Solution

MODEL PAPER 2 PHYSICS

NEET-UG - Physics

1.

(c) Resistance

Explanation:

[Resistance] = $[ML^2T^{-3}A^{-2}]$

∴ Unit of resistance = $kg\ m^2A^{-2}s^{-3}$

2. **(a)** 10^5

Explanation:

Muscle × speed = power

$\therefore$ Muscle $= \frac{\text{power}}{\text{speed}} = \frac{\text{work}}{\text{time} \times \text{speed}} = \frac{[ML^2T^{-2}]}{[T] \times [LT^{-1}]}$

= $[MLT^{-2}]$ = mass × accleleration = force

Hence, $\frac{\text{SI unit of force.}}{\text{CGS unit of force}} = \frac{kg \times m \times s^{-2}}{gm \times cm \times s^{-2}}$

$10^3 \times 10^2 = 10^5$

3.

(d) A is false but R is true.

Explanation:

Due to earth's axial rotation, the speed of the trains relative to earth will be different and hence the centripetal forces on then will be different. Thus their effective weights $\left[mg - \frac{mv^2}{r}\right]$ will be different. So they exert different pressure on the rails.

4. **(a)** 20.0

Explanation:

Initial velocity, u = 100 m/s

As it stops so final velocity, v = 0

Acceleration a = - 5 m/s^2

We know, v - u = at

$\Rightarrow t = \frac{v-u}{a}$

$\Rightarrow t = \frac{0-100}{-5} = \frac{-100}{-5}$

$\Rightarrow$ t = 20.0 s

5.

(d) 24 m

Explanation:

According to the conditions,

For first case,

u_1 = 50 km/h

= $\frac{125}{9}$ m/s

Acceleration,

a = $\frac{-u^2}{2S_1}$

= $-\left(\frac{125}{9}\right)^2 \times \frac{1}{2 \times 6}$

= -16 m/s^2

For second case, we have

u_2 = 100 km/h

= $\frac{250}{9}$ m/s

$S_2 = \frac{-u^2}{2a}$

$= -\left(\frac{250}{9}\right)^2 \times \frac{-1}{2\times16}$

= 24 m

6. **(a)** 0°

Explanation:

When $\theta = 0^\circ$,

$|\vec{A} + \vec{B}| = \sqrt{|\vec{A}|^2 + |\vec{B}|^2 + 2|\vec{A}||\vec{B}|\cos 0^\circ}$

$= |\vec{A}| + |\vec{B}|$

7. **(c)** 6 m/s

Explanation:

$F = ma = m\frac{dv}{dt} = m\frac{dv}{dx} \cdot \frac{dx}{dt}$

$Fdx = mv\,dv \left[\frac{dx}{dt} = v\right]$

$3x\,dx = 8v\,dv$

$3\int_2^{10} x dx = 8\int_0^v v dv$

$\frac{3}{2}\left[x^2\right]_2^{10} = \frac{8}{2}\left[v^2\right]_0^v$

$\frac{3}{2}[100 - 4] = 4[v^2 - 0]$

or $\frac{3}{2} \times \frac{96}{4} = v^2$ or v = 6 m/s.

8. **(c)** $\frac{1}{3}$

Explanation:

$\mu = \frac{\text{Length hanging from the table}}{\text{Length lying on the table}}$

$= \frac{l/4}{3l/4} = \frac{1}{3}$

9. **(c)** mk^2r^2t

Explanation:

$a_c = \frac{v^2}{r}, \therefore \frac{v^2}{r} = k^2rt2$

$KE = k = \frac{1}{2}mv^2 = \frac{1}{2}\,mk^2r^2t^2$

By work-energy theorem, change in kinetic energy is equal to work done,

$W = \Delta k = \frac{1}{2}\ mk^2r^2t^2 - 0$

$\therefore P = \frac{dW}{dt} = mk^2r^2t$

10. **(b)** $r\omega$

Explanation:

the angular displacement of a particle about the z-axis

$d\theta = \frac{ds}{r}$

differentiate with respect to time

$\frac{d\theta}{dt} = \frac{1}{r}\frac{ds}{dt}$

$\frac{d\theta}{dt} = \omega$

$\frac{ds}{dt} = v$

$\omega = \frac{v}{r}$

$v = r\omega$

11.

(c) 3 : 4

Explanation:

Acceleration due to gravity,

$g = \frac{GM}{R^2} = \frac{4}{3}\pi G\rho R$

$\therefore \frac{g_2}{g_1} = \frac{\rho_2}{\rho_1} \times \frac{R_2}{R_1} = \frac{1}{2} \times 1.5 = \frac{3}{4}$

12. **(a)** 33.3 m

Explanation:

Stress = $\frac{\text{weight}}{\text{area}} = \frac{mg}{A} = \frac{Vdg}{A} = \frac{ALdg}{A}$ = Ldg

$\therefore L = \frac{\text{breaking stress}}{dg} = \frac{10^6}{3\times10^3\times10}$ = 33.3 m

13.

(b) 10 g

Explanation:

$m = \pi r^2 h\rho$

$= \pi r^2 \left(\frac{2\sigma\cos\theta}{r\rho g}\right)\rho = \frac{2\pi r\sigma\cos\theta}{g}$

$\Rightarrow m \propto r$

$\therefore \frac{m'}{m} = \frac{2r}{r}$ = 2

or m' = 2m = 2 $\times$ 5g = 10 g

14. **(a)** 3.8 $\times$ 10^{14} kg

Explanation:

Total energy radiated by the sun

$= 1.4 \times 10^3 \times 4\pi \times \left(1.5 \times 10^{11}\right)^2 Js^{-1}$

= 39.5 $\times$ 10^{25} Js^{-1}

= 39.5 $\times$ 86400 $\times$ 10^{25} J day^{-1}

= 3.4 $\times$ 10^{31} J day^{-1}

$\Delta m = \frac{E}{c^2} = \frac{3.4\times10^{31}}{9\times10^{16}}$

= 3.8 $\times$ 10^{14} kg

15.

(d) AY$\alpha\Delta$T

Explanation:

Due to thermal exp., change in length (Δl) = l $\alpha\Delta$T ...(i)

Young's modulus (Y) = $\frac{\text{Normal stress}}{\text{Longitudinal strain}}$

Y = $\frac{\frac{F}{A}}{\frac{\Delta l}{l}} = \frac{\Delta l}{l} = \frac{F}{AY}$

$\Delta l = \frac{Fl}{AY}$

From eq^n (i), $\frac{Fl}{AY} = l\alpha\Delta T$

F = AY$\alpha\Delta$T

16.

(b) Statement (iii) is correct.

Explanation:

Statement (iii) is correct.

17.

(b) 1200 R

Explanation:

For a monoatomic gas, $C_V = \frac{3}{2}R$

Q = $nC_V\Delta T$

= $4 \times \frac{3}{2}$ R × (473 - 273) = 1200 R

18.

