

Solution

FULL TEST 3 PHYSICS

NEET-UG - Physics

- 1.
- (c) (Time)²
- Explanation:**
- $$B = \frac{F}{qv}$$
- $$\therefore [B] = \frac{[F]}{[q][v]} = \frac{[MLT^{-2}]}{[AT][LT^{-1}]} = [MT^{-2}A^{-1}]$$
- $$[M] = [\text{Magnetic dipole moment}] = [m \times 2l]$$
- $$= [\text{Pole strength} \times \text{magnetic length}]$$
- $$= [\text{Ampere} \times \text{metre} \times \text{metre}] = [AL^2]$$
- $$[I] = [\text{Moment of Inertia}] = [ML^2]$$
- $$\therefore \left[\frac{I}{BM} \right] = \frac{[ML^2]}{[MT^{-2}A^{-1}][AL^2]} = [T^2] = (\text{Time})^2$$
- 2.
- (b) 5.15 mm
- Explanation:**
- $$\text{Least count (L.C.)} = \frac{\text{Pitch}}{\text{no. of division on circular scale}} = \frac{0.5}{50} = .01 \text{ mm}$$
- $$\text{Zero error} = 5 \times .01 \text{ mm}$$
- $$\text{True reading} = 5 + .01 \text{ mm} \times 20 - .01 \text{ mm} \times 5 = 5.15 \text{ mm}$$
- 3.
- (b) 10 s
- Explanation:**
- As the train and parrot are moving just in opposite directions, hence relative velocity of the parrot w.r.t. the train = $[10 - (-5)] \text{ m s}^{-1} = 15 \text{ m s}^{-1}$. Time taken by the parrot to cross the train = $\frac{150}{15} = 10 \text{ sec}$.
- 4.
- (c) If the assertion is true but the reason is false.
- Explanation:**
- A vehicle moving with constant speed on a straight road is an inertial frame. Newton's laws of motion are applicable only in the inertial frame.
- 5.
- (c) parallelogram law of addition
- Explanation:**
- Parallelogram law of vector addition:** It states that If two vectors are considered to be the adjacent sides of a parallelogram, then the resultant of two vectors is given by the vector which is a diagonal passing through the point of contact of two vectors.
- 6.
- (b) Both A and R are true but R is not the correct explanation of A.
- Explanation:**
- Both A and R are true but R is not the correct explanation of A.
- 7.
- (d) at the bottom of the circle.

Explanation:

$$mg = 2 \times 9.8 = 19.6 = 19.6 \text{ N}$$

$$\therefore \frac{mv^2}{r} = \frac{2 \times 25}{1} = 50 \text{ N}$$

At the given position,

$$T = \frac{mv^2}{r} + mg \cos \theta$$

$$\therefore 69.6 = 50 + 19.6 \cos \theta$$

$$\therefore \cos \theta = 1$$

$$\therefore \theta = 0^\circ$$

This implies the stone is at the bottom.

8.

(d) $\sqrt{2} v$

Explanation:

By conservation of momentum,

$$p_3 = \sqrt{p_1^2 + p_2^2}$$

$$mv' = \sqrt{(mv)^2 + (mv)^2}$$

$$v' = \sqrt{2}v$$

9.

(d) Both A and R are false.

Explanation:

For the movement around a short portion of the circular track, the direction of impulse vector is same as that of the change in momentum. The direction of the vector representing the change in momentum is the same as the direction of vector representing the change in velocity. For a particle in uniform circular motion, we know that the direction of vector representing the change in velocity is that of acceleration, which is towards the centre of circle. Thus the impulse vector is directed towards centre of circle.

If the car makes one rotation around the track, there is no friction between the tires and the roadway and this force is always directed toward the centre of the circle. For every location of the car on the track, another point of its motion is diametrically opposed across the circle. Thus, as we add up the vector impulse around the circle, they cancel in pairs, total impulse is zero.

10. **(a)** 108 rad

Explanation:

$$\omega = \omega_0 + \alpha t$$

$$36 = 0 + 6\alpha$$

$$\alpha = \frac{36}{6} = 6 \text{ rad/s}^2$$

$$\theta = \omega_0 t + \frac{1}{2} \alpha t^2$$

$$\theta = 0 + \frac{1}{2} \times 6 \times 6 \times 6$$

$$\theta = 108 \text{ rad}$$

11. **(a)**

- i. uniform motion in a straight line and
- ii. circular orbits of the stars

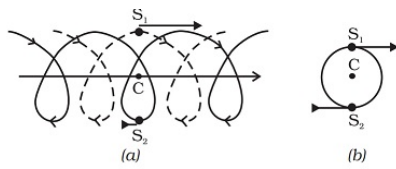
Explanation:

A double star or visual double is a pair of stars that appear close to each other in the sky as seen from Earth when viewed through an optical telescope.

In absence of external force Centre of mass of double star moves like a free particle. In Centre of mass frame both stars moving in a circle about the Centre of mass which is at rest and both star are diametrically opposite to each other.

Thus in our frame of reference, the trajectories of the stars are a combination of

- i. uniform motion in a straight line of the Centre of mass and
- ii. circular orbits of the stars about the Centre of mass.



- a. Trajectories of two stars, S_1 (dotted line) and S_2 (solid line) forming a binary system with their centre of mass C in uniform motion.
- b. The same binary system, with the centre of mass C at rest.

12.

(c) $T_{ma} > t$

Explanation:

- i. $T_{st} = 2\pi\sqrt{\frac{(R+h)^3}{GM}} = 2\pi\sqrt{\frac{R}{g}} \dots (As, h \ll R \text{ and } GM = gR^2)$
- ii. $T_{ma} = 2\pi\sqrt{\frac{R}{g}}$
- iii. $T_{sp} = 2\pi\sqrt{\frac{1}{g(\frac{1}{l} + \frac{1}{R})}}$
 $= 2\pi\sqrt{\frac{R}{2g}} \dots (As, l = R)$
- iv. $T_{is} = 2\pi\sqrt{\frac{R}{g}} \dots (As, l = \infty)$

13.

(b) 5 : 3

Explanation:

$$\frac{u_1}{u_2} = \left(\frac{r_2}{r_1}\right)^2$$

$$\therefore \frac{9}{25} = \left(\frac{r_2}{r_1}\right)^2$$

$$\therefore \frac{r_2}{r_1} = \frac{3}{5}$$

$$\therefore \frac{r_1}{r_2} = \frac{5}{3} = \frac{d_1}{d_2}$$

14.

(d) $\frac{A_2}{A_1} F_1$

Explanation:

According to Pascal's Law,

Pressure applied to any point inside the liquid is transmitted equally in all direction so,

Pressure applied to the smaller cylinder is equal to the pressure on the other cylinder, which is given by

$$\frac{F_1}{A_1} = \frac{F_2}{A_2}$$

So,

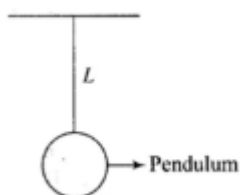
Maximum force on the other side is,

$$F_2 = \frac{A_2}{A_1} \times F_1$$

15. (a) increases as its effective length increases even though its centre of mass still remains at the centre of the bob.

Explanation:

As we know time period of a pendulum is given by $T = \sqrt{\frac{L}{g}}$ so from this we can say $T \propto \sqrt{L}$



Now also we know that as the temperature increased the length L increases due to linear expansion i.e. $\Delta L = L(1 + \alpha\Delta t)$.
So from above we can say on increasing temperature, its effective length increases hence T also increases.

