

$$2\pi r = n\lambda$$

$$2 \times \pi \times 52.9 \times \frac{9}{1} = 3 \times \lambda$$

$$2\pi \times 52.9 \times 3 = \lambda$$

$$6 \times \pi \times 52.9 = \lambda$$

$$\lambda = 317.4\pi \text{ pm}$$

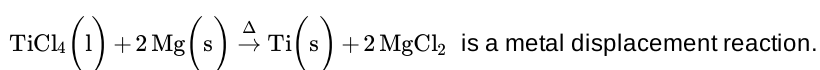
(73) Answer : (1)

Solution:

Charge to mass ratio of canal rays do not depend on the nature of the gas.

(74) Answer : (1)

Solution:



(75) Answer : (2)

Solution:

PbS is black

$[\text{Fe}(\text{SCN})]^{2+}$ is red in colour

(76) Answer : (2)

Solution:

0.6 M of 20 mL H_2SO_4 = 0.6 M of 40 mL NH_3

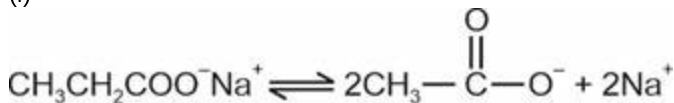
$$\text{Percentage of N} = \frac{14 \times 0.6 \times 2 \times 20}{1000 \times 0.56}$$

= 60%

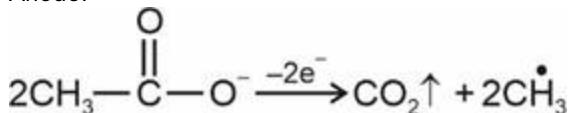
(77) Answer : (2)

Solution:

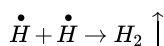
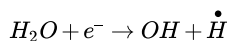
(i)



Anode:



Cathode:



(78) Answer : (1)

Solution:

The solutions that show large negative deviation from Raoult's law form maximum boiling azeotrope at a specific composition.

(79) Answer : (1)

Solution:

Mass of CH_3COOH = 1.8×1.06

= 1.908 g

$$\text{Moles} = \frac{1.908}{60} = 0.0318 \text{ mole}$$

$$\Delta T_f = k_f \times m$$

$$= 1.86 \times 0.0318$$

$$= 0.059$$

$$i = \frac{\Delta T_f(\text{observed})}{\Delta T_f(\text{calculated})}$$

$$= 1.04$$

(80) Answer : (1)

Solution:

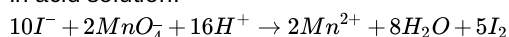


Due to more negative $\Delta_{\text{hyd}}\dot{\text{H}}$ of $\text{Cu}^{2+}(\text{aq})$, stability of $\text{Cu}^{2+}(\text{aq})$ is more than $\text{Cu}^+(\text{aq})$.

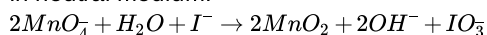
(81) Answer : (4)

Solution:

In acid solution:



In neutral medium:



(82) Answer : (3)

Solution:

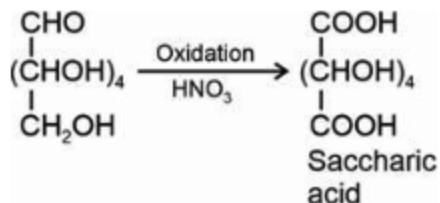
Group	Cation	Group reagent
II	$\text{Pb}^{2+}, \text{Cu}^{2+}, \text{As}^{3+}$	H_2S gas + dil. HCl
III	$\text{Al}^{3+}, \text{Fe}^{3+}$	$\text{NH}_4\text{OH} + \text{NH}_4\text{Cl}$

IV	$\text{CO}^{2+}, \text{Ni}^{2+}, \text{Mn}^{2+}, \text{Zn}^{2+}$	$\text{NH}_4\text{OH} + \text{H}_2\text{S}$
V	$\text{Ba}^{2+}, \text{Ca}^{2+}, \text{Sr}^{2+}$	$\text{NH}_4\text{OH} + (\text{NH}_4)_2\text{CO}_3$