(d) $\frac{9}{16}$

Explanation:

$T = 2\pi\sqrt{\frac{M}{k}}$

$T' = 2\pi\sqrt{\frac{M+m}{k}}$

$\therefore \frac{T'}{T} = \sqrt{\frac{M+m}{m}}$

$\Rightarrow \frac{5}{4} = \sqrt{1 + \frac{m}{M}}$

$\Rightarrow \frac{25}{16} = 1 + \frac{m}{M}$

$\therefore \frac{m}{M} = \frac{25}{16} - 1 = \frac{9}{16}$

19. **(a)** 113 m/s

Explanation:

v = $\omega\sqrt{A^2 - y^2}$

= $2\sqrt{(60)^2 - (20)^2}$

= $80\sqrt{2}$ = 113 ms^{-1}

20.

(c) Only (i) and (iii)

Explanation:

y = $1 + \omega t + \omega^2 t^2$ is algebraic function and y = $\sin^3 \omega t$ is not harmonic being the product of sin ωt (thrice). But y = $\sin \omega t - \cos \omega t$ and y = $5\cos\left(\frac{3\pi}{4} - 3\omega t\right)$ are simple harmonic functions. Hence y = $\sin \omega t - \cos \omega t$ and y = $5\cos\left(\frac{3\pi}{4} - 3\omega t\right)$ represent SHM.

21.

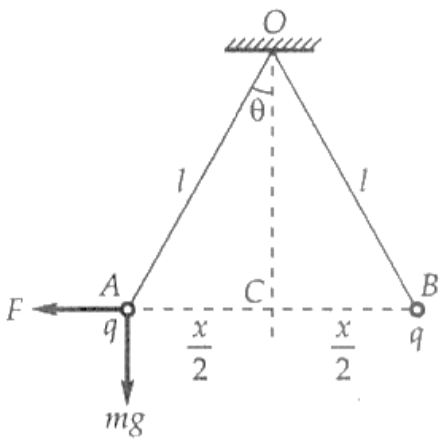
(c) $\nu_{beat} = \nu_1 - \nu_2$

Explanation:

The beat frequency is always equal to the difference in frequency of the two notes that interfere to produce the beats. So if two sound waves with frequencies of 256 Hz and 254 Hz are played simultaneously, a beat frequency of 2 Hz will be detected.

22. **(a)** v $\propto x^{-\frac{1}{2}}$

Explanation:



From △ACO of forces,

$\frac{F}{AC} = \frac{mg}{OC}$

$\frac{kq^2}{x^2(\frac{x}{2})} = \frac{mg}{\sqrt{l^2-\left(\frac{x}{2}\right)^2}}$

$\frac{2kq^2}{x^3} = \frac{mg}{l}$ [$\frac{x}{2}$ << l]

$\therefore q^2 = \frac{mg}{2kl} \cdot x^3$

$\Rightarrow q^2 \propto x^3$

$\Rightarrow q \propto x^{3/2}$

$\Rightarrow \frac{dq}{dt} \propto \frac{3}{2}x^{\frac{1}{2}}\frac{dx}{dt}$

$\Rightarrow \frac{dq}{dt} \propto \frac{3}{2}x^{\frac{1}{2}} \cdot v$

As $\frac{dq}{dt}$ is constant for both spheres, so

$v \propto \frac{1}{x^{\frac{1}{2}}} \Rightarrow v \propto x^{-\frac{1}{2}}$

23.

(c) $\frac{C}{3}$, 3v

Explanation:

V_{eff} = V + V + V = 3V

$\frac{1}{C_{\text{eff}}} = \frac{1}{C} + \frac{1}{C} + \frac{1}{C} \Rightarrow C_{\text{eff}} = \frac{C}{3}$

24.

(b) capacitance

Explanation:

Q = CV

When V = 1

Thus, Q = C

25.

(b) $\frac{P}{4}$

Explanation:

$\frac{P}{4}$

it is given that the element of a heater is rated (P, V). If it is connected across a source of voltage V' = **V/2**.

we have to find **power consumed** by element of the heater.

here resistance of element, $R = V^2/P$

thus $P' = (V/2)^2/(V^2/P)$

P' = P/4

26. **(a)** 10 W

Explanation:

P = $\frac{V^2}{R}$ i.e., $P \propto V^2$

or $\frac{P_1}{P_2} = \frac{V_1^2}{V_2^2}$ or $\frac{40}{P_2} = \frac{(200)^2}{(100)^2}$

or P_2 = 10 W

27.

(c) 1.5×10^3 m/s

Explanation:

$Bqv = \frac{mv^2}{r}$

or BQR = mv

For electrons as well as proton B is the same, r is the same and numerically charge q is the same; therefore mv is constant.

$m_e v_e = m_p v_p$

or $v_p = \left(\frac{m_e}{m_p}\right) v_e$

or $v_p = \left(\frac{0.90 \times 10^{-30}}{1.8 \times 10^{-27}}\right) \left(3.0 \times 10^6\right) = 1.5 \times 10^3 \text{m/s}$

28.

(c) 30 A in the opposite direction.

Explanation:

Here, current cannot be in same direction in both wire because then, B_p = 0. So current should be in opposite direction.

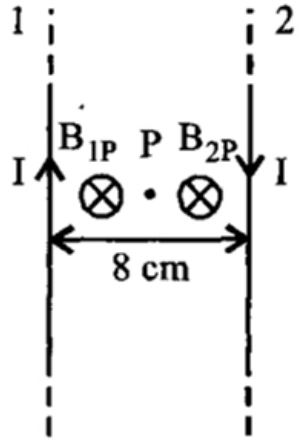
$B_p = B_{1p} + B_{2p}$

$B_p = 2\frac{\mu_0 I}{2\pi r}$

$300 \times 10^{-6} = 2 \times 2 \times 10^{-7} \times \frac{I}{4 \times 10^{-2}}$

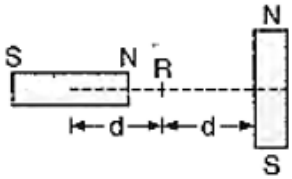
$3 \times 10^{-4} = 10^{-5} \times I$

I = 30 A



29. **(a)** $\sqrt{5}B$

Explanation:



Induction at

$R = \sqrt{B^2_{\text{axial}} + B^2_{\text{equatorial}}}$

$= \sqrt{\left(\frac{\mu_0}{4\pi} \cdot \frac{2M}{d^3}\right)^2 + \left(\frac{\mu_0}{4\pi} \cdot \frac{M}{d^3}\right)^2}$

$\sqrt{5}B$

30.

(c) $\frac{T_o}{3}$

Explanation:

Initial time period of magnet

$T_0 = 2\pi\sqrt{\frac{\text{I}}{\text{MB}}}$

I - moment of inertia of bar magnet

M- magnetic moment of bar magnet

when the magnet is cut into three equal pieces the magnetic moment of each piece of magnet becomes $= M' = \frac{\text{M}}{3}$

New moment of inertia of each magnet = $I' = \frac{\text{I}}{3^3} = \frac{I}{27}$

New time period of magnet is

$T' = 2\pi\sqrt{\frac{\text{I}'}{\text{M}'\text{B}}} = 2\pi\sqrt{\frac{\text{I}/27}{(\text{M}/3)\text{B}}}$

$T' = \frac{T_0}{3}$

31.

(d) If both assertion and reason are false.

Explanation:

Diamagnetic materials have L = 0, S = 0 and J = 0. They have no magnetic dipole moment. The given reason is wrong.

32.

(d) rate of change of magnetic flux through the coil

Explanation:

rate of change of magnetic flux through the coil

33.