16.

(c) 12 J

Explanation:

As we know that,

$$\therefore \Delta Q = \Delta U + \Delta W$$

$$\therefore \Delta Q = U_2 - U_1 + \Delta W$$

$$\therefore \Delta Q = -30 \text{ J,}$$

$$\Delta W = -22 \text{ J}$$

$$U_1 = 20 \text{ J}$$

$$\therefore U_2 = \Delta Q - \Delta W + U_1$$

$$= -30 - (-22) + 20$$

$$= 12 \text{ J}$$

17.

(b) only ii

Explanation:

When a slab of ice at 273 K melts, the volume of water formed is less than the volume of ice melted, i.e., volume decreases.

Therefore, work done by the ice-water system is negative or positive work is done by the atmosphere on the ice-water system.

This increases the internal energy of the ice-water system.

18.

(b) $\sqrt{41} \times 10^6 \text{ ms}^{-1}$

Explanation:

According to definition,

$$v_{\text{rms}} = \sqrt{\frac{v_1^2 + v_2^2}{2}}, \text{ Where } v_1 \text{ and } v_2 \text{ are the individual velocities of the } v_0 \text{ molecules.}$$

$$\text{Given, } v_1 = 9 \times 10^6 \text{ ms}^{-1} \text{ and } v_2 = 1 \times 10^6 \text{ ms}^{-1}$$

$$\therefore v_{\text{rm}} = \sqrt{(9 \times 10^6)^2 + (1 \times 10^6)^2}$$

$$= \sqrt{\frac{81 \times 10^{12} + 10^{12}}{2}}$$

$$= \sqrt{\frac{82 \times 10^{12}}{2}} = \sqrt{41} \times 10^6 \text{ ms}^{-1}$$

19.

(b) the acceleration due to gravity becomes zero in the earth satellite

Explanation:

Time period of pendulum,

$$T = 2\pi \sqrt{\frac{l}{g}}$$

In artificial satellite, $g = 0$, therefore $T \rightarrow \infty$

20.

(c) 0.9 m.

Explanation:

$$\lambda = \frac{c}{f} = \frac{360}{200}$$

$$\lambda = 1.8 \text{ m}$$

$$\text{distance between two antinodes is } = \frac{\lambda}{2} = \frac{1.8}{2} = 0.9$$

21.

(c) $8.3 \times 10^{-11} \text{ C}$

Explanation:

At bottom surface, electric field is zero as $y = 0$

\therefore Electric flux, $\phi_1 = 0$; At top surface, $y = 0.5$

\therefore Electric flux. $\phi_2 = EA = (150y^2)(0.5)^2$

$$= 150 \times (0.5)^2 \times (0.5)^2$$

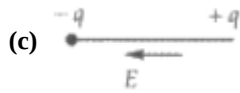
And flux through all other surface is zero because $\vec{E} \perp \vec{A}$ for each of them

$$= \frac{150}{4} (0.5)^2 = \frac{150}{16} \therefore \phi_{total} = \phi_1 + \phi_2 = \frac{150}{16}$$

Using Gauss's law $\phi = \frac{Q_{in}}{\epsilon_0} \Rightarrow \frac{150}{16} = \frac{Q_{in}}{\epsilon_0}$

$$\Rightarrow Q_{in} = \frac{150}{16} \times 8.85 \times 10^{-12} = 8.3 \times 10^{-11} \text{ C}$$

22.



(c) **Explanation:**

P.E. of a dipole is maximum when \vec{p} is antiparallel to \vec{E} .

$$U = -pE \cos 180^\circ = +pE = \text{maximum +ve value.}$$

23. (a) $\epsilon_0 \frac{d\phi_E}{dt}$

Explanation:

$$\epsilon_0 \frac{d\phi_E}{dt}$$

24.

(d) current flows from A to B via G

Explanation:

current flows from A to B via G

25. (a) $\frac{\pi}{l} \left[\frac{r^2}{K_c} + \frac{R^2 - r^2}{K_n} \right]$

Explanation:

We can treat the whole wire as a copper wire and a nickel wire(plating) connected in parallel. copper wire:

area of copper wire(a) = πr^2

length = l

resistivity = ρ_c

$$\Rightarrow \text{conductance} = \frac{a}{l\rho_c} = \frac{\pi r^2}{l\rho_c}$$

nickel wire:

are(a) = $\pi(R^2 - r^2)$

length = l

resistivity = ρ_n

$$\Rightarrow \text{conductance} = \frac{a}{l\rho_n} = \frac{\pi(R^2 - r^2)}{l\rho_n}$$

The conductance of the nickel-plated copper wire is the sum of these two conductances = $\frac{\pi}{l} \left[\frac{r^2}{K_c} + \frac{R^2 - r^2}{K_n} \right]$

26.

(d) (i) and (iv)

Explanation:

(i) and (iv)

27. **(b)** Both A and R are true but R is not the correct explanation of A.
Explanation:
 When bulbs are connected in series and out of that one get fused then due to this there will be no continuity in the circuit (or resistance offered by the fused bulb is infinite) and no current will flow through the remaining bulbs.
28. **(a)** 90°
Explanation:
 90°
29. **(a)** 0.10 m
Explanation:

$$r = \frac{mv}{eB} = \frac{v}{\frac{e}{m} B}$$

$$= \frac{2 \times 10^5}{5 \times 10^7 \times 4 \times 10^{-2}} 0.10 \text{ m}$$
30. **(d)** remains unchanged only
Explanation:
 remains unchanged only
31. **(c)** Induction furnace
Explanation:
 Induction furnace
32. **(b)** 75 mH
Explanation:
 Given: $N = 600$ $L = 108 \text{ mH}$ $N' = 500$
 Self inductance of the coil $L = \frac{\mu_0 N^2 A}{l}$ where $A = \pi r^2$
 $\Rightarrow L \propto N^2$ ($\because A = \text{constant}$)
 $\Rightarrow \frac{L'}{L} = \frac{N'^2}{N^2}$
 $\therefore \frac{L'}{108} = \frac{(500)^2}{(600)^2}$
 OR $L' = 108 \times \frac{25}{36} = 75 \text{ mH}$
33. **(d)** $A = X_C$, $B = X_L$
Explanation:
 Capacitive reactance,
 $X_C = \frac{1}{\omega C} = \frac{1}{(2\pi f)C} \therefore X_C \propto \frac{1}{f}$
 X_C vs f graph is rectangular hyperbola Inductive reactance
 $X_L = \omega L = (2\pi f)L$
 $\therefore X_L \propto f$
 $\therefore X_L$ vs f graph is straight line.
34. **(d)** 90%
Explanation:

$$\eta = \frac{E_s I_s}{E_p I_p} \times 100\%$$

$$= \frac{11 \times 90}{220 \times 5} \times 100\% = 90\%$$

35.

(d) Radio

Explanation:

Wavelength range of radio waves is 0.1 m to 600 m. So, this radiation belongs to radio waves.

36.

(b) X-rays

Explanation:

As E lies between 100 eV to 100 keV, so the e.m. waves are X-rays.

$$\text{Aliter. } X = \frac{12400}{E} \text{ eVA}$$

$$= \frac{12400 \text{ eVA}}{15 \times 10^3 \text{ eV}} = 0.826 \text{ A}$$

λ lies between 0.01 Å to 100 Å, so the em waves are X-rays.