(83) Answer : (3)

Solution: $\text{K}_2\text{HgI}_4 + \text{NH}_3 + \text{KOH} \rightarrow \text{HgO} \cdot \text{Hg}(\text{NH}_2)\text{I}$ Basic mercury (II) amido-iodine (Brown precipitate)

(84) Answer : (3)

Solution:

(85) Answer : (4)

Solution:

Riboflavin – Cheilosis

Pyridoxine – Convulsions

Ascorbic acid – Scurvy

Thiamine – Beri-Beri

(86) Answer : (2)

Solution:

Basic strength order in aqueous solution.

 $(\text{CH}_3)_2\text{NH} > \text{CH}_3\text{NH}_2 > (\text{CH}_3)_3\text{N} > \text{NH}_3$

(87) Answer : (3)

Solution:

Oxoacids of Br are – HOBr

HOBrO₂HOBrO₃

(88) Answer : (4)

Solution: $\text{XeF}_6 + \text{H}_2\text{O} \rightarrow \text{XeOF}_4 + \text{HF}$ $\text{XeF}_6 + \text{H}_2\text{O} \rightarrow \text{XeO}_2\text{F}_2 + \text{HF}$

(89) Answer : (3)

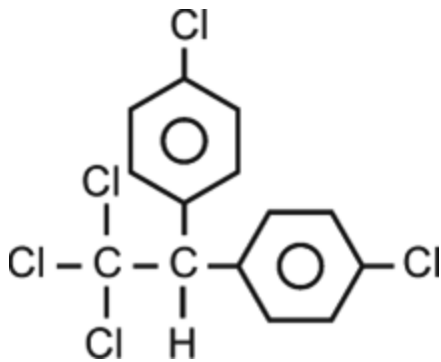
Solution:

Boiling point is determined by molecular weight and intermolecular forces.

Hydride	Boiling point (K)
NH_3	238.5
PH_3	185.5
AsH_3	210.6
SbH_3	254.6

(90) Answer : (2)

Solution:



BIOLOGY

(91) Answer : (4)

Solution:

The difference in shapes of leaves produced in air and those produced in water in buttercup represents the environmental heterophylly. While coriander shows developmental heterophylly.

(92) Answer : (1)

Solution:

Multicarpellary, apocarpous gynoecium is seen in *Michelia*. *Papaver* has multicarpellary syncarpous gynoecium.

(93) Answer : (3)

Solution:

Groundnut is an example of ex-albuminous seed.

(94) Answer : (3)

Hint:

The inheritance of character represented in the given pedigree is due to the recessive gene.

Solution:

The character represented in the pedigree is not Y-linked because the male in second generation is unaffected but his son is affected.

(95) Answer : (2)

Solution:

Human beings and *Drosophila* = XY type, female heterogamety is in birds.

(96) Answer : (2)

Solution:

(97) Answer : (2)

Solution:

The Rho factor is responsible for the termination of transcription in prokaryotes.

(98) Answer : (4)

Solution:

Sequence of chromosome 1 was completed in May 2006.

(99) Answer : (4)

Solution:

DNA-dependent DNA polymerase is the main enzyme required for DNA replication (Label D).

(100) Answer : (3)

Solution:

The immunosuppressive agent "Cyclosporin A" is produced by the fungi *Trichoderma polysporum*.

(101) Answer : (4)

Solution:

Paramecium caudatum and *Paramecium aurelia* in same culture is a classic example of competitive exclusion.

(102) Answer : (1)

Solution:

Darwinian fitness is represented by 'r'

(103) Answer : (4)

Solution:

Pyramid of biomass in an aquatic ecosystem is inverted. Pyramid of energy is always upright.

(104) Answer : (3)

Solution:

Alexander von Humboldt observed that within a region, species richness increased with increasing explored area, but only upto a limit.