(c) $\frac{\omega L}{R}$

Explanation:

Q or quality factor of resonant circuit is a measure of quality of resonant circuit. In an LCR circuit, the quality factor Q = $\frac{\omega_0}{\Delta\omega} = \frac{\omega}{\frac{R}{L}} = \frac{\omega L}{R}$

34.

(c) 3.43 V/m

Explanation:

3.43 V/m

35. **(a)** $\frac{U}{c}$

Explanation:

$\frac{U}{c}$

36.

(c) the bombarding electrons knock out electrons from the inner shell of the target atoms and one of the outer electrons falls into this vacancy

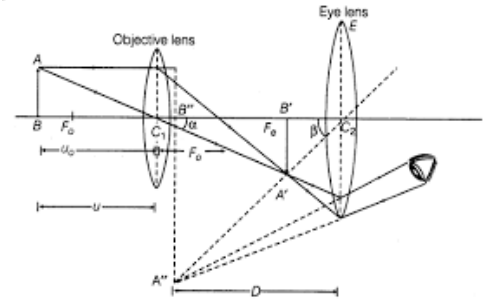
Explanation:

the bombarding electrons knock out electrons from the inner shell of the target atoms and one of the outer electrons falls into this vacancy

37.

(c) 6 mm

Explanation:



Since tower n is situated very far (2000 m), so its image is at the focal plane of objective lens.

So angle subtended by tower is equal to angle subtended by the image, $\beta = \alpha$

or $tan\beta = tan\alpha$

or $\frac{10}{2000} = \frac{A'B'}{1.2}$

$\therefore\ A'B' = 6 \times 10^{-3}m = 6mm$

38.

(b) is formed at the least distance of distinct vision

Explanation:

Magnification of compound microscope is given by

m = $(\frac{v_o}{u_o})(1 + \frac{D}{f_e})$ when final image is formed at near point

Whereas, m = $(\frac{v_o}{u_o})(\frac{D}{f_e})$, when final image is formed at infinity.

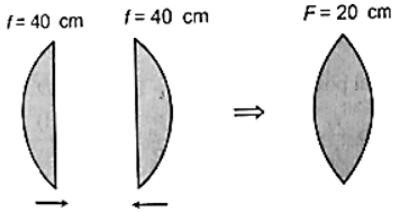
Hence, magnification is maximum when final image is formed at near point (least distance of distinct vision).

39.

(b) 40 cm

Explanation:

To obtain, an inverted and equal size image, the object must be paced at a distance of 2f from the lens,i.e.,40 cm in this case.



40.

(c) λ_1 (n_1/n_2)

Explanation:

$\lambda_{medium} = \frac{\lambda_{air}}{n_m} = \frac{(c/v)}{n_m}$

$\therefore \lambda_1 = \frac{c}{vn_1}; \lambda_2 = \frac{c}{vn_2}$

or $\lambda_1 n_1 = \lambda_2 n_2$ or $\lambda_2 = \lambda_1 \left(\frac{n_1}{n_2}\right)$

41.

(b) 1.602×10^{-17} J

Explanation:

K = eV = 1.602 x $10^{-19} \times$ 100 J

= 1.602×10^{-17} J

42. **(a)** 4.0 V

Explanation:

As we know,

$K_{max} = eV_0 \Rightarrow eV_0 = 4eV \Rightarrow V_0 = 4V$

43. **(a)** Both A and R are true and R is the correct explanation of A.

Explanation:

Assertion and reason both are correct statements and reason is correct explanation for assertion.

44.

(c) Thomson's model and Rutherford's model

Explanation:

According to Thomson model, an atom consists of a positively charged sphere with electrons filled in it. The positively charged part of the atom in this model is the atom itself and so it has the most mass.

According to Rutherford model, the positive charge and most of the mass of the atom is concentrated in the nucleus of the atom. The nucleus is thus the positively charged part of the atom and it has the most mass.

So both the models say that the positively charged part of the atom possesses most of the mass.

45.

(c) $\frac{1}{n^2}$

Explanation:

In Bohr's model of the hydrogen atom, the total energy of the electron in n^{th} discrete orbit is proportional to $\frac{1}{n^2}$

46. **(a)** $F_{pp} = F_{nn} = F_{pn}$

Explanation:

The nuclear force is independent of the nature of the charge of the nucleon.

47. **(a)** space which was previously occupied by an electron

Explanation:

A hole is a vacancy created by the loss of an electron from a covalent bond.

48.

(c) decreases

Explanation:

In forward biasing, the width of the potential barrier decreases.

49. **(a)** NAND

Explanation:

NAND and NOR gates are used as universal gates.

50.

(c) $t_1 < t_2 < t_3$

Explanation:

$t_1 < t_2 < t_3$

Solution

CHEMISTRY MODEL PAPER 2

NEET-UG - Chemistry

1.

(b) 169.9

Explanation:

Molar mass of $AgNO_3$ in g/mol:

= [atomic mass of Ag] + [atomic mass of N] + [atomic mass of O*3]

= [107.8682 + 14.00676 + 15.99948*3]

= 169.8731 ≈169.9

2.

(d) 180.156

Explanation:

Calculations: Molecular mass of a compound is calculated using the atomic mass of the elements involved in its molecular formula. Thus, in glucose with molecular formula $C_6H_{12}O_6$ the molecular formula is calculated as;

6 (atomic mass of C) + 12 (atomic mass of H) + 6 (atomic mass of O)

= (6 × 12.0107) + (12 × 1.0079) + (6 × 15.9994)

=180.15588

= **180.156**

3.

(d) 16 and 15

Explanation:

There are 8 protons in a single atom of oxygen and 8 neutrons. Thus, a molecule of oxygen (O_2) would contain 16 of each. To gain + charge it must have to loose one electron. So number of electrons in O_2^+ = 16-1=15.

4. **(a)** Around 10^6 Hz

Explanation:

Radiofrequency (RF) is any of the electromagnetic wave frequencies that lie in the range extending from around 3 kHz to 300 GHz, which include those frequencies used in radio communication or radar. RF usually refers to electrical rather than mechanical oscillations.

5. **(a)** $F_2 < Cl_2 < O_2 < N_2$

Explanation:

As bond order increases bond dissociation energy also increases.

Thus N_2

i. The triple bonded N_2 with bond order = 3 has the highest bond dissociation energy.

ii. The doubly bonded O_2 with bond order = 2 has lesser bond dissociation energy than N_2

iii. F_2 and Cl_2 both are single bonded having the same bond order = 1

But, the electron-electron repulsive force (e-e repulsion) is maximum in the F_2 molecule due to its small size. This accounts for the lower bond dissociation energy of F_2 as compared to Cl_2.

6.

(d) Am

Explanation:

Elements with atomic number 93 and beyond are transuranic elements.

7.

(b) number of bonded valence electron pairs. and number of non-bonded valence electron pairs.

Explanation:

The shape of a molecule depends upon valence electron pairs i.e. both bonded and non-bonded.

8. **(a)** one sigma and two pi bonds

Explanation:

Acetylene is C_2H_2.

C atoms are bound with triple bond i.e. 1 sigma and 2 pie bonds.

9.

(c) paramagnetic character decreases and the bond order increases

Explanation:

For O_2: $\sigma 1s^2$, $\sigma^* 1s^2$, $\sigma 2s^2$, $\sigma^* 2s^2$, $\sigma 2pz^2$

($\pi 2py^2 = \pi 2px^2$), ($\pi^* 2py^1 = \pi^* 2px^1$)$\sigma^* 2pz$

For O_2: $\sigma 1s^2$, $\sigma^* 1s^2$, $\sigma 2s^2$, $\sigma^* 2s^2$, $\sigma 2pz^2$

($\pi 2py^2 = \pi 2px^2$), ($\pi^* 2py^1 = \pi^* 2px^0$)$\sigma^* 2pz$

Bond order = $\frac{N_b - N_a}{2}$

For O_2 = $\frac{10-6}{2}$ = 2

For O_2^+ = $\frac{10-5}{2}$= 2.5

10. **(a)** the sum of the standard enthalpies of the intermediate reactions into which the overall reaction may be divided at the same temperature.

Explanation:

Hess's Law states that if a reaction takes place in several steps then its standard reaction enthalpy is the sum of the standard enthalpies of the intermediate reactions into which the overall reaction may be divided at the same temperature.

11.

(b) may be positive or negative.

Explanation:

Standard molar enthalpy of formation of a compound from its elements can be +ve or –ve.

For example: $C + O_2(g) \rightarrow CO_2(g); \Delta_r H$ = 393.5 kJ mol^{-1}

$N_2(g) + \frac{1}{2}O_2(g) \rightarrow N_2O(g);\ \Delta_r H$ = +92 k J mol^{-1}

12.

(c) 12.33

Explanation:

Molarity= $\frac{mass\ of\ Ca(OH)_2 \times 1000}{Molar\ mass\ \times Volume} = \frac{0.3 \times 1000}{56 \times 500} =$ 0.0107M

The chemical reaction involved are, $CaO + H_2O = Ca(OH)_2$

Here, $Ca(OH)_2 = Ca^{2+} + 2OH^-$

Concentration of OH^- = $2[OH^-] = 2 \times 0.0107 = 0.0214$M

Now,

$K_w = [H_3O^+][OH^-] \Rightarrow [H_3O^+] = \frac{K_w}{[OH^-]} = \frac{10^{-14}}{0.0214}$ = 46.27×10^{-14}

Therefore, $pH = -\log[H_3O^+] = -\log[46.27 \times 10^{-14}] = 12.33$

13.

(b) 12

Explanation:

Moles of NaOH formed = 0.023/23 =0.001

Concentration of NaOH = $\frac{(0.001)\times(1000)}{(100)} = 0.01\,\text{M}$

pOH=-log[OH-] = - log [0.01] = -log [10-2] = - (-2) log 10 = 2

We know that, pH + pOH =14

pH =14-2 = 12

14. **(a)** increasing the total pressure

Explanation:

The equilibrium reaction for dissociation of H_2 into H atoms is as follows:

$H_2 \rightleftharpoons H+H.$

Since a number of atoms on the reactant side and product side are the same, therefore, change in pressure has no effect on the position of equilibrium.

15. **(a)** reverse direction

Explanation:

reverse direction

16.

(d) The aqueous solution of copper nitrate turns green in colour and the metallic zinc strip turns darker in colour.

Explanation:

On placing a strip of metallic zinc in an aqueous solution of copper nitrate for about one hour, the copper nitrate solution turns green in colour and zinc strip turns darker.

Formula and Ionic equation for the reaction are as follows.

Formula Equation:	$Zn\ (s) + Cu(NO_3)_2\ (aq) \longrightarrow Cu\ (s) + Zn(NO_3)_2\ (aq)$
Ionic Equation:	$Zn\ (s) + Cu^{2+}\ (aq) \longrightarrow Zn^{2+}\ (aq) + Cu\ (s)$

As is seen in ionic equation Zn is losing 2 electrons, thus oxidation occurs and Cu is gaining 2 electrons, thus reduction occurs. Since oxidation and reduction take place simultaneously in this reaction, it is a redox reaction. Also since Zn is losing electrons and becoming darker in colour, it is the reducing agent and Cu is gaining 2 electrons, it is the reducing agent. The resultant solution Zinc nitrate [$Zn(NO_3)_2$] is green in colour.

17. **(a)** 12 pentagons and 20 hexagons

Explanation:

12 pentagons and 20 hexagons and no two pentagons share the edge, which will lead to destabilization.

18.

(c) CO_2

Explanation:

Because in CO_2 bond dipole is opposite in direction. So bond dipole of each CO bond is cancelled out by others.

19. **(a)** parallel orientation of the two p orbitals on adjacent atoms.

Explanation:

Parallel orientation of p orbitals on adjacent atoms is necessary for side-ways overlapping and formation of π bond.

20.

(b) Functional group isomers

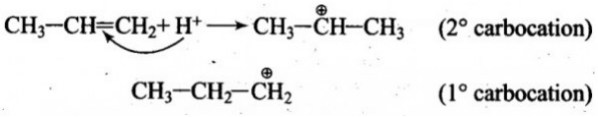
Explanation:

Two or more compounds having the same molecular formula but different functional groups are called functional isomers and this phenomenon is termed as functional group isomerism. For example, the molecular formula C_3H_6O represents both a ketone and aldehyde:$CH_3COCH_3\ and\ CH_3CH_2CHO$

21. **(a)** 2° Carbocation

Explanation:

When the electrophile attacks CH_3-CH=CH_2, delocalisation of electron can take place in two ways:



As 2° carbocation is more stable than 1° carbocation, the first addition is more feasible.

22.

(b) sp^2 hybridised carbon, trigonal planar

Explanation:

Due to the presence of a double bond in the carbonyl carbon ($> C = O$), carbon is sp^2 hybridised. This hybridization leads to a trigonal planar geometry which means a bond angle of 120° around the C.

23.

(c) 2-methylprop-1-ene

Explanation:

$$\overset{1}{CH_2} = \overset{2}{\underset{\underset{CH_3}{|}}{C}} - \overset{3}{CH_3}$$

$2-methylprop-1-ene$

24. **(a)** chain isomers

Explanation:

$$\underset{2\ -\ \text{methypropane}}{CH_3 - \overset{\overset{CH_3}{|}}{CH} - CH_3}, \underset{\text{n-}\ \text{butane}}{CH_3 - CH_2 - CH_2 - CH_3}$$

Molecular formula $\rightarrow$ Same

Chain of C-atom $\rightarrow$ Different

25.

(c) 0.92

Explanation:

$$0.54 = 1 - \frac{\alpha}{2}$$

$$\frac{\alpha}{2} = 1 - 0.54$$

$$\frac{\alpha}{2} = 0.46$$

$$\alpha = 0.92$$

26. **(a)** supersaturated

Explanation:

When a small amount of solute is added to its solution and it does not dissolve and get precipitated then this solution is supersaturated solution. The supersaturated solution usually contains more of the dissolved material .

27.

(c) 96500C

Explanation:

For converting FeO to Fe_2O_3 1mol of electrons are required

$Fe^{2+} \rightarrow Fe^{3+}$

Oxidation of one mole of Fe^{2+} will require 1 × 96500 = 96500C.

28. **(a)** Reduction of H_2O

Explanation:

Reduction of H_2O

29.

(d) reduces to one-fourth

Explanation:

For a zero order reaction, reduce to one-fourth

30.

(b) $2.71 \times 10^{-6}s^{-1}$

Explanation:

Decay constant(k) = $\frac{0.693}{t_{1/2}}$

$k = \frac{0.693}{2.95 \times 24 \times 60 \times 60} = 2.71 \times 10^{-6}\ s^{-1}$

31. **(a)** NaF and O_2

Explanation:

Fluorine reacts with concentrated NaOH to produce NaF and O_2. But with cold diluted 2NaOH, it forms OF_2 and NaF.

$2F_2 + 4NaOH \rightarrow 4NaF + 2H_2O + O_2\uparrow$

32.

(b) All of these

Explanation:

Ammonia forms a stable dark blue coloured complex ion $[Cu(NH_3)_4]^{2+}$ with Cu^{2+} ions by replacing water molecule ligands.

33. **(a)** $Cr_2O_7^{2-}$

Explanation:

Chromate ion (CrO_4^{2-}) changes to dichromate ion ($Cr_2O_7^{2-}$) on acidification.

$2\ CrO_4^{2-} + 2\ H^+ \rightarrow Cr_2O_7^{2-} + H_2O$

34.

(d) + 3

Explanation:

+3 oxidation state is most common for all lanthanoids.

35.

(d) both σ and π character

Explanation:

The metal-carbon bond in metal carbonyls possesses both σ and π character. The M–C σ bond is formed by the donation of lone pair of electrons on the carbonyl carbon into a vacant orbital of the metal. The M–C π bond is formed by the donation of a

pair of electrons from a filled d orbital of metal into the vacant antibonding π^* orbital of carbon monoxide. The metal to ligand bonding creates a synergic effect which strengthens the bond between CO and the metal.

36.

(d) $[Ti(NO_3)_4]$

Explanation:

Ti has atomic number 22. And its electronic configuration is $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^2$.

In the given complex, there are four NO_3^- groups bonded to Ti. Each NO_3^- carries -1 charge, hence there is -4 charge on the ligands and overall the complex is neutral which means Ti is in +4 oxidation state. So Ti^{4+} has an electronic configuration $1s^2 2s^2 2p^6 3s^2 3p^6$ means there are no electrons in d orbital and hence d-d transition is not possible. So it is expected to be colourless.

37.

(d) Wurtz reaction

Explanation:

The **Wurtz reaction**, named after Charles-Adolphe **Wurtz**, is a coupling reaction in organic chemistry, organometallic chemistry and recently inorganic main group polymers, whereby two alkyl halides are reacted with sodium metal in dry ethereal solution to form a higher alkane:

$2R - X + 2Na \rightarrow R - R + 2NaX$

38.

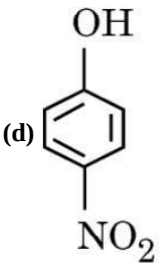
(c) $(CH_3)_3$-I

Explanation:

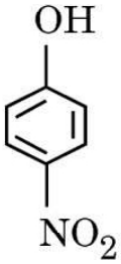
$(CH_3)_3$-I

Explanation: The C-I bond is the weakest because of the large difference in the size of carbon and iodine. This means that iodine is a better leaving group.

39.

(d) 

Explanation:



Electron withdrawing power of nitro group is more than other group. Hence, p−nitrophenol is most acidic among the given.

40.

(b) a primary alcohol

Explanation:

When $–CH_2OH$ group is replaced by –COOH group then only molecular weight will increase by 14units.

41.

(b) Oxime

Explanation: Oxime

42.

(d) Iodine/NaOH

Explanation:

2-pentanone ($CH_3COCH_2CH_2CH_3$) will give an iodoform test (reaction with I_2 + NaOH) because of the presence CH_3CO- group and yellow precipitate will be formed. But 3-pentanone ($CH_3CH_2COCH_2CH_3$) does not have CH_3CO- group hence will not give the iodoform test. The reaction is as follows:

$CH_3COCH_2CH_2CH_3 + I_2 + NaOH \rightarrow CHI_3$ (yellow precipitate) + $CH_3CH_2CH_2COO^-Na^+$

$CH_3CH_2COCH_2CH_3 + I_2 + NaOH \rightarrow$ No reaction

43. **(a)** 2,4,6-tribromophenol

Explanation:

When phenol is treated with aqueous bromine at room temperature, it forms 2,4,6-tribromophenol, a white precipitate with an antiseptic smell.

44. **(a)** $(CH_3)_2NH$

Explanation:

Greater is the stability of the substituted ammonium cation, stronger should be the corresponding amine as a base. Thus, the order of the basicity of aliphatic amines should be: primary > secondary > tertiary, which
is opposite to the inductive effect based order. Further $C_6H_5NHCH_3$ is less basic than both CH_3 NH_2 and $(CH_3)_2NH$ due to the delocalization of the lone pair of electrons present on the nitrogen atom into the benzene ring.

45.

(b) Vitamin C

Explanation:

Vitamin C is water soluble

46.

(b) D – 2 – deoxy ribose

Explanation:

Complete hydrolysis of DNA yields a pentose sugar, phosphoric acid and nitrogen containing heterocyclic compounds (called bases). In DNA molecules, the sugar moiety is β-D-2-deoxyribose.

47.

(b) iodine pentoxide

Explanation:

I_2O_5 is used. A definite mass of an organic compound is decomposed by heating in a stream of nitrogen gas. The mixture of gaseous products containing oxygen is passed over red-hot coke when all the oxygen is converted to carbon monoxide. This mixture is passed through warm iodine pentoxide when carbon monoxide is oxidised to carbon dioxide producing iodine.

48. **(a)** Chromatography

Explanation:

Chromatography is associated with the stationary phase and mobile phase.

49.

(b) Fehling’s solution

Explanation:

Fehling solution does not react with aromatic aldehyde.

50.

(c) S

Explanation:

On passing H_2S gas through acidified $KMnO_4$ solution, we get S and Mn^{2+}.

The redox reactions are as follows:

$MnO_4^- + 8H^+ + 5e^- \rightarrow Mn^{2+} + 4H_2O] \times 2H_2S \rightarrow 2H^+ + S + 2e^-] \times 5$

The overall reaction is as follows:

$2MnO_4^- + 5H_2S + 6H^+ \rightarrow 2Mn^{2+} + 5S + 8H_2O$ Sulphur is obtained due to the oxidation of H_2S by $KMnO_4$.

Solution

BIOLOGY MODEL PAPER 2

NEET-UG - Biology

BOTANY (Section-A)

1. **(a)** (i)
   Explanation:
   Problem, defining, hypothesis, observation, experiment

2. **(d)** Group of closely related species of plants or animals
   Explanation:
   Genus is a taxonomic category which comprises a group of closely related plants and animals which has more characters in common in comparison to species of other genera.

3. **(a)** (iv) only
   Explanation:
   Notochord is a mesodermally [the middle layer of cells or tissues of an embryo, or the parts derived from this (e.g. cartilage, muscles, and bone)] derived rod-like structure formed on the dorsal side [posterior] during embryonic development in some animals. Animals with notochord are called chordates and those animals which do not form this structure are called non-chordates, e.g., Porifera to Echinoderms.

4. **(c)** Eubacteria are also called false bacteria
   Explanation:
   Eubacteria are also called true bacteria. Eu stands for true.

5. **(d)** cellular endosperm
   Explanation:
   The coconut water from tender coconut is free nuclear endosperm (made up of thousand of nuclei) and the surrounding white kernel is the cellular endosperm.

6. **(d)** it is hygrospcopic
   Explanation:
   Moss peat (Dry Sphagnum) has great water absorbing capacity. For this characteristic it is used as a packing material.

7. **(d)** Sporophyte phase is small and generally parasitic on gametophyte
   Explanation:
   The main plant body of the bryophyte is haploid. It produces gametes and known as a gametophyte. An antherozoid fuses with the egg to produce the zygote. Zygotes do not undergo a reduction division immediately. They produce a multicellular body called a sporophyte. The sporophyte is not free-living but attached to the photosynthetic gametophyte and derives nourishment from it.

8. **(b)** Both Castor and Maize
   Explanation:
   Both Castor and Maize

9.

(b) Reduction division occurs in the megaspore mother cells

Explanation:

Megspore mother cell divide meiotically to form four haploid megaspores which undergoes mitosis so that a haploid female gamete is formed. Antipodal cells are three in number. A large central cell is present in the embryo sac. The synergids bears filiform apparatus.

10. **(a)** Primary meristems

Explanation:

The meristem that originates from the embryonic meristems is Primary meristems. They gave the power of division throughout the life of the plant. They build the primary body of the plant. They are located at the tip of the root and stem.

11.

(c) Hydrophyte

Explanation:

Root caps are present in terrestrial plants to protect the root tip from breaking away as they grow deeper through the layers of the soil. However, the roots of hydrophytes that are floating or submerged do not have to grow through the abrasive layers of soil, as the roots are floating in the water or the soil are soft and waterlogged. In aquatic plants, root caps are absent and root pockets are present.

12.

(b) Dicot root

Explanation:

The parenchymatous or sclerenchymatous cells which lie between the xylem and the phloem bundles of the root is called **conjuctive tissue**.

In monocot root, conjunctive tissue is made up of parenchymatous tissue.

13. **(a)** males produce two different types of gametes.

Explanation:

In X0 type of sex determination method, males produce two different types of gametes, either with or without X-chromosome. So, males are heterogametes. Females have XX genotype and produce X type of gametes, thus, are homogametic.

14. **(a)** One extra chromosome in 21st pair

Explanation:

One extra chromosome in 21st pair

15.

(d) A - Repressor, B - Inducer, C- β -galactosidase, D - Permease, E-Transacetylase

Explanation:

The lac operon consists of three structural genes, lac z, lac y, lac a. The gene lac z codes for β-galactosidase (C) which hydrolyses lactose to glucose and galactose, lac y codes for permease (D), a membrane-bound protein constituent of the lactose transport system which increases permeability of the cell to β - galactosides, and lac a codes of thiogalac to side transacetylase (E), an enzyme of uncertain metabolic function. The gene i codes for a repressor (A) which is a regulator protein synthesised all the time (constitutively). Repressor is meant for blocking the operator gene so that the structural genes are unable to form mRNAs. After coming in contact with inducer, e.g., lactose (B) the repressor undergoes conformational change in such a way that it is unable to combine with operator. Thus, formation of inducer-repressor complex switches on the lac operon.

16.

(b) 30%

Explanation:

The purines and pyrimidines are always in equal amounts as per Chargaff's rule. So, if cytosine is 20%, the thymine will be 30% and thymine is equal to adenine. So, adenine will be 30%.

17. **(a)** A - (iii), B - (v), C - (iv), D - (ii), E - (i)
Explanation:
A - (iii), B - (v), C - (iv), D - (ii), E - (i)

18. **(a)** Option b is correct.
Explanation:
Golgi apparatus was discovered by Camillo Golgi in nerve cells of barn owl and cat.

19. **(d)** A - (iii), B - (iv), C - (v), D - (ii)
Explanation:
A - (iii), B - (iv), C - (v), D - (ii)

20. **(c)** Acetylcholine
Explanation:
Alzheimer's disease is a neurological disorder in which the death of brain cells causes memory loss and cognitive decline. It is caused by humans due to the deficiency of acetylcholine.

21. **(c)** Formation of spores (sporogenesis)
Explanation:
In Pteridophyte Dryopteris, adiantium the gametophytes give rise to sporophyte by gametic union and sporophyte gives rise to gametophyte by forming haploid spores(sporogenesis) after meiosis.

22. **(d)** (A)-Regulator, (B)-Conformer, (C)-Partial regulator
Explanation:
In the diagram, a is regulator because these organisms are able to maintain homeostasis by physiological osmotic concentration. Therefore is a straight line indicating stable response b is a conformer; these organisms cannot maintain a constant internal environment temperature c is partial regulator; these organisms are able to regulate internal temperature partially.

23. **(a)** gross primary productivity
Explanation:
The rate of synthesis of organic matter or biomass produced by green plants during a given period of time is called gross primary productivity. It is measured as weight gm/m2/ year or energy (kcal/m^2/yr).

24. **(b)** Chloromycetin
Explanation:
Chloromycetin

25. **(a)** (i)
Explanation:
In last 500 year 784 species extincted

26. **(b)** UP
Explanation:
UP

27. **(a)** Seed Bank
Explanation:

Ex situ conservation is conservation of selected rare plants/animals in places outside their natural homes. Ex situ conservation includes offsite collections and gene banks. Offsite collections are live collections of wild and domesticated species in botanical garden, zoological parks, wildlife safari parks, arboreta, etc. Gene banks are institutes that maintain stocks of viable seeds (seed banks), live growing plants (orchards). tissue culture and frozen germplasm with the whole range of genetic variability. In in situ conservation, the endangered species are protected in their natural habitats so that the entire ecosystem is protected. Biosphere reserves. National parks, wildlife sanctuary and sacred groves, all are the examples of in situ conservation.

28.

(d) splitting of the centromeres.

Explanation:

Anaphase is characterised by splitting of the centromeres and separation of chromatids. Chromatids move to opposite poles from the equatorial plates.

29. **(a)** cytoplasm

Explanation:

Cytokinesis is the division of protoplast of the cell into two daughter cells after the nuclear division or karyokinesis, so that each daughter cell comes to have its own nucleus. Cytokinesis is different in animal and plant cells. Cytokinesis in animal cells is of cleavage type. In plant cell, cytokinesis is of two types: cleavage and cell plate. Cleavage method of cytokinesis takes place in some lower plants. Cell plate method is a common method of cytokinesis in plant cells.

30. **(a)** Both PS-I and PS-II

Explanation:

Both PS-I and PS-II

31.

(d) 6

Explanation:

Six molecules of CO_2 need to be fixed to form one glucose molecule. Hence, six turns of the cycle occur to form one molecule of glucose through C3 or Calvin cycle.

32.

(b) Chloroplast-Mitochondria-Peroxisome

Explanation:

Photorespiration required three cell organelles in sequence of chloroplast, peroxisome and mitochondria. Option (Chloroplast-Mitochondria-Peroxisome) may be correct if be read as said sequence.

33. **(a)** Chlorophyll

Explanation:

Chlorophyll

34. **(a)** Both of these

Explanation:

Respirometer is an instrument used for measuring rate of respiration and respiratory quotients.

35.

(c) promotion of lateral branches.

Explanation:

The phenomenon of apical dominance can be seen in most of the vaseular plants in which, in the presence of apical bud, growth of lateral buds (fanned just below the apex) is suppressed. At the removal of apical bud, the lateral buds grow vigorously. It is widely used in tea plantation and hedge making.

BOTANY (Section-B)

36.

(d) (i) and (iii)

Explanation:

Tautonym is the taxonomic designation used for certain animals assigned with same generic name and specific name. E.g., Rattus rattus (rat), Catla catla (catla), etc. Family Leguminosae is divided into three sub-families [Papilionaceae (= Fabaceae), Mimosaceae and Caesalpiniaceae].

37. **(a)** Mycobacterium
Explanation:
Tuberculosis (TB) is caused by a type of bacterium called *Mycobacterium tuberculosis*. It's spread when a person with active TB disease in their lungs coughs or sneezes and someone else inhales the expelled droplets, which contain TB bacteria.

38. **(a)** Bryophytes
Explanation:
Bryophytes are nonvascularized plants that are still dependent on a moist environment for survival. Like all plants, the bryophyte life cycle goes through both haploid (gametophyte) and diploid (sporophyte) stages. The gametophyte comprises the main plant (the green moss or liverwort), while the diploid sporophyte is much smaller and is attached to the gametophyte. The haploid stage, in which a multicellular haploid gametophyte develops from a spore and produces haploid gametes, is the dominant stage in the bryophyte life cycle. The mature gametophyte produces both male and female gametes, which join to form a diploid zygote. The zygote develops into the diploid sporophyte, which extends from the gametophyte and produces haploid spores through meiosis. Once the spores germinate, they produce new gametophyte plants and the cycle continues.

39. **(c)** Option (c) is correct.
Explanation:
The parts of grass embryo labelled as A, B, and D are the epiblast, radicle, and scutellum, respectively.

40. **(b)** Dianthus
Explanation:
In the **free central placentation,** the ovary is unilocular and the ovules are arranged on the **central** axis of the placenta which is not attached to the walls of the ovary by any septum. It is seen in Dianthus and primrose.

41. **(c)** A - (iv), B - (iii), C - (i), D - (ii)
Explanation:
Codominance is a phenomenon in which alleles of a gene do not show dominance-recessive relationship and are able to express themselves independently when present together. Multiple alleles are more than two alternate forms of a gene on the same locus. Pleiotropy is the phenomenon in which a gene influences two or more apparently unrelated phenotypic traits. Polygenic inheritance occurs when one characteristic is controlled by two or more genes. Often the genes are large in quantity but small in effect.

42. **(c)** The DNA is condensed into a chromatin fibre
Explanation:
The association of H1 protein indicates the complete formation of nucleosome because of which the DNA is condensed form.

43. **(c)** Guanine rich repeats
Explanation:
Telomere seems to be functionally different from the rest of the chromosomes. It is the terminal end of the chromosomes formed of moderately Guanine rich repeats.

44. **(a)** Bacteria: (A) Rod-shaped, (B) Spherical shaped
Explanation:
Bacteria: (A) Rod-shaped, (B) Spherical shaped

45.

(d) lactic acid

Explanation:

In anaerobic respiration, bacteria produce lactic acid.

46.

(d) All of these

Explanation:

All of these

47.

(d) Organisms linked in food chain

Explanation:

Organisms linked in food chain

48.

(d) Cytokinin

Explanation:

Cytokinin is a phytohormone playing role in releasing apical dominance. The main shoot of the plant influences the overall growth of the plants as studied by many scientists. Removing or pruning the main shoot of plant thus encourage the growth of lateral branches/ axillary buds removing the influence of main shoot growth on them.

49. **(a)** $W_1 = W_0e^{rt}$ (W_0 = intitial size, W_1 = final size, r = growth rate, t = time of growth, e = base of natural logarithms)

Explanation:

$W_1 = W_0e^{rt}$ (W_0 = intitial size, W_1 = final size, r = growth rate, t = time of growth, e = base of natural logarithms)

50. **(a)** One

Explanation:

One

Solution

ZOOLOGY MODEL PAPER 2

NEET-UG - Biology

ZOOLOGY (Section-A)

1.

(d) Ctenophora

Explanation:

The members of Ctenophora are exclusively marine, radially symmetrical, diploblastic organisms with tissue level of organisation.

2.

(c) (a)-(iii), (b)-(iv), (c)-(ii), (d)-(i)

Explanation:

(a)-(iii), (b)-(iv), (c)-(ii), (d)-(i)

3.

(b) I-Locust - Gregarious pest, II- Scorpion-Book lungs

Explanation:

The image I is Locust which is also called gregarious pest and image II is Scorpion which respires through book lungs. Both of these animals belong to phylum Arthropoda.

4. **(a)** Nerve cells

Explanation:

Nerve cells are the highly excitable cells, specialised for impulse conduction, They originate from neural plate of embryonic ectoderm and serve as structural and functional units of nervous tissue.

5. **(a)** Iris - involuntary smooth muscle

Explanation:

The iris contains involuntary smooth muscles. It encircles the pupil of the iris and helps to dilate the pupil when there is insufficient light for the normal function of the eye.

6.

(c) Only D

Explanation:

All of these

7. **(a)** Organic acid

Explanation:

Organic acid

8.

(b) Inspiration is a passive and expiration is an active process.

Explanation:

Inspiration is an active and expiration is a passive process.

9.

(c) A: Alveolar cavity - main site of exchange of respiratory gases

Explanation:

The correct labelled part with their function is A. The labelled parts A, B, C, and D in the given figure are alveolar cavity, red blood cell, blood capillary and basement membrane respectively.

10.

(c) Increase of CO_2 content in inhaled air.

Explanation:

Ventilation rate of lungs is the process that mixes fresh inspired gas with alveolar gas. Increase of CO_2 content in inhaled air is responsible for increase in ventilation rate of lungs. If there is no ventilation at all, there will be no replenishment of oxygen and no removal of CO_2. PO_2 will fall and pCO_2 will rise towards the venous O_2 and CO_2 tensions.

11.

(c) Option (a) is incorrect pair.

Explanation:

Vas deferens ascends to the abdomen and loops over the urinary bladder.

12.

(b) Primary spermatocyte and spermatogonia

Explanation:

Primary spermatocyte and spermatogonia

13.

(d) 1-Acrosome, 2-Nucleus, 3-Centriole, 4-Mitochondria, 5-Galea capitis

Explanation:

1-Acrosome, 2-Nucleus, 3-Centriole, 4-Mitochondria, 5-Galea capitis

14.

(d) itching in and around vagina

Explanation:

The symptoms of trichomoniasis include foul-smelling vaginal discharge, genital itching, and painful urination.

15.

(c) Zygote Intra Fallopian Transfer (ZIFT)

Explanation:

Zygote Intra Fallopian Transfer (ZIFT)

16.

(c) Australopithecus

Explanation:

Australopithecus

17.

(b) CH_4, H_2, NH_3 and water vapor at 800^oC

Explanation:

Oparin and Haldane proposed a hypothesis. According to this hypothesis, the first form of life came from pre-existing non-organic molecules. S.L. Miller supported their proposal. He created Earth's reducing atmosphere during the early days of development. He created electric discharge in a closed flask containing methane, hydrogen, ammonia, and water vapor at 800^oC. This resulted in the formation of amino acids.

18.

(d) (ii) $\rightarrow$ (i) $\rightarrow$ (iv) $\rightarrow$ (iii)

Explanation:

In the process of urination, first bladder fills with urine and becomes distended. Stretch receptors on the wall of urinary bladder send signal to the CNS. CNS possess on motor message to initial messengers to initiate the contraction smooth muscle of

bladder and simultaneous relaxation of urethral sphincter causing the release of urine.

19.

(d) vasoconstrictor.

Explanation:

Angiotensin-II is a powerful, vasoconstrictor thus increases glomerular blood pressure and thereby GFR.

20.

(d) Proximal convoluted tubule

Explanation:

Proximal convoluted tubule part is considered to be the site where majority (65%) of ions and water in the urinary space is reabsorbed back into the body. In proximal tubule, the following occurs:

i. Sodium, chloride, water, glucose and amino acids are reabsorbed (removed from the tubules).
ii. Organic acids and bases like bile salts, oxalate and urate are secreted into the proximal tubule.

21. **(a)** Ca^{++} concentration decreases

Explanation:

Ca^{++} concentration decreases

22.

(b) Stapes

Explanation:

The stapes is the third bone of the three ossicles in the middle ear. The stapes is a stirrup-shaped bone and the smallest bone in the human body. It rests on the oval window to which it is connected by an annular ligament. So, the correct answer is 'Stapes'.

23. **(a)** Pivot joint

Explanation:

The joint between the atlas and axis is an example of a pivot joint.

24.

(d) Cerebellum

Explanation:

Brain stem is formed by mid brain, pons varolli and medulla oblongata.

25.

(d) Dura mater

Explanation:

Dura mater

26. **(a)** The point in which the axon is exposed

Explanation:

The point in which the axon is exposed

27.

(c) Transcription

Explanation:

Transcription

28.

(b) Pituitary

Explanation:

Pituitary

29. **(a)** Spleen

Explanation:

The spleen is made of red pulp and white pulp, separated by the marginal zone. White pulp mainly contains lymphocytes such as T cells whereas red pulp is made up of several different types of blood cells, including platelets, granulocytes, red blood cells, and plasma.

30. **(a)** 12-16 mg

Explanation:

The haemoglobin content per 100mL of blood of a normal healthy human adult is 12-16 mg.

31.

(d) Veins

Explanation:

Intravenous injection is given for rapid distribution of drugs/substance. Intra-muscular injection is given for producing local effect.

32.

(d) (i), (ii), and (iii)

Explanation:

Agrobacterium tumifaciens, a pathogen of several dicot plants is able to deliver a piece of DNA known as 'T-DNA' to transform normal plant cells into a tumour and direct these tumour cells to produce the chemicals required by the pathogen.

33.

(c) chilled ethanol

Explanation:

Chilled ethanol is used for the precipitation of DNA, during the isolation of the desire gene. Isopropanol is useful for large sample volumes.

34.

(d) The anticoagulant hirudin is being produced from transgenic Brassica napus seeds.

Explanation:

The anticoagulant hirudin is being produced from transgenic Brassica napus seeds.

35.

(d) All are correct

Explanation:

All are correct

ZOOLOGY (Section-B)

36.

(c) Some members like Taenia possess high regeneration capacity

Explanation:

In Platyhelminthes specialised cells called flame cells help in osmoregulation and excretion. Sexes are not separate. Fertilisation is internal and development is through many larval stages. Some members like Planaria possess high regeneration capacity.

37.

(d) None of these

Explanation:

The female reproductive organs include a pair of ovaries. A mature female can lay 2500 to 3000 ova at a time. Fertilization is external and takes place in water.

38.

(c) Statement (d) is correct.

Explanation:

In a standard ECG, a patient is connected to the machine with three electrical leads, one to each wrist and one to the left ankle.

39.

(b) Each terminal bronchiole gives rise to a network of bronchi.

Explanation:

Each terminal bronchiole does not give rise to a network of bronchi. The bronchioles or bronchioli are the passageways by which air passes through the nose or mouth to the alveoli (air sacs) of the lungs, in which branches no longer contain cartilage or glands in their submucosa. They are branches of the bronchi and are part of the conducting zone of the respiratory system. The bronchioles divide further into smaller terminal bronchioles which are still in the conducting zone and these then divide into the smaller respiratory bronchioles which mark the beginning of the respiratory region.

40.

(d) Sertoli cells

Explanation:

Sertoli cells

41.

(b) Gamete intra-fallopian transfer

Explanation:

Gamete intra-fallopian transfer

42.

(b) Homologous organs

Explanation:

These forelimbs perform different functions in these animals, they have similar anatomical structure - all of them have humerus, radius, ulna, carpals, metacarpals and phalanges in their forelimbs. Hence, in these animals, the same structure developed along different directions due to adaptions to different needs. This is divergent evolution and these structures are homologous.

43.

(b) Filtration of blood

Explanation:

Filtration of blood

44.

(b) Only D

Explanation:

During muscle contraction, the laterally projecting heads (cross bridges) of the thick myosin myofilaments come in contact with the thin actin myofilaments and rotate on them. This pulls the thin myofilaments toward the middle of the sarcomere, past the thick myofilaments. The Z lines come closer together and the sarcomere becomes shorter. Length of the A band remains constant. Myofilaments (both actin and myosin) stay the same length. Free ends of actin myofilaments move closer to the centre of the sarcomere bringing Z lines closer together. I band shortens, and H zone narrows. A similar action in all the sarcomeres results in shortening of the entire myofibril, and thereby of the whole fibre and the whole muscle.

45.

(b) All of these

Explanation:

The cerebral hemisphere or cerebrum is the centre of thinking, will power, reasoning, and memory, experience and learning knowledge and articulate speech.

46. **(a)** Pineal
Explanation:
Pineal

47.
(c) Duodenum and jejunum
Explanation:
Duodenum and jejunum

48.
(b) (v) → (iii) → (i) → (iv) → (ii)
Explanation:
Red blood cell (blood) will first meet SAN in the right atrium. Then from the right atrium it passes into right ventricle through atrioventricular valve. From the right ventricle it enters into pulmonary artery through semilunar valve.

49.
(d) The enzyme binds DNA at specific sites and cuts only one of the two strands.
Explanation:
Restriction enzymes cut DNA molecules at a particular point by recognizing a specific sequence. Each restriction endonuclease functions by inspecting the length of a DNA sequence. Once it finds its specific recognition sequence, it will bind to the DNA and cut each of the two strands of the double helix at specific points in its sugar-phosphate backbone.

50. **(a)** generated by introducing foreign DNA into a cell and regenerating a plant from that cell.
Explanation:
The plants produced through genetic engineering contain gene or genes usually from an unrelated organism. Such genes are called transgenes and the plants having transgenes are called transgenic plants. Recombinant DNA techniques are being used to improve crop plants by increasing their productivity, by making them more nutritious, and by developing disease resistance. Transgenic plants have a natural resistance to herbicides and pests. In the future, plants may have an ability to fix atmospheric nitrogen and an increased ability to grow arid and salty soils.