37. **(a) $\frac{2U}{c}$**

Explanation:

$$\frac{2U}{c}$$

38. **(a) 3 m**

Explanation:

$$i = \theta_c$$

In ΔSAB

$$\frac{R}{h} = \tan \theta_c$$

$$\therefore R = h \tan \theta_c$$

$$\text{or } R = \frac{h}{\sqrt{\mu^2 - 1}} = \frac{4}{\sqrt{\left(\frac{5}{3}\right)^2 - 1}}$$

$$= \frac{4 \times 3}{\sqrt{25 - 9}} = \frac{4 \times 3}{4} = 3 \text{ m}$$

39. **(a) myopia**

Explanation:

myopia

40.

(d) 0.2 mm

Explanation:

$$\text{Angular width of a maximum in double-slit pattern} = \frac{\beta}{D} = \frac{\lambda}{d}$$

$$\text{Angular width of central maximum in single slit pattern} = \frac{2\lambda}{a}$$

$$\text{Given, } 10 \times \frac{\lambda}{d} = \frac{2\lambda}{a}$$

$$\Rightarrow a = \frac{1}{5} d = \frac{1}{5} \times 1 \text{ mm} = 0.2 \text{ mm}$$

41.

(d) $\frac{9}{4}$

Explanation:

$$r = \sqrt{\frac{w_1}{w_2}} = \sqrt{\frac{1}{25}} = \frac{1}{5}$$

$$\frac{I_{\max}}{I_{\min}} = \frac{\left(1 + \frac{1}{5}\right)^2}{\left(1 - \frac{1}{5}\right)^2} = 9 : 4$$

42.

(c) $K_A < \frac{K_B}{2}$

Explanation:

$$\frac{hc}{\lambda} = W_0 + K_{\max} \Rightarrow \frac{hc}{\lambda_A} = W_0 + K_A \dots(i)$$

and $\frac{hc}{\lambda_B} = W_0 + K_B \dots(ii)$

Subtracting (i) from (ii), $hc \left[\frac{1}{\lambda_B} - \frac{1}{\lambda_A} \right] = K_B - K_A$

$$\Rightarrow hc \left[\frac{1}{\lambda_B} - \frac{1}{2\lambda_B} \right] = K_B - K_A \Rightarrow \frac{hc}{2\lambda_B} = K_B - K_A \dots(iii)$$

From (ii) and (iii), $2K_B - 2K_A = W_0 + K_B$

$$\Rightarrow K_B - 2K_A = W_0$$

$$\Rightarrow K_A = \frac{K_B}{2} - \frac{W_0}{2} \text{ which gives } K_A < \frac{K_B}{2}$$

43.

(c) $\geq 2.8 \times 10^{-9} \text{ m}$

Explanation:

Energy of photon,

$$E = \frac{hc}{\lambda} = \frac{1240}{500} \text{ eV} = 2.48 \text{ eV}$$

$$K_{\max} = E - W = 2.48 - 2.28 = 0.2 \text{ eV}$$

$$\lambda_{\min}(\text{electron}) = \frac{12.27}{\sqrt{K_{\max}(\text{eV})}} \text{ \AA}$$

$$= \frac{12.27}{\sqrt{0.2}} \text{ \AA} = 27.436 \text{ \AA} \simeq 2.74 \times 10^{-9} \text{ m}$$

Hence, $\lambda \geq 2.8 \times 10^{-9} \text{ m}$

44.

(d) the frame in which the electron is at rest is not inertial.

Explanation:

In a hydrogen atom, electrons revolving around a fixed proton nucleus have some centripetal acceleration. So that, its frame of reference is non-inertial. In the frame of reference, where the electron is at rest, the given expression is not true as it forms the non-inertial frame of reference.

As the mass of an electron is negligible as compared to proton, so the centripetal force cannot provide the electrostatic force,

$$F_p = \frac{m_p v^2}{r}$$

So, the given expression is not true, as it forms noninertial frame of reference due to $m_e \ll m_p$ or centripetal force on $F_e \ll F_p$.

45. (a) (B)

Explanation:

A moderator is used to slow down neutrons in a nuclear reactor.

46. (a) 10^{-3} to $10^6 \Omega \text{ cm}$

Explanation:

Resistivity of a semiconductor at room temp, is in between 10^{-3} to $10^6 \Omega \text{ cm}$.

47.

(d) unidirectional voltage having ripples

Explanation:

A rectifier which rectifies both halves of each a.c. input cycle is called a full wave rectifier. The output of a full wave rectifier is continuous but pulsating in nature. However, it can be made smooth by using a filter circuit.

48. (a) positive feedback

Explanation:

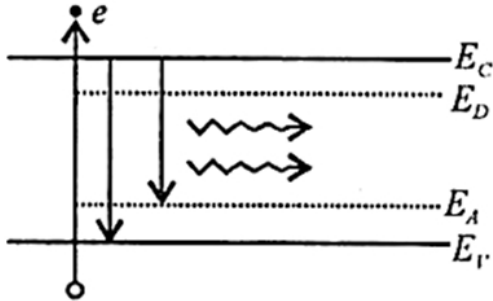
In oscillators, a positive feedback is used because positive feedback sets up oscillations of constant amplitude.

49.

(b) Both A and R are true but R is not the correct explanation of A.

Explanation:

In semiconductor there may be energy bands due to donor impurities (E_D) near the conduction band or acceptor impurities E_A near the valence band. When electron falls from higher to lower energy level containing holes, the energy is released in the form of radiation. The energy of radiation emitted by LED is equal or less than the band gap of the semiconductor used. The radiation released lies in range of visible light whose colour depends on the semiconductor used.



50.

(c) 0.5 m

Explanation:

Fundamental frequency for closed pipe at one end.

$$f = \frac{v}{4l}, \frac{3v}{4l}, \frac{5v}{4l} \dots$$

Now,

$$166 = \frac{332}{4l}$$

$$l = \frac{332}{166 \times 4} = 0.5 \text{ m}$$

Solution

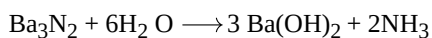
CHEMISTRY MODEL PAPER 3

NEET-UG - Chemistry

1. (a) 1,6,3,2

Explanation:

The given equation when balanced is as follows:



Hence, '1, 6, 3, 2' should be inserted in provided blank spaces from left to right.

2.

(b) 0.03 g

Explanation:

since 1000 mg = 1g

\therefore 30 mg

= $[(1/1000) \times 30]$ g

= 0.03 g

3.

(d) non-metals

Explanation:

non-metals

4. (a) Hydrogen atom

Explanation:

Neils Bohr proposed a model of hydrogen atom based on the quantum theory and explained the atomic spectrum of hydrogen.

5.

(c) P, As, Sb

Explanation:

P, As, Sb

6.

(d) Groups-1 and 17

Explanation:

Groups-1 and 17 consist highly reactive elements. They tend to lose and gain electron(s) respectively to achieve inert gas configuration.

7. (a) AlCl_3

Explanation:

Few ionic bonds have partial covalent characteristics which were first discussed by a scientist, Kazimierz Fajans in 1923. He gave the rule to predict whether a chemical bond will be covalent or ionic which is now commonly known as Fajan's rule. The rule can be stated as:

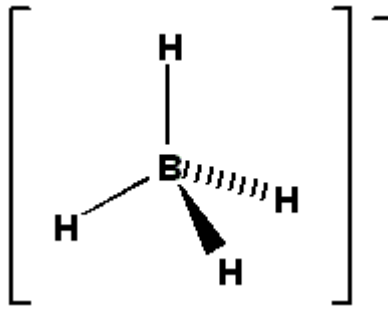
- **Size of the ion:** Smaller the size of cation, larger the size of anion, greater is the covalent character of the ionic bond.
- **Charge of Cation:** Greater the charge of cation, greater is the covalent character of the ionic bond.
- **Electronic configuration-** For cations with the same charge and size, the one, with $(n-1)d^nns^0$ which is found in transition elements, has greater covalent character than the cation with ns^2np^6 electronic configuration, which is commonly found in alkali or alkaline earth metals.

Keeping these rules in mind, we can say that AlCl_3 has a high covalent character.

8.

(c) BH_4^-

Explanation:



Boron is surrounded by 4 bond pairs.

In BH_4^- = no. of bond pair = 4

No. of lone pair = 0

It undergoes sp^3 hybridized, so have tetrahedral geometry.

NH_2^- = V - shape H_3O^+ = Pyramidal

CO_3^{2-} = triangular planar

9.

(c) 83.14 J

Explanation:

83.14 J

10.

(b) $\Delta S_{sys} = \frac{q_{sys,rev}}{T}$

Explanation:

$\Delta S_{sys} = \frac{q_{sys,rev}}{T}$. The equation can be used to calculate the change in entropy of a system of a reversible process as entropy is a state property.

Where, $q_{sys, rev}$ = Heat supplied to a system at temperature T.

11.

(b) HCl, Cl^- and H_2O , H_3O^+ .

Explanation:

A species formed by receiving a proton from a base is known as conjugate acid and Conjugate base is a species formed by the removal of proton from an acid.

In this case, Cl^- is formed by donating a proton to water molecule hence it is a conjugate base while protonated water (H_3O^+) becomes conjugate acid.

12. (a) nothing appears to happen, but forward and reverse are continuing at the same rate

Explanation:

$Q=K$

The reaction is already at equilibrium. The concentrations won't change since the rates of the forward and backward reactions are equal.

13.

(b) $K_a = 5.01 \times 10^{-7}$, $[A^-] = 7.08 \times 10^{-5}$ and $pK_a = 6.3001$

Explanation:

$pH = -\log[H^+]$

$4.15 = -\log[H^+]$

$[H^+] = 7.08 \times 10^{-5} = [A^-]$

$K_a = [H^+][A^-][HA]$

$$K_a = 5.01 \times 10^{-7}$$

$$pK_a = -\log [5.01 \times 10^{-7}] = 6.3001$$

14.

(c) H_3O^+

Explanation:

Hydrogen ion by itself is a bare proton with a very small size (~10–15 m radius) and intense electric field, binds itself with the water molecule at one of the two available lone pairs on it giving H_3O^+ . This species has been detected in many compounds (e.g., $H_3O^+Cl^-$) in the solid-state.

In aqueous solution, the hydronium ion is further hydrated to give species like $H_5O_2^+$.

15.

(d) $KBrO_4$

Explanation:

Because K is +1 and O is -2, and they all have to add up to 0 because the overall molecule has a charge of 0 (it's neutral).

$$1 + Br + -2(4) = 0$$

$$1 + Br - 8 = 0$$

$$Br = +7$$

16.

(c) the inertness of the inner ns electrons because of ineffective shielding.

Explanation:

The inert pair effect is nothing but the extra stability concept. Generally, P-block elements show variable valiancy which is equal to the maximum oxidation (Group oxidation state) state of that group of p-block elements, p block elements may show another oxidation state i.e.+2.

Group oxidation state +4 is obtained when electrons are lost from both ns and np levels, +2 oxidation state is obtained while only np level electrons are lost due to extra stability and poor shielding of ns electron which are called inert pair. **The effect is the inert effect.**

17.

(b) Si - O - Si linkages

Explanation:

Si - O - Si linkages because Silicones have $-(R_2SiO)-$ repeating unit.

18.

(b) $*CH_3 - CH_2 - Cl$

Explanation:

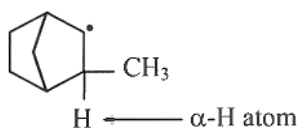
Cl is most electronegative amongst Cl, Br and I and has more -I (inductive electron withdrawing) effect. So it causes the asterisk marked to have the maximum partial positive charge.

19.

(c) III only

Explanation:

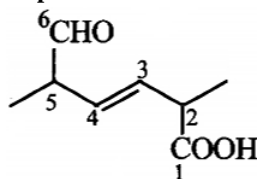
In alkyl free radicals, the carbon atom having the unpaired electron is sp^2 hybridized. For hyperconjugation to occur, the α -carbon atom with respect to sp^2 hybridized carbon atom should have at least one hydrogen atom. Among the given structures, only (III) has an α -hydrogen atom.



Hence, hyperconjugation occurs in structure (III).

20. (a) 2, 5-dimethyl-6-oxo-hex-3-enoic acid

Explanation:

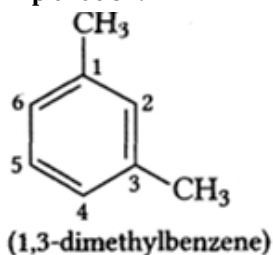


(2, 5-dimethyl-6-oxo-hex-3-enoic acid)

21. (b) free-radical mechanism
- Explanation:**
- In the presence of peroxide and light, the addition of HBr to unsymmetrical alkenes occurs contrary to Markovnikov's rule. The chemistry follows a free-radical mechanism. Organic reactions, which proceed by homolytic fission are called free radical or homopolar or nonpolar reactions.

22. (a) 1,3-dimethylbenzene

Explanation:

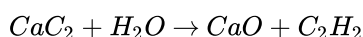


23. (b) CaC_2

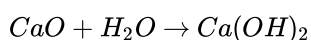
Explanation:

The reaction of CaC_2 (Calcium carbide) with water produces acetylene (C_2H_2).

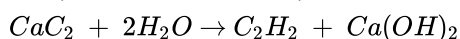
The chemical equation for the reaction of calcium carbide (CaC_2) with water to yield acetylene ($\text{HC} \equiv \text{CH}$) is



The calcium oxide (CaO) is formed as a byproduct, which simultaneously reacts with water to give $\text{Ca}(\text{OH})_2$



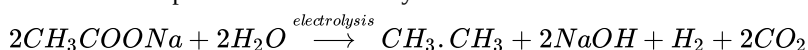
Thus, the overall reaction is,



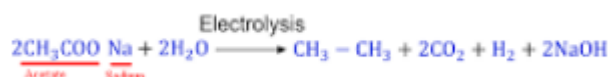
24. (b) Sodium acetate

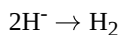
Explanation:

This is an example of Kolbe's electrolysis method. The reaction is:



The step-wise redox reactions occurring in the electrolytic cell are depicted as under





25.

(d) Hexane

Explanation:

Both hexane and n-octane are non-polar, so they mix easily.

26.

(c) 0.1 molal BaCl₂ solution

Explanation:

i=3 so ΔT_b will be maximum and hence T_b will be maximum.

27.

(d) $8.1 \times 10^4 \text{g}$

Explanation:

Equivalent mass of Al = at.mass/ valency = 27/3 = 9

$$W = \frac{(E \times I \times t)}{96500}$$

$$w = \frac{9 \times 4 \times 10^4 \times 6 \times 60 \times 60}{96500} = 8.05 \times 10^4 \text{g}$$

28.

(c) 108

Explanation:

Data:

1. Current in ampere (I) = 0.5 amp
2. Time in seconds = 193 s
3. Mass of Ag metal deposited (w) = 0.108g

Formula:

$$w = Z I t \dots\dots(i)$$

$$Z = \frac{\text{Equivalent weight}}{96500C} \dots\dots(ii)$$

Substitute (ii) in (i),

$$w = \frac{\text{Equivalent weight}}{96500C} \times I \times t$$

$$\text{or Equivalent weight} = \frac{w \times 96500C}{I \times t}$$

$$\text{Equivalent weight} = \frac{0.108g \times 96500C}{0.5amp \times 193sec} = \frac{0.108 \times 96500}{0.5 \times 193} \times \frac{g \times C}{amp \times sec} = \frac{0.108 \times 96500}{96.5} \times \frac{g \times C}{C} = 108g [\because 1C = 1amp \times 1sec]$$

$$\text{Equivalent weight of Ag} = 108 \text{ g}$$

29.

(c) More than ΔH

Explanation:

ΔH = +ve for endothermic reaction

, therefore, E_a > ΔH

30. **(b)** remains constant
Explanation:
 remains constant
31. **(c)** Mercury
Explanation:
 Ozone is detected by using Hg.
 When ozone is passed through mercury, it loses its meniscus and sticks to the glass due to the formation of mercurous oxide.
 This is called tailing of mercury.
 $2\text{Hg}(s) + \text{O}_3(g) \rightarrow \text{Hg}_2\text{O}(s) + \text{O}_2(g)$
32. **(a)** Blue
Explanation:
 $\text{Cu}^{2+}(s) + 4\text{NH}_3(l) \rightarrow [\text{Cu}(\text{NH}_3)_4]^{2+}(aq)(\text{blue})$
33. **(b)** 3.87 B.M
Explanation:
 Electronic configuration of Cr^{3+} is $[\text{Ar}]3d^3$. The number of electrons that contribute towards spin only magnetic moment is 3.
 Spin only magnetic moment can be calculated using this formula
 $\sqrt{n(n+2)}$
 Where n is the number of unpaired electrons. So for Cr^{3+} , the number of unpaired electrons equals 3.
 $\sqrt{3(3+2)} = 3.87 \text{ B.M}$
34. **(d)** 2
Explanation:
 Both Zn and Fe can displace Hydrogen from HNO_3 .
35. **(a)** 5
Explanation:
 The complex of Fe with CO ligand is $[\text{Fe}(\text{CO})_5]$ i.e. pentacarbonyliron(0). So the value of x =5.
36. **(a)** NH_4^+
Explanation:
 Ligand must donate a pair of electron or loosely held electron pair to metal and form an M-L bond.
37. **(d)** shorter and stronger
Explanation:
 In chlorobenzene, the hybridization of carbon attached to Cl is sp^2 , and in methyl chloride hybridization of C attached to Cl is sp^3 . In sp^2 hybridization, s-character is 33% and in sp^3 s-character is 25%. The sp^2 hybridized carbon with a greater s-character is more electronegative and can hold the electron pair of C—X bond more tightly than sp^3 -hybridized carbon in haloalkane with less s-character resulting in a short bond length of C-Cl bond. Since it is difficult to break a shorter bond than a longer bond, means it is stronger. Also in chlorobenzene, the electron pairs on Cl atom are in conjugation with π -electrons of the ring, so C—Cl bond acquires a partial double bond character due to resonance which makes the bond stronger.
38. **(c)** Sandmeyer's reaction
Explanation:

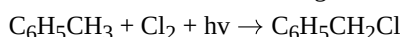


Mixing the solution of the freshly prepared diazonium salt with cuprous chloride or cuprous bromide results in the replacement of the diazonium group by $-Cl$ or $-Br$. This is called Sandmeyer's reaction.

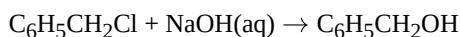
39. (a) benzyl alcohol

Explanation:

Monochlorination of toluene gives benzylchloride.



benzyl chloride on reaction with aq. NaOH will give benzyl alcohol by substitution reaction.



40.

(c) i, ii, iii

Explanation:

- **Preparation of phenols from haloarenes:** Chlorobenzene is an example of haloarenes which is formed by monosubstitution of the benzene ring. When chlorobenzene is fused with sodium hydroxide at 623K and 320 atm sodium phenoxide is produced. Finally, sodium phenoxide on acidification gives phenols.
- **Preparation of phenols from diazonium salts:** When an aromatic primary amine is treated with nitrous ($NaNO_2 + HCl$) acid at 273 - 278 K, diazonium salts are obtained. These diazonium salts are highly reactive in nature. Upon warming with water, these diazonium salts finally hydrolyse to phenols. Phenols can also be obtained from diazonium salts by treating it with dilute acids.
- **Preparation of phenols from benzene sulphonic acid:** Benzenesulphonic acid can be obtained from benzene by reacting it with oleum. Benzenesulphonic acid thus formed is treated with molten sodium hydroxide at high temperature which leads to the formation of sodium phenoxide. Finally, sodium phenoxide on acidification gives phenols.

41.

(b) HCHO

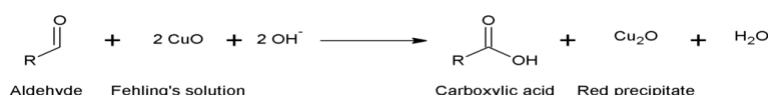
Explanation:

HCHO is most reactive towards nucleophilic addition reaction.

42.

(d) Cu_2O

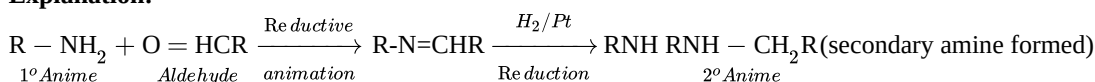
Explanation:



aldehydes give positive fehling's test with a red precipitate of Cu_2O

43. (a) $1^\circ R-NH_2 + RCHO$ followed by H_2/Pt

Explanation:



44.

(c) $NH_2^- > OH^- > NH_3 > H_2O$

Explanation:

$NH_2^- > OH^- > NH_3 > H_2O$. Due to higher electronegativity of O than N atom, the O-H bond is more polar than the N-H bond. Hence, O-H is more acidic in nature than the N-H bond. Now, NH_2^- and OH^- have a negative charge due to which they are more basic than NH_3 and H_2O .

45.

(c) Nucleotides

Explanation:

Information regarding the sequence of nucleotides in the chain of a nucleic acid is called its primary structure. This gives information about sequence of bases in DNA which is primarily responsible for the hereditary character. Thus nucleotides are carrier of hereditary character.

46.

(b) Proline

Explanation:

Those amino acids which cannot be synthesised in the body and must be obtained through diet, are known as essential amino acids. Proline is not an essential amino acid.

47. (a) Fractional distillation

Explanation:

The fractional distillation method will be used for the separation of a mixture of acetone and ethanol.

48.

(d) To separate different fractions of crude oil in petroleum industry

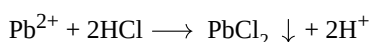
Explanation:

To separate different fractions of crude oil in petroleum industry

49.

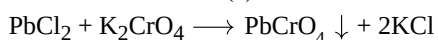
(c) $\text{Pb}(\text{NO}_3)_2$, PbCl_2 , PbCrO_4

Explanation:



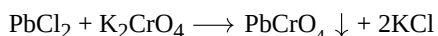
White ppt

(B)



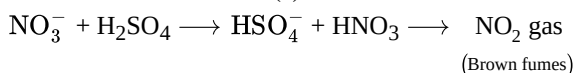
Yellow ppt.

(C)

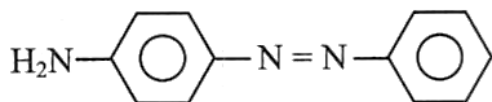


Yellow ppt.

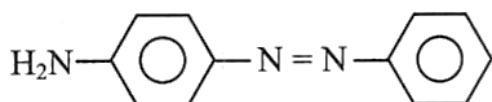
(C)



50. (a)



Explanation:



Solution
BOTANY MODEL PAPER 3
NEET-UG - Biology
BOTANY (Section-A)

1. **(a)** Rhizopus
Explanation:
Rhizopus shows heterothallism i.e. sexes reside in different individuals.
2. **(d)** All of these
Explanation:
A taxonomic group or any rank in a biological classification into which related organisms are classified is known as a taxon. It includes species, genera, family, or class.
3. **(d)** Fission
Explanation:
Bacteria increase their cell number or individuals mainly by binary fission. Rest of the processes are mostly used during unfavourable conditions.
4. **(c)** These lack cell organelle
Explanation:
In addition to proteins, viruses also contain genetic material, that could be either RNA or DNA. No virus contains both RNA and DNA. A virus is a nucleoprotein and the genetic material is infectious. Viruses are obligate parasites.
5. **(a)** When pollen is shed at two-celled stage, double fertilization does not take place
Explanation:
When pollen is shed at two-celled stage, double fertilization does not take place
6. **(c)** Pinus
Explanation:
Pinus and Cedrus have branched stem. Cycas has unbranched stem.
7. **(b)** Its xylem is mainly composed vessels
Explanation:
In the stem of Cycas, xylem consists of tracheitis and xylem parenchyma. There is no vessel.
8. **(a)** xenogamy
Explanation:
Xenogamy is the transfer of pollen grains from anther to the stigma of a different plant.
9. **(a)** Thalamus or petal
Explanation:
Thalamus or petal
10. **(c)** Stilt root
Explanation:
 - i. Different parts of the plant undergo several types of modifications and perform certain functions to help the other parts of the plant under abnormal conditions.

- ii. Similarly, the major function of the root is to transport water and mineral salts from the soil to the parts of the plant but it undergoes certain modifications that enable it to store food and also provide mechanical strength to the plant.
- iii. The stems of maize and sugarcane have supporting roots coming out of the lower nodes of the stem. These are called stilt roots.

11.

(b) Calcium oxalate

Explanation:

Raphides are needle-shaped crystals of Calcium oxalate found in various tissues including leaves, roots, shoots, fruits, etc. which are present in highly specialised cells called idioblast.

12.

(b) Medullary rays

Explanation:

In between the vascular bundles, there are few layers of parenchymatous cells that constitute the Medullary rays. These are slightly larger in size as compared to other cortical cells. Usually, these are polygonal in outline and exhibit no intercellular spaces in between.

13.

(b) 50%

Explanation:

50%

14.

(d) Heterozygous carrier

Explanation:

Heterozygous carrier

15. **(a)** The pH of histones is slightly acidic.

Explanation:

Histone octamers consist of units of 8 histone molecules with a pair of each protein H₂A, H₂B, H₃, and H₄. H1 histone present outside of the octamer connects the DNA with the octamer, Histones consist of basic amino acid residues such as lysine and arginine with a side chain. They have a positive charge in the side chain. But they are not acidic.

16. **(a)** Statement I is incorrect but Statement II is true.

Explanation:

The code which has at least three letters is called the triplet code. There are about 64 codons to code for 20 amino acids. Among them, AUG has an initiator dual function. It codes for Methionine and acts as an initiator codon. The codon 'AAA' and 'AAG' code for amino acid lysine. So, statement I is incorrect, but statement II is correct.

17.

(d) Lysosome

Explanation:

Lysosome is covered by single unit membrane whereas mitochondria, nucleus and chloroplast all have double unit membrane.

18.

(d) Schleiden

Explanation:

Schleiden found that all plant cells have a similar structure, the cell wall, clear jelly like substance, and a nucleus.

19.

(c) Bacteria

Explanation:

Bacteria

20.
(b) Plasmodium malariae
Explanation:
Plasmodium malariae
21.
(d) recombination of alleles
Explanation:
Crossing over is a process of exchange of genetic material between non-sister chromatids of two homologous chromosomes and leads to recombination of genes. It is an enzyme mediated process.
22.
(c) competitive release.
Explanation:
Competitive release is the growth of the species range when a competitor for its niche is eliminated. It usually occurs when one of two species competing for the same resource disappears, thereby allowing the remaining competitor to utilise the resource more fully than it could in the presence of the first species. Joseph Connell's (1961) demonstrates competitive release for study of competition for space between the barnacle species Balanus and Chthamalus in the intertidal zone on the rocky Scottish coast.
23.
(b) Statement (a) is incorrect.
Explanation:
Net primary productivity is the available biomass for the consumption of the heterotrophs.
24.
(d) Primary treatment
Explanation:
Primary or physical treatment is the process of removal of small and large, floating and suspended solids from sewage through two processes of filtration and sedimentation.
25.
(b) Mammals
Explanation:
Mammals
26.
(d) All are correct
Explanation:
All are correct
27.
(d) River dolphin
Explanation:
River dolphin found in holy river Ganga, Brahmaputra, Indus and its tributaries is the National aquatic animal of India. Presence of river dolphin in Ganga indicates pure and fresh water.
28.
(b) It inhibits chromosome replication.

Explanation:

Colchicine is an alkaloid widely used in plant breeding for doubling the chromosome number. The alkaloid does not allow the formation of spindle because it prevents assembly of microtubules. It is, therefore, called 'mitotic poison'. Colchicine holds the cells in metaphase. Colchicine does not inhibit chromosome replication.

29. **(d)** Metaphase
Explanation:
Metaphase is a stage of mitosis in the eukaryotic cell cycle in which chromosomes are at their most condensed and coiled stage. Metaphase is the best stage in mitosis for analysing the chromosomes and to study their morphology.
30. **(a)** Electrons are cycled in cyclic photophosphorylation
Explanation:
Electrons are cycled in cyclic photophosphorylation.
31. **(a)** oxygen in water.
Explanation:
The oxygen evolved from green plants during photosynthesis comes from water was proved by Ruben and Kamen by using the heavy isotope of oxygen (O^{18}).
32. **(a)** All of these
Explanation:
Z-scheme involves both PS I and PS II. Electrons released from photolysis of H_2O are picked up by reaction centre of PS II. The chlorophyll a in the reaction centre of PS II absorbs light of 680 nm wavelength and excites electrons. The excited electrons are passed by a series of electron acceptors in a sequence - Pheophytin, Plastoquinone (PQ), Fe-S complex, Cytochrome b6-f complex and plastocyanin. The movement of electrons is downhill, in terms of an oxidation-reduction or redox potential scale. From plastocyanin, the electrons are passed on to the pigments of PS I. At the same time, the chlorophyll a in the reaction centre of PS I absorbs 700 nm wavelength and electrons get excited. The excited electrons pass downhill through a series of acceptors which are, modified chlorophyll a, Fe-S proteins, Ferredoxin and finally to $NADP^+$. $NADP^+$ reductase combines $NADP^+$ with H^+ to form NADPH.
33. **(d)** Red
Explanation:
Chlorophyll absorbs red and violet-blue light while transmitting and reflecting green light. Chlorophyll 'a' absorbs blue light with wavelengths of 430 nm and red light of 662 nm. 453 nm and 642 nm wavelengths are absorbed by chlorophyll 'b'.
34. **(b)** α -Ketoglutaric acid
Explanation:
 α -Ketoglutaric acid
35. **(b)** Abscisic acid
Explanation:
Abscisic acid prepares plants to cope with stress conditions like drought, etc. by inducing stomatal closure and other reactions. Hence it is named stress hormone

BOTANY (Section-B)

36. **(d)** Sapindales
Explanation:
Mango is included in Order Sapindales.

37. **(a)** *B. megatherium*
Explanation:
Bacillus megatherium is a rod-like, Gram-positive, mainly aerobic spore-forming bacterium found in widely diverse habitats. It is used to cure the bitterness of tea leaves.
38. **(a)** Anisogamy
Explanation:
Anisogamy is the fusion of two dissimilar mobile gametes.
39.
(c) Option (d) is correct.
Explanation:
X shows allogamy, i.e., the transfer of pollen grains from anther of one flower to the stigma of a genetically different flower; Y represents the autogamy in which a flower is pollinated by its own pollen grains; and Z represents the geitonogamy in which pollen grains of one flower are transferred to the stigma of another flower on the same plant.
40. **(a)** leaves
Explanation:
Leaves are mainly the organ of photosynthesis. It has specialised parenchymatous cells having chlorophyll. It does not have any fibrous cells.
41. **(a)** One
Explanation:
One
42.
(b) Bioinformatics
Explanation:
Bioinformatics
43.
(d) nucleolus
Explanation:
Nucleolus is a small dense spherical structure present in the nucleus of a cell during interphase. It is the centre for synthesis of ribosomal RNA (rRNA) that forms ribosomal subunits.
44. **(a)** VAM - Mycoherbicide
Explanation:
VAM - Mycoherbicide
45. **(a)** Protein
Explanation:
Proteins are essential nutrients for the human body. They are one of the building blocks of body tissue and can also serve as a fuel source.
46.
(d) (i) only
Explanation:
Antibiotics are chemical substances secreted by certain microbes which inhibit the growth and development of other microbes. Most of them are produced by actinomycetes (specially the genus *Streptomyces*) and filamentous fungi. Some important antibiotics are: tetracycline, chloramphenicol, streptomycin, etc.
47.
(c) Scavengers
Explanation:

48.

(c) Germination of the seed to senescence

Explanation:

Development is a term that includes all changes that an organism goes through during its life cycle from germination of the seed to senescence.

49.

(b) Crescograph

Explanation:

Crescograph is a sensitive device, devised by J.C. Bose. It records primary growth very accurately. It magnifies growth up to 10,000 times giving information of growth per second.

50.

(b) a scheme of transfer of electrons in the light reaction of photosynthesis

Explanation:

During light reaction, transfer of electrons starting from the PS II, uphill to the acceptor, down the electron transport chain to PS I, excitation of electrons, transfer to another acceptor, and finally downhill to NADP^+ is called Z-scheme, due to its characteristic shape.

Solution
ZOOLOGY MODEL PAPER 3
NEET-UG - Biology
ZOOLOGY (Section-A)

1. **(c)** Flame cells
Explanation:
In phylum Platyhelminthes, the excretory organ is specialized cells called flame cells which help in osmoregulation and excretion.
2. **(c)** (a)-(iv), (b)-(v), (c)-(i), (d)-(ii), (e)-(iii)
Explanation:
(a) Chameleon - (iv) Tree lizard
(b) Hemidactylus - (v) Wall lizard
(c) Corvus - (i) Crow
(d) Columba - (ii) Pigeon
(e) Calotes - (iii) Garden lizard
Hence, the correct match pairs are: (a)-(iv), (b)-(v), (c)-(i), (d)-(ii), (e)-(iii).
3. **(a)** (a)-(i), (b)-(iii), (c)-(v), (d)-(vi), (e)-(ii)
Explanation:
 - Porifera has a water transport or canal system.
 - In Aschelminthes, the alimentary canal is complete with a well-developed muscular pharynx.
 - In Annelida, the body surface is distinctly marked out into segments or metameres.
 - Arthropods have jointed appendages.
 - Echinodermata have a water vascular system that helps in locomotion, capture, and transport of food and respiration.Hence, the correct match pairs are: (a)-(i), (b)-(iii), (c)-(v), (d)-(vi), (e)-(ii).
4. **(c)** A - (iv), B - (iii), C - (ii), D - (i)
Explanation:
The external genitalia is represented by male gonapophysis or phallomere. Gonopore is the opening of ejaculatory duct. The sperms are stored in the seminal vesicles and are glued together in the form of bundles called spermatophores which are discharged during copulation. Each ovary is formed of a group of eight ovarian tubules or ovarioles, containing a chain of developing ova.
Hence, the correct match pair is:
A - (iv), B - (iii), C - (ii), D - (i)
5. **(d)** To bring intercellular fluid back into the blood
Explanation:
To bring intercellular fluid back into the blood.
6. **(a)** 6000 - 8000 mL
Explanation:
Approximate volume of air a healthy man can expire or inspire per minute is 6000 - 8000 mL.
7. **(d)** Oxygen carrying capacity of haemoglobin decreases
Explanation:

If human blood becomes acidic, oxygen carrying capacity of haemoglobin decreases.

8. **(a)** CO₂ level in blood.

Explanation:

Rate of breathing is mainly controlled by CO₂ level in the blood. Excess CO₂ mainly stimulates the respiratory centre of the brain and increases the inspiratory and expiratory signals to the respiratory muscles.

- 9.

- (b)** Diaphragm

Explanation:

Diaphragm which receives electrical messages from the brain for breathing in and out, is a domeshaped muscular partition which separates thorax from the abdomen in mammals. It plays major role in breathing, as its contraction increases the volume of the thorax and so inflates the lung.

- 10.

- (d)** Spasm in bronchial muscles

Explanation:

Asthma is caused due to inflammation of lungs and spasm in bronchial muscles. The peculiar symptoms of the disease are coughing, chest tightness, and shortness of breath. It is mainly caused due to environmental and genetic factor.

11. **(a)** Gametogenesis - Insemination - Fertilisation - Implantation - Parturition

Explanation:

The reproductive events in humans include the formation of gametes (gametogenesis), i.e., sperms in males and ovum in females, transfer of sperms into the female genital tract (insemination), and fusion of male and female gametes (fertilization) leading to the formation of zygote. This is followed by the formation and development of the blastocyst and its attachment to the uterine wall (implantation), embryonic development (gestation), and delivery of the baby (parturition). Hence, the correct sequence of human reproduction is Gametogenesis - Insemination - Fertilisation - Implantation - Parturition.

- 12.

- (c)** both placenta and fully developed foetus.

Explanation:

The signals for parturition originate from the fully developed foetus and the placenta which induce mild uterine contractions called foetal ejection reflex. This triggers release of oxytocin from the maternal pituitary. Oxytocin acts on the uterine muscle and causes stronger uterine contractions.

- 13.

- (c)** (A)-(iv), (B)-(iii), (C)-(ii), (D)-(i)

Explanation:

(A)-(iv), (B)-(iii), (C)-(ii), (D)-(i)

14. **(a)** 16

Explanation:

16

- 15.

- (c)** Uterus

Explanation:

Uterus

16. **(a)** Eohippus

Explanation:

Eohippus

17. **(b)** Genetic drift
Explanation:
Genetic drift
18. **(c)** Rennin
Explanation:
Renin does not favour the formation of large quantities of dilute urine.
19. **(a)** Calyces
Explanation:
Calyces
20. **(b)** I and IV
Explanation:
The flow of filtrate in the two limbs of Henle's loop is in opposite directions and thus forms a counter-current mechanism (the process due to which the urine is made hypertonic). Vasa recta also play a significant role in counter-current mechanism.
21. **(a)** (i) and (iii)
Explanation:
Each actin (thin) filament is made of two 'F' (filamentous) actins helically wound to each other. Each F actin is a polymer of monomeric 'G' (globular) actins. Myosin (thick) filament is a polymerised protein. Many monomeric proteins called meromyosins constitute one thick filament. Tropomyosin is a fibrous molecule that attaches to F actin in the groove between its filament. The globular head of meromyosin consists of heavy meromyosin.
22. **(d)** Depression in the skull in the area of the pituitary gland
Explanation:
Sella turcica is also known as hypophyseal fossa. It is a cup-shaped depression in the sphenoid bone. It contains the pituitary gland. This depression is at the base of the skull in the centre of the cranial cavity. An empty Sella turcica is a disorder in which cerebrospinal fluid gets filled in this depression. So, the correct answer is 'Depression in the skull in the area of the pituitary gland'.
23. **(b)** H-band is obliterated
Explanation:
H-band is obliterated
24. **(b)** D
Explanation:
The label D represents basilar membrane. The movement of the basilar membrane is most important to hearing. Once the hair cell microvilli bend, the hair cells depolarize, thus inducing action potentials in the cochlear nerve.
25. **(c)** Meninges
Explanation:
Meninges
26. **(c)** myelin sheath and nodes of Ranvier

Explanation:

Medullated nerve fibres are covered by myelin sheath. The conduction of impulse is faster in medullated nerve fibre due to the presence of myelin sheath and nodes of Ranvier.

27. (a) GLUT IV

Explanation:

GLUT IV is insulin-dependent and is responsible for the glucose transport into muscle and adipose cells in anabolic conditions. Whereas GLUT-I is insulin-independent and is widely distributed in different tissues.

28.

(c) Thymosin

Explanation:

Thymosin

29.

(c) Right ventricle

Explanation:

The pulmonary artery arises from the right ventricle of the four-chambered heart and transport blood to the lungs.

30.

(b) Ferrous form

Explanation:

Ferrous form

31. (a) Involuntary and striated

Explanation:

Cardiac muscles are found exclusively in the heart. They are cylindrical, non-tapering, branched with faint striations. They have one or two nuclei in each cell. They are involuntary. Their function is rhythmic contraction and relaxation throughout life.

32. (a) DNA

Explanation:

To cut DNA with a restriction enzyme, it should be pure and free from other impurities. The plasma membrane RNA, proteins, polysaccharides, and lipids are treated with enzymes like lysozyme, cellulose, chitinase, and proteases. RNA can be removed with ribonuclease. Finally, the purified DNA is precipitated by adding chilled ethanol. Change - to fine threads of DNA.

33. (a) Gel electrophoresis

Explanation:

DNA fragments formed by restriction endonucleases can be separated by a technique called gel electrophoresis. DNA fragments are negatively charged and hence can be separated by moving them towards the anode under an electric field through a medium/matrix such as agarose, a natural polymer extracted from sea weeds.

34.

(c) Statements (A) and (B)

Explanation:

In 1997, the first transgenic cow, Rosie, produced human protein enriched milk. The milk contained the human alpha-lactalbumin and was nutritionally a more balanced product for human babies than natural cow-milk. Isolation of DNA from other macromolecule is achieved by treating the bacterial cells/plant or animal tissue with enzymes such as lysozyme (bacteria), cellulase (plant cells), chitinase (fungus).

35. (a) insect - resistance

Explanation:

The genetically modified (GM) Bt brinjal in India has been developed mainly for insect resistance. Through genetic engineering Bt toxin genes were isolated from *Bacillus thuringiensis* and incorporated into the several crop plants such as cotton, brinjal.

ZOOLOGY (Section-B)

36. **(b)** Onchosphere, hexacanth, cysticercus, matured proglottid, gravid proglottid
Explanation:
Onchosphere or hexacanth is the larval stage of the *Taenia solium* (tapeworm) which migrates from the intestine to internal tissues or organs within the intermediate host. An onchosphere develops into a cysticercus. The cysticercus further develops into a mature tapeworm called matured proglottid that are released from the tapeworm's end segment and leave the host in faeces or migrate as independent motile proglottids. The gravid proglottids release eggs which are shed and the further life cycle continues. Hence, the correct sequence is Onchosphere, hexacanth, cysticercus, matured proglottid, gravid proglottid.
37. **(a)** Providing nutrients, maintaining ion balance, getting rid of excess neurotransmitters.
Explanation:
Astrocytes have several different functions such as supplying neurons with nutrients, maintaining homeostatic ion concentrations, and removing excess neurotransmitters.
38. **(d)** They carry blood from an organ towards the heart.
Explanation:
Veins are blood vessels that carry blood towards the heart. Most veins carry deoxygenated blood from the tissues back to the heart; exceptions are the pulmonary and umbilical veins, both of which carry oxygenated blood to the heart.
39. **(a)** Hb has more affinity to combine with carbon monoxide.
Explanation:
Charcoal on burning produces carbon monoxide (CO). CO has about 200 times more affinity for Hb than O₂. On combining with Hb, it forms a stable compound carboxy-haemoglobin. Because of this compound, Hb cannot carry sufficient O₂ to the tissues ultimately leading to death.
40. **(d)** Secondary oocyte
Explanation:
Secondary oocyte
41. **(d)** Weekly
Explanation:
Weekly
42. **(d)** (ii), (iii) and (iv)
Explanation:
- Darwin's finches are a result of natural selection.
 - Excessive herbicides in the fields resulted in resistant varieties.
 - The constant usage of certain drugs resulted in the evolution of prokaryotes with specific drug resistance.
 - Artificial breeding of animals like cows and other cattle to increase milk yield or domestication of dogs for the betterment of human life are all changes in the environment due to anthropogenic or human actions.
43. **(a)** afferent arteriole, efferent arteriole
Explanation:
Glomerulus is a tuft of capillaries formed by (afferent arteriole) a fine branch of renal artery. Blood from the glomerulus is carried away by an (efferent arteriole).
44. **(c)** Production of body heat
Explanation:

Production of body heat is not a function of the skeletal system. The skeletal system performs vital functions -support, movement, protection, blood cell production, calcium storage and endocrine regulation-that enable us to survive.

45.
(d) Vertebrate's embryo
Explanation:
Vertebrate's embryo
46.
(b) FSH and LH
Explanation:
FSH and LH
47.
(d) Only (v)
Explanation:
Menstrual cycle to become irregular
48.
(c) Atherosclerosis
Explanation:
Coronary Artery Disease is often referred to as atherosclerosis. It affects the blood vessels that supply blood to the heart muscle. It is caused by deposits of calcium, fat, cholesterol, and fibrous tissues, which makes the lumen of arteries narrower.
49.
(b) the same on two strands when orientation of reading is same.
Explanation:
Palindrome in DNA is a sequence of base pairs that reads same on the two strands when orientation of reading is kept the same.
50.
(c) (i) and (iii)
Explanation:
I. Fruit softening is promoted by an enzyme polygalacturonase, which degrades pectin in the transgenic tomato variety Flavr savr.
II. Recently the US government has patented the Indian Basmati rice as 'Rice tec'. The Government of India challenged this decision on April 28, 2001.
III. The war, which is fought by bioweapons (bio-logical weapons) against human or their crops and animals is called as biowar.