(105) Answer : (3)

Solution:

In a typical test cross an organism showing a dominant phenotype is crossed with the recessive parent instead of self-crossing.

(106) Answer : (2)

Solution:

A purine ring has 4 N atoms and an additional 'N' containing substituent group is also present in the structure of adenine and guanine.

(107) Answer : (4)

Solution:

Enzymes are biological molecules usually made up of proteins. These are sensitive to change in temperature and pH.

(108) Answer : (4)

Solution:

During respiration, O_2 is provided to cells and tissues which metabolises glucose to release energy.

(109) Answer : (4)

Solution:

Tidal volume is approx 500 mL

Residual volume : Averages 1100 mL to 1200 mL

Inspiratory reserve volume : Averages 2500 mL to 3000 mL

Vital capacity : Averages 4000 mL to 4600 mL

(110) Answer : (2)

Solution:

Matrix of some connective tissue is solid.

Cardiac muscle fibres are branched.

Tendons are inelastic, while ligaments are elastic.

(111) Answer : (2)

Solution:

Heart beat rate of a healthy adult human is 72 times/min in his resting state.

(112) Answer : (3)

Hint:

Dissolved form of carbon dioxide

Solution:

Reabsorption is minimum in ascending limb of loop of Henle. The descending limb of loop of Henle is permeable to water but almost impermeable to electrolytes. This concentrates the filtrate as it moves down.

The ascending limb is impermeable to water but allows transport of electrolytes actively or passively.

(113) Answer : (2)

Solution:

	Column I		Column II
A.	Ball and socket joint	iii.	Shoulder joint
B.	Hinge joint	iv.	Knee joint
C.	Saddle joint	ii.	Between carpal and metacarpal of thumb
D.	Gliding joint	i.	Between carpals

(114) Answer : (2)

Hint:

Gap between two neurons

Solution:

Axon terminal contains vesicles filled with neurotransmitters.

- The receptor for neurotransmitters are present on post-synaptic membrane.
- In electrical synapses, the membrane of pre and post-synaptic neurons are in very close proximity.

(115) Answer : (3)

Solution:

The diagram mentioned in the question is representing the mechanism of a steroid hormone (e.g., estrogen).

(116) Answer : (3)

Solution:

Genetic diversity enables a population to adapt to its environment. Insects are most species rich taxonomic group amongst the animals.

(117) Answer : (4)

Solution:

Wheat belongs to order Poales

(118) Answer : (3)

Solution:

All single-celled eukaryotes are placed under kingdom Protista according to Whittaker's classification

(119) Answer : (1)

Solution:

Viruses cause mumps. In viruses, the protein coat protects the nucleic acid.

(120) Answer : (1)

Solution:

Gracilaria (Red algae) stores food in the form of floridean starch.

(121) Answer : (2)

Solution:

In monocot plants, such as wheat and maize, roots originate from base of the stem and form fibrous root system. In banyan tree, tap root system is found.

(122) Answer : (4)

Solution:



represents epipetalous stamens.

(123) Answer : (2)

Solution:

These features belong to family Solanaceae.

(124) Answer : (3)

Solution:

As compared to the dicot root which have fewer xylem bundles there are usually more than six (polyarch) xylem bundles in the monocot root.

(125) Answer : (2)

Solution:

In leaves, the ground tissue consists of thin-walled chloroplast containing cells and is called mesophyll.

(126) Answer : (3)

Solution:

Robert Brown discovered nucleus. George Palade discovered ribosomes, Camillo Golgi discovered Golgi bodies. Singer and Nicolson proposed the structure of plasma membrane.

(127) Answer : (3)

Solution:

Every chromosome essentially has a primary constriction or centromere. The centromeres hold the two chromatids of a chromosome.

(128) Answer : (1)

Solution:

ER divides the intracellular space into two distinct compartments, i.e., luminal (inside ER) and extra luminal (cytoplasm) compartments.

(129) Answer : (2)

Solution:

Crossing over between homologous chromosomes is completed by the end of pachytene

(130) Answer : (4)

Solution:

The resting phase or interphase is divided into G₁, S and G₂ phases.

(131) Answer : (2)

Solution:

Adult *Ophiura* is radially symmetrical with tube within tube body plan.

(132) Answer : (1)

Solution:

Air sacs to supplement respiration are present in birds.

(133) Answer : (2)

Solution:

Presence of notochord, gill slits and dorsal tubular nerve cord are characteristic features of chordates.

(134) Answer : (1)

Solution:

Presence of claspers on pelvic fins of males is a characteristic feature of cartilaginous fishes. In cyclostomes, unpaired fins are present but scales are absent. Fishes possess streamlined body.

(135) Answer : (2)

Solution:

RNAi prevents protein synthesis by preventing translation of mRNA.

(136) Answer : (4)

Solution:

Exonuclease will not harm circular plasmid containing gene for insulin synthesis.

(137) Answer : (4)

Hint:

Human diseases

Solution:

Many transgenic animals are designed to increase our understanding of how genes contribute to the development of disease.

Today transgenic models exist for many human diseases such as cancer, cystic fibrosis, rheumatoid arthritis and Alzheimer's disease.

(138) Answer : (1)

Hint:

Coded by *lac Z*

Solution:

If a recombinant DNA is inserted within the coding sequence of an enzyme, β -galactosidase then, this results in inactivation of the gene for synthesis of this enzyme, which is referred to as insertional inactivation.

(139) Answer : (3)

Solution:

The secretions of bulbourethral glands help in the lubrication of the penis.

(140) Answer : (3)

Solution:

Darwin explained arrival of a new species but could not explain arrival of fittest.

(141) Answer : (2)

Solution:

Nearly all of the essential nutrients, and 70-80 per cent of electrolytes and water are reabsorbed by PCT. It helps to maintain the pH and ionic balance of body fluids.

ADH causes reabsorption of water from latter part of DCT and CD.

(142) Answer : (1)

Solution:

The epididymis leads to vas deferens that ascend to the abdomen and loops over the urinary bladder. It receives a duct from seminal vesicle and opens into urethra as the ejaculatory duct. Male urethra is common passage for both sperm and urine.

(143) Answer : (3)

Solution:

Storage polysaccharide in animals is glycogen which is a polymer of glucose.

(144) Answer : (1)

Solution:

Epithelium tissue has free surface, which faces either a body fluid or the outside environment and thus provides a covering or a lining for some parts of the body. Epithelial tissue is present in the inner surface of hollow organs like bronchioles and fallopian tubes.

(145) Answer : (3)

Solution:

Drugs like barbiturates, amphetamines, benzodiazepines are used to help patients cope with mental illness like depression and insomnia. Cocaine is a stimulant.

(146) Answer : (3)

Solution:

Saheli was developed by scientists at Central Drug Research Institute (CDRI) in Lucknow. It blocks estrogen receptors and inhibits implantation.

(147) Answer : (3)

Solution:

About 15 mya, primates called *Dryopithecus* were existing. They were hairy and walked like gorilla and chimpanzees.

(148) Answer : (4)

Solution:

Acrosome is filled with digestive enzymes which help in fertilisation of the ovum.

(149) Answer : (4)

Solution:

In females who have bilateral blockage in fallopian tubes, IUT can be a possible mode of conceiving as fertilisation occurs outside the body. In ZIFT, zygote or early embryos could then be transferred into the fallopian tube (upto 8 blastomeres) and embryo with more than 8 blastomeres, into the uterus (Intra uterine transfer).

(150) Answer : (2)

Solution:

The nymphs look very much like adults. The nymph grows by moulting about 13 times to reach the adult form. The female cockroach has of two large ovaries, lying laterally in 2nd – 6th abdominal segments. In cockroach, 13 chambered heart with 12 pairs of alary muscles are present. Heart of cockroach consists of elongated muscular tube lying along mid-dorsal line of thorax and abdomen.

(151) Answer : (2)

Solution:

In frogs, a triangular structure called sinus venosus joins the right atrium. It receives blood through the major veins called vena cava. The ventricle opens into a sac like conus arteriosus on the ventral side of heart.

(152) Answer : (3)

Solution:

Vector for malaria is female *Anopheles* mosquito and for filariasis female *Culex* mosquito. Vector for dengue is *Aedes* mosquito. Ringworm, typhoid and pneumonia are not vector-borne diseases.

(153) Answer : (2)

Solution:

'Ramachandran plot' rank among the most outstanding contributions in structural biology which helps us to understand the structure of proteins.

(154) Answer : (2)

Solution:

Lysozyme is used to isolate genetic material from bacterial cells.

(155) Answer : (3)

Solution:

If a restriction enzyme cuts the DNA a little away from the centre of recognition site, sticky ends will be produced.

(156) Answer : (3)

Solution:

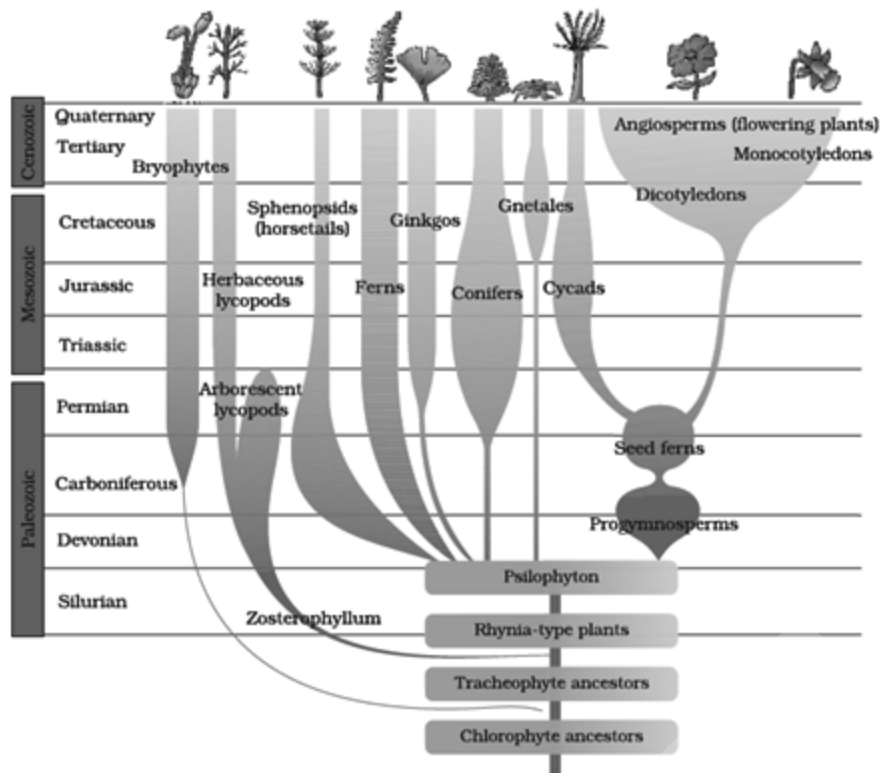
In prophase, the chromatin material becomes untangled.

(157) Answer : (1)

Solution:

'A' represents the e⁻ acceptor which is located towards the outer side of the membrane and transfer its electron not to an electron carrier but to an H carrier.

- (158) Answer : (2)
Solution:
Both chlorophyll *a* and *b* show maximum absorption in blue and red region of the visible spectrum.
- (159) Answer : (2)
Solution:
During conversion of phosphoenolpyruvate to pyruvate there is a substrate level phosphorylation.
- (160) Answer : (3)
Solution:
Ethylene and auxin both can be used to increase yield of pineapple as they help to synchronise fruit set.
- (161) Answer : (4)
Solution:
Nectaries are present in flowers which are pollinated by biotic agents.
- (162) Answer : (3)
Solution:
Taylor *et. al.* experiments on *Vicia faba* and proved that DNA in chromosomes also replicate semi-conservatively.
- (163) Answer : (1)
Solution:
Trichoderma is a free living fungus which could be used as a biocontrol agent. *Glomus* is a fungus that forms symbiotic association. Baculoviruses belong to genus *Nucleopolyhedrovirus*. *Azospirillum* is a free-living N₂ fixer.
- (164) Answer : (1)
Solution:
Primary production is the amount of biomass or organic matter produced per unit area over a time period by plant during photosynthesis.
- (165) Answer : (3)
Solution:
Complex IV refers to cytochrome c oxidase complex containing cytochromes *a* and *a₃* and two copper centres.
- (166) Answer : (2)
Solution:
Paramecium possesses cilia as their locomotory structure.
- (167) Answer : (1)
Solution:
Selaginella belongs to class Lycopside but *Equisetum* belongs to class Sphenopsida. *Selaginella* possesses microphylls. Rest of the features are shared by both *Selaginella* and *Equisetum*.
- (168) Answer : (3)
Solution:
Marigold show basal placentation. *Dianthus* and *Primrose* show free central placentation.
- (169) Answer : (2)
Solution:
The correct sequence of position of tissues in dicot stem anatomy is as follows:
c. This layer is covered with cuticle and bear a few stomata – Epidermis
d. This layer consists of a few layers of collenchymatous cells – Hypodermis
b. Cells of this layer are rich in starch grains and the layer is referred to as starch sheath – Endodermis
a. This tissue is present in the form of semi-lunar patches of sclerenchyma – pericycle
e. This tissue is found in endarch condition – xylem
- (170) Answer : (2)
Solution:
Aleuroplasts store proteins
- (171) Answer : (2)
Solution:
Insulin is a protein hormone, made up of amino acids. So, it will get digested by the protein digesting enzymes.
- (172) Answer : (2)
Solution:



(173) Answer : (3)

Solution:

IUDs are ideal contraceptives for the females who want to delay pregnancy and/or space children. It is one of the most widely accepted methods of contraception in India. It is reversible.

(174) Answer : (4)

Solution:

Testudo (Tortoise) is a reptile. It is oviparous and in them development is direct.

(175) Answer : (2)

Solution:

Heart has four chambers, two relatively small upper chambers called atria and two larger lower chambers called ventricles. A thin, muscular wall called the interatrial septum separates the right and left atria, whereas a thick-walled, the inter-ventricular septum, separates the left and the right ventricles. The atrium and the ventricle of the same side are also separated by a thick fibrous tissue called atrio-ventricular septum.

(176) Answer : (4)

Solution:

Carpals – 8 in each wrist

Ear ossicles – 6

Palm bones – 5 in each palm

Cranial bones – 8

Pelvic girdle bones – 2

Pectoral girdle bones – 4

The facial region is made up of 14 skeletal elements which form the front part of skull.

(177) Answer : (4)

Solution:

The neural system coordinates and integrates functions of organs.

Inner parts of cerebral hemisphere and a group of associated deep structures form a complex structure called the limbic system which is concerned with olfaction, autonomic responses, regulation of sexual behaviour, expression of emotional reactions and motivation.

The midbrain receives and integrates visual, tactile and auditory inputs.

The cerebellum integrates information received from the semicircular canal of the ear and the auditory system.

(178) Answer : (4)

Solution:

Exophthalmic goitre is a form of hyperthyroidism, characterized by enlargement of the thyroid gland, protrusion of eye balls, increased metabolic rate and weight loss, also called Graves' disease.

(179) Answer : (2)

Solution:

Aldosterone is main mineralocorticoid in human body. It acts mainly at the renal tubules and stimulates the reabsorption of Na^+ and H_2O and excretion of K^+ and phosphate ions.

(180) Answer : (1)

Solution:

