1. **(b)**

$C_{rms} = \sqrt{\frac{3RT}{M}}$ or $C_{rms} \alpha \sqrt{T}$

$$\frac{(C_{rms})_{T_2}}{(C_{rms})_{T_1}} = \sqrt{\frac{T_2}{T_1}} = \sqrt{\frac{400}{100}} = 2$$

$(C_{rms})_{T_2} = 2(C_{rms})_{T_1} = 2 \times v = 2v$

2. (a)When a place of glass is heated, due to low thermal conductivity it does not conduct heat fast enough and as a result, unequal thermal expansion takes place. Due to this unequal thermal expansion of its layers, the glass cracks.

3. (c)The deviation of light is maximum in case of a convex mirror which provides a greater field of view for a convex

4. (c) The age of universe is believed to be 10-20 billion years.

5. (c)At equator

$$g' = g - w^2 R$$

When earth suddenly stops $\omega = 0$

$$g' = g - (0)^2 R$$

$$g' = g$$

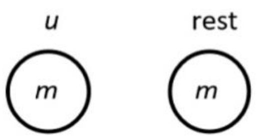
This mean g will increase

6. (d)Relation between ${}^0C$ and ${}^0F$,

$$\frac{C}{5} = \frac{5-32}{9}$$

$$\Rightarrow \frac{C}{5} = \frac{140-32}{9}$$

$$\Rightarrow C = 60^0 C$$



7. (c)

$$v_1 = \frac{(m-em)u+0}{2m}$$

$$v_2 = \frac{0+mu(1+e)}{2m}$$

$$\therefore \frac{v_1}{v_2} = \frac{(1-e)}{(1+e)} \quad \text{..... (C)}$$

$$\frac{v_2}{v_1} = \frac{(1+e)}{(1-e)}$$

8. (d) $\Delta Q = \Delta U + \Delta W$

$$\Rightarrow \Delta U = \Delta Q - \Delta W$$

$$\Rightarrow \Delta U = 150 - 110$$

$$\Rightarrow \Delta U = 40J$$

9. (b)Let N is population covered

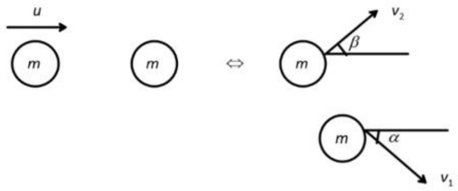
We know that

$$d = \sqrt{2Rh}$$

$$N = \pi d^2 \sigma = 2\pi Rh\sigma$$

$$= 2 \times 3.14 \times 6400 \times 0.1 \times 1000$$

$$= 2 \times 3.14 \times 6.4 \times 10^5 = 4 \times 10^6$$



10. (c)

As collision is elastic

$$\frac{1}{2}mu^2 = \frac{1}{2}mv_1^2 + \frac{1}{2}v_2^2$$

$$u^2 = v_1^2 + v_2^2 \quad \text{...... (a)}$$

$$m\vec{u} = m\vec{v}_1 + m\vec{v}_2$$

$$\vec{u} = \vec{v}_1 + \vec{v}_2$$

$$u^2 = v_1^2 + v_2^2 + 2v_1.v_2 \cos\theta \quad \text{.... (b)}$$

Solving (a) and (b)

$$2v_1.v_2 \cos\theta = 0$$

$$\cos\theta = 0$$

$$\theta = 90^0$$

i.e v_1 and v_2 are mutually perpendicular.

11. (c)Sun produces radoatopm wjocj reacjes earth without any propagating medium. Falls on our body and we fell confortable.

12. (a)

(a) As distance of surface is maximum from axis at equator, hence v is maximum as $v = \omega \times r$

(b) Angular velocity is same everywhere

(c) As distance of surface is maximum from axis at equator, hence v is maximum as $v = \omega \times r$

(d) As distance of surface is maximum from axis at equator, hence v is maximum as $v = \omega \times r$

13. (b) $\gamma_r = \gamma_a + \gamma_v$

Where $\gamma_r =$ Coefficient of real expansion,

$\gamma_a =$ coefficient of apparent expansion and

$\gamma_v =$ coefficient of expansion of vessel.

For copper

$$\gamma_r = C + 3\alpha Cu = C + 3A \quad \text{.... (a)}$$

For silver $\gamma_r = S + 3\alpha Ag$ ....(b)

From eq. (a) and (b)

$$\Rightarrow C + 3A - S + 3\alpha Ag = 0$$

$$= \alpha A g = \frac{C - S + 3A}{3}$$

14. (d) $R_T = R_0\left(1+\alpha T\right)$

$$\frac{R_{15}}{R_{37.5}} = \frac{R_0\left(1+\alpha\times 15\right)}{R_0\left(1+\alpha\times 37.5\right)}$$

$$\therefore \frac{4}{5} = \frac{\left(1+\alpha\times 15\right)}{\left(1+\alpha\times 37.5\right)}$$

$$4\left(1+\alpha\times 37.5\right) = 5\left(1+\alpha\times 15\right)$$

$$\left(4+\alpha\times 150\right) = \left(5+\alpha\times 75\right)$$

By solving this we get, $a = \frac{1}{75}\ {}^0C^{-1}$

15. (a)Proton and electron move under the influence of their mutual electrostatic attraction. Therefore momentum is conserved i.e. constant, hence $K = \frac{p^2}{2m}$. As electron has less mass, it possesses greater kinetic energy.

16. (a)Both coils oppose the increase in current in straight wire, due to which change in magnetic flux is increased throguh the two coils. Hence current in coil A is clokcwise and current in coil B is anticlockwise

17. (a)Water has maximum specific heat among water, alcohol, glycerine and oil. Water has specific heat $4186 J kg^{-1}\ {}^0C^{-1}$

18. (d)The stability of atom depends on both number of protons and neutrons. For light stable nuclides, the neutron number is equal to the proton number so that the ration N/Z is equal to 1. The ratio increases for the heavier nuclides and becomes about 1.6 for heaviest stable nuclides. For larger values of Z, the nuclear force is ot able to balance electric repulsions of protons unless N>Z. There are no stable nuclide with Z>83 or A>209. Thr nuclide $^{209}_{83}Bi$ is the heaviest stable nucleus.

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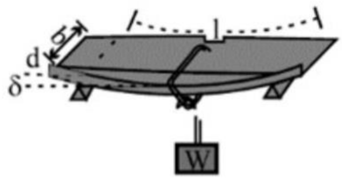


19. (a)

δ = Depression in the beam

Y = Young's Modulus

W = Load Applied

L = Length of the beam

b = width of the beam

d = thickness of the beam

$$\delta = \frac{WL^3}{4Ybd^3}$$

$$\therefore \delta \propto \frac{1}{Y}$$

20. (c)

For a mole of an ideal gas, the equation of state is PV = RT

or T = $\frac{PV}{R}$

which is proportional to the product pV

At x , PV = (4 × 10^5) (1 × 10^{-4}) = 40 Nm

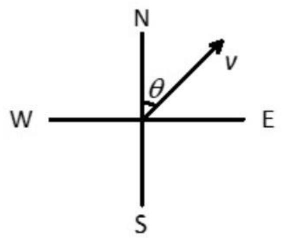
At y, pV = (1 × 10^5) (5 × 10^{-4}) = 50 Nm

At z, pV = (1 × 10^5) (1 × 10^{-4}) = 10 Nm

Thus, T is maximum at y since pV is the highest and T is minimum at z since pV is the smallest

PV = RT

21. (c)



$u = v_y$ at $v\cos 45^0$

$$t = \frac{v}{\sqrt{2}a}$$

When v_{man} due north is equal to wind velocity comp along north, then wind is found to blow due east

$$v_m = v\cos 45^0$$

$$v_m = \frac{v}{\sqrt{2}}$$

$$v_m = at$$

$$\frac{v}{\sqrt{2}} = at$$

$$\frac{v}{\sqrt{2}t} = a$$

22. (c)Phase difference is 2π means constrictive interference so resultant amplitude will be maximum.

23. (c)We know that

$$t = pE\sin\theta$$

$$\Rightarrow T = pE\sin 30$$

$$\Rightarrow 10\sqrt{3} = \frac{pE}{2}$$

$$\Rightarrow pE = 20\sqrt{3}$$

Potential energy, U = $-pE\cos 30^0$

$\therefore$ Potential energy U = $-20\sqrt{3}\times\frac{\sqrt{3}}{2}$

$$= -10\times 3 = -30J$$

24. (a) $\lambda = \frac{h}{P} = \frac{h}{\sqrt{2m_0K}}$

$$\lambda = \frac{h}{\sqrt{2\times1.66\times10^{-27}\times0.05\times1.6\times10^{-19}}}$$

$$\lambda = 1.28\overset{0}{A}$$

$$\lambda \approx 1.3\overset{0}{A}$$

25. (d) n_A = Known frequency = 256 Hz, n_B = ?

X = 2 bps, which is decreasing after loading (i.e. x↓)

Known tuning fork is loaded so $n_A \downarrow$

Hence $n_A \downarrow - n_B = x \downarrow$ ….(i) correct

$n_A - n_B \downarrow = x \downarrow$…..(ii) Wrong

$$\Rightarrow n_B = n_A - x = 256 - 2 = 254Hz$$

26. (a) $V \propto T$

$$\Rightarrow \frac{v_1}{v_2} = \frac{T_1}{T_2}$$

$$\Rightarrow \frac{200}{v_2} = \frac{(273+20)}{(273-20)} = \frac{293}{253}$$

$$\Rightarrow v_2 = \frac{200\times253}{293} = 172.6ml$$

27. (b)In first 2s, number of nucleons present is 900 out of 1000,

This means percentage number of nucli left =

$\frac{900}{1000}\times100 = 90\%$,

i.e., 90% nuclei are left behind.

Therefore in next 2s, 90% of 900 nuclei will be left.

Number of nuclei left

$= \frac{90}{100}\times900 = 810$, i.e., 810 nuclei will be left.

28. (a) $v_{\max} = a\omega$

$$v_{\max} = a\times2\pi\text{f}$$

$$v_{\max} = 0.12\pi\times300$$

$$v_{\max} = 60\pi\, cm\, s^{-1}$$

29. (c)

Disc	A	B
Radius	r	4r
Thickness	t	$\frac{t}{4}$

$$\frac{I_A}{I_B} = \frac{\frac{1}{2}m_Ar_A^2}{\frac{1}{2}m_Br_B^2} = \frac{m_Ar_A^2}{m_Br_B^2}$$

$$\frac{I_A}{I_B} = \frac{\pi r_A^2 t_A r_A^2}{\pi r_B^2 t_B r_B^2}$$

$$\frac{I_A}{I_B} = \frac{r_A^4 t_A}{r_B^4 t_B} = \left(\frac{1}{4}\right)^4\left(\frac{4}{1}\right)$$

$$\frac{I_A}{I_B} = \frac{1}{64}$$

$$\therefore I_A < I_B$$

30. (c)Equation of motion $y = a\cos\omega t$

$$\Rightarrow \frac{a}{2} = a\cos\omega t$$

$$\Rightarrow \cos\omega t = \frac{1}{3}$$

$$\Rightarrow \omega t = \frac{\pi}{3}$$

$$\Rightarrow \frac{2\pi t}{T} = \frac{\pi}{3}$$

$$\Rightarrow t = \frac{\frac{\pi}{3}\times t}{2\pi} = \frac{4}{3\times2} = \frac{2}{3}S$$

31. (c)Given,

F = 100 dyne

M = 5 gram

T = 10 second

Acceleration

$$a = \frac{F}{m} = \frac{100}{5} = 20cm/s^2$$

Now from equation of motion

$$v = u + at$$

$$v = 0 + 20\times10$$

$$v = 200cm/s$$

32. **(d)**

As 1/3 part of the chain is hanging from the edge of the table.

So by substituting n = 3 in standard expression

$$W = \frac{MgL}{2n^2} = \frac{MgL}{2(3)^2} = \frac{MgL}{18}.$$

33. (a)In Bernoulli's theorem,

Velocity head = $\frac{v^2}{2g}$

Velocity head = $\frac{(5)^2}{2\times10}$

Velocity head = 1.25m

34. (b)Absorption power

$$= \frac{Heat\ absorbed}{Total\ heat\ given} = \frac{q}{P}$$

35. (a)Given that $\vec{r} = 3t\hat{i} - 4\cos\hat{j}$

$$\frac{d\vec{r}}{dt} = 3\hat{i} + 4\sin t\hat{j}$$

$$\Rightarrow \frac{d^2\vec{r}}{dt^2} = +4\cos t\hat{j}$$

Impulse = $\int \vec{F}.dt = \int_0^{\frac{\pi}{2}} m\vec{a}dt = \int_0^{\frac{\pi}{2}} m\left(4\cos t\hat{j}\right).dt$

$$= \hat{j}\int_0^{\frac{\pi}{2}} 12\cos t.dt = 12\hat{j}Ns$$

36. (a)Both will exapnd equally as thermal expansion depends on size, material and temperature, which are same in all the two

37. (c)We know that

$Q = mc.\Delta\theta$

$\Rightarrow \Delta\theta = \frac{Q}{m.c}$

When $c = \infty$,

$\Rightarrow \Delta\theta = 0$

$\Rightarrow Q = 0$

38. (b)In the direction parallel to plate

$v_1 \cos\alpha = v_2 \cos\beta$

$\frac{v_1}{v_2} = \frac{\cos\beta}{\cos\alpha}$

Ratio of kinetic energy

$\frac{KE_1}{KE_2} = \left(\frac{v_1}{v_2}\right)^2$

$\frac{KE_1}{KE_2} = \left(\frac{\cos\beta}{\cos\alpha}\right)^2$

39. (c) $W = \vec{F}.\vec{s}$

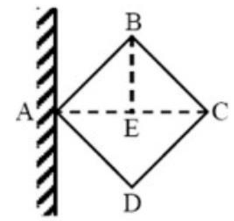
$W = \left(5\hat{i} + 3\hat{j}\right) - \left(2\hat{i} - 2\hat{j}\right)$

$W = 10 - 3 = 7J$

40. (c)Initially speed of ball B is less hence centrifugal in non inertial frame is less, so ball is in contact with the inner surface when speed will be sufficient, ball will lose contact with the inner surface and goes in contact with the outer surface.

41. (c)In the figure, draw a perpendicular BE from B to line AC, Accodrting to Pythagoras theorem

$BE^2 + AE^2 = 1^2$



Or $y^2 + \left(\frac{x}{2}\right)^2 = 1^2$

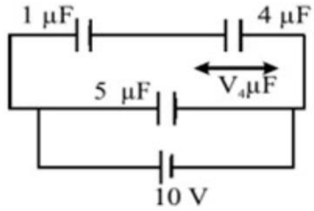
$\therefore 2y\left(\frac{dy}{dt}\right) + \frac{x}{2}.\frac{dx}{dt} = 0$

$\Rightarrow \left(-\frac{dy}{dt}\right) = \frac{1}{2}\left(\frac{x}{2y}\right).\frac{dx}{dt}$

x= 2y , as the rhombus is in the form of a square.

Hence, $v_B = \frac{1}{2v_c} = \frac{v}{2}$

42. (c)



$3\mu F$ & $1\mu F$ are in parallel hence $C_{net} = C_1 + C_2$ hence is equal to $4\mu F$.

Now $2\mu F$ & $2\mu F$ are in series with this equivalent capacitor ($4\mu F$). Solving $2\mu F$ and $2\mu F$ are in series, we get $2\mu F$.

$\therefore V_{4\mu F} = \frac{V \times C_{3\mu F}}{\left(C_{1\mu F} + C_{4\mu F}\right)}$

$\Rightarrow V_{4\mu F} = \frac{10 \times 1}{(1+4)} = 2$

$\Rightarrow V_{4\mu F} = 2V$

(Potential difference across $4\mu F$ capacitor is calculated by voltage division rule)

$\therefore V_{5\mu F} = 10V$

(Potential difference across $5\mu F$ is same as battery)

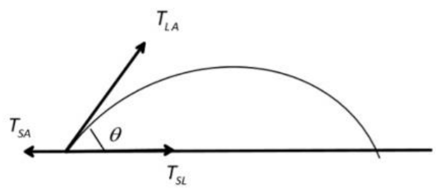
$\therefore \frac{V_{1\mu F}}{V_{5\mu F}} = \frac{2}{10} = \frac{1}{5}$

43. (c) $\frac{\Delta Q}{\Delta t} = \frac{KA\Delta\theta}{\Delta x}$

$\Rightarrow$ Thermal gradient

$\Rightarrow \frac{\Delta\theta}{\Delta x} = \frac{\left(\Delta Q / \Delta t\right)}{K}$

$\Rightarrow \frac{\Delta\theta}{\Delta x} = \frac{10}{0.4} = 25^0 C\,cm^{-1}$



44. (c)

$\cos\theta = \frac{T_{SA} - T_{SL}}{T_{LA}}$

From this diagram, angle of contact depend on surface tension due to solid, liquid and gas (air) all the three

45. (b)Diamagnetic materials are characterized by small negative susceptibilities and are only slightly affected by a change in their temperature.

46. (b)According to Einstein's equation for P.E.E.

For 1st case,

$\frac{1}{2}mv^2 = hf - W$, where f = frequency of incident light and W = work function

For 2nd case,

$$\frac{1}{2}mv_1^2 = h(4f) - W$$

$$\frac{1}{2}mv_1^2 = 4hf - 4W + 3W$$

$$\frac{1}{2}mv_1^2 = 4(hf - W) + 3W$$

$$\frac{1}{2}mv_1^2 = 4\frac{1}{2}mv^2 + 3W$$

$$\frac{1}{2}mv_1^2 = \frac{1}{2}m(2v)^2 + 3W$$

This equation tells us on comparison that,

$v_1 > 2v$

47. (b)We know that, $\phi = BA\cos\theta$

Angle between $\vec{A}$ and $\vec{B}$ is 30^0

$\phi = 1\times10^{-3}Wb$

$A = 0.02m^2$

$\Rightarrow 10^{-3} = B\times2\times10^{-2}\times\cos30^0$

$\Rightarrow B = 0.058T$

48. **(a)**

From the standard equation

$$v_1 = \left(\frac{m_1 - m_2}{m_1 + m_2}\right)u_1 = \left(\frac{M - m}{M + m}\right)u\ .$$

49. (c)When a diamagnetic material is inserted into a coil, the value of permeability decreases, hence l decreases, Therefore $Z = \sqrt{X_L^2 + R^2}$ decreases and as a result the current increases.

50. ()4Initially balancing pint is J,

Hence $\frac{AH}{BJ} = \frac{P}{Q} = \frac{20}{80}$

Now if P & Q are interchanged,

Let balancing point be J_1

$$\frac{AJ_1}{BJ_1} = \frac{Q}{P} = \frac{80}{20}$$

The balanced point shifts by

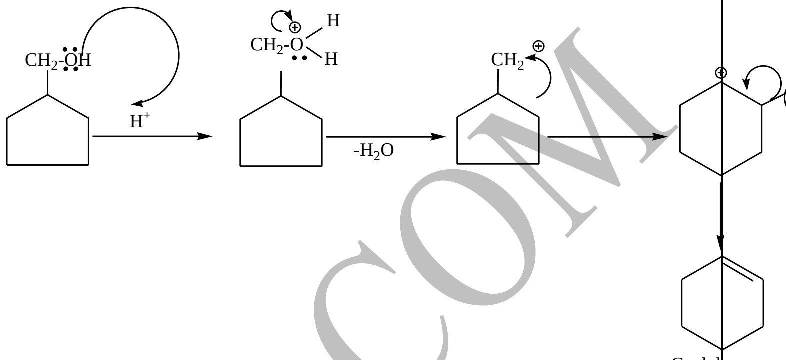
$AJ_1 - AJ = 80 - 20 = 60cm$

CHEMISTRY

1. (a)

Liquid N_2O_4 + unsymmetrical dimethylhydrazine (UDMH) represents a biliquid propellant.

2. (b)Cyclopentyl carbinol



3. (d) $\boxed{B.P \propto M.wt}$

4. (d) $(I)\ NH_4NO_3 \xrightarrow{\Delta} N_2o + 2H_2O$

$(II)\ NH_4N_2O \xrightarrow{\Delta} N_2 + 2H_2O$

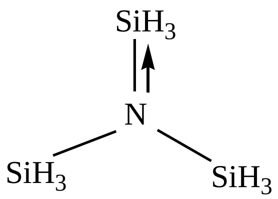
$(III)\ PCl_5 \xrightarrow{\Delta} PCl_3 + Cl_2$

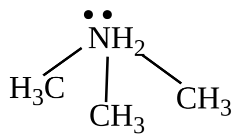
I, II are comproportionation reaction's , III is Redox reaction

5. (a)Tishchenko reaction

$$2R-CHO \xrightarrow[-H_2O]{Al(OC_2H_5)} RCOOCH_2R$$

6. (b)





Trigonalplanar

less basic $\because$ "Si" has

Vacant 'd' orbitals

$\therefore$ dative tondis formed

$p^{\pi} - d^{\pi} - bond$

pyramidal

morebasic $\because N$ has lone pair

7. (d) $\underset{(3-0.75)}{A} + \underset{(1-0.75)}{B} \rightarrow \underset{1.5}{2C}$

$$K = \frac{[C]^2}{[A]\,[B]} = \frac{(1.5)^2}{2.25 \times 0.25} = \frac{2.25}{2.25 \times 0.25} = 4.0\,.$$

8. (c) When rate of forward reaction is equal to the rate of backward reaction then equilibrium is supposed to be established.

9. (c)

$$FeCl_3(aq.) + 3NaHCO_3(aq) \rightarrow 3CO_2 + Fe(OH)_3 + 3NaCl$$

$Fe(HCO_3)_3$ is not formed

10. (a)II, III, IV

H_2O, F are week field ligands form outer orbital complex.

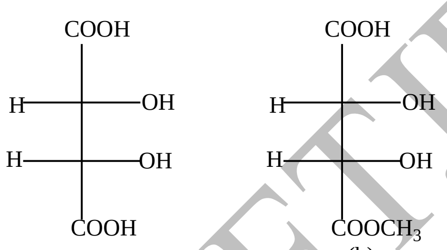
11. (d) Suppose 1 mole of *A* and *B* each taken then 0.8 *mole/litre* of *C* and *D* each formed remaining concentration of *A* and *B* will be (1 – 0.8) = 0.2 *mole/litre* each.

$$Kc = \frac{[C]\,[D]}{[A]\,[B]} = \frac{0.8 \times 0.8}{0.2 \times 0.2} = 16.0$$

12. (d)Finkelstein reaction

$$H_3C - CH_2 - Br + NaI \xrightarrow{Acetone} H_3C - CH_2 - I + NaBr$$

13. (d)



(a) (b)

Enantiomers of each other (based on absolute configuration)

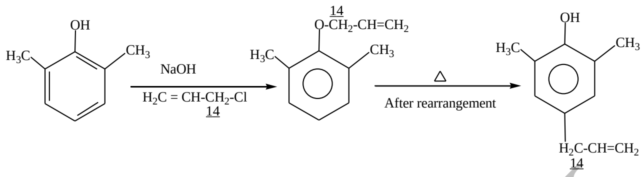
14. (d) $K_a = 1.0 \times 10^{-4}$

Weak acids given, The equilibrium constant for its reaction with strong base means reciprocal of hydrolysis constant = $\frac{1}{K_h}$

$$\because K_h = \frac{Kw}{Ka}$$

$$\frac{1}{Kh} = \frac{Ka}{Kw} = \frac{10^{-4}}{10^{-14}} = 10^{10}$$

15. (a)



16. (d) $E^0 of\ \ Cu^{+2}/Cu = +0.34$

Cu^{+2} oxidizing agent

$E^0 of\ Fe^{+2}/Fe = -0.44V$

Fe acts as reducing agent

17. (d)For tetrahedral co-ordination

$(r^+/r^-) = 0.225\ to\ 0.414$

18. (c) $Na + C + N + S \rightarrow NaSCN$

$$Fe^{+3} + SCN^- \rightarrow [Fe(SCN)]^{2+}$$

Blood Red Colour

19. (b)When $\Delta_0 < P$ then $t2g^3\ eg^1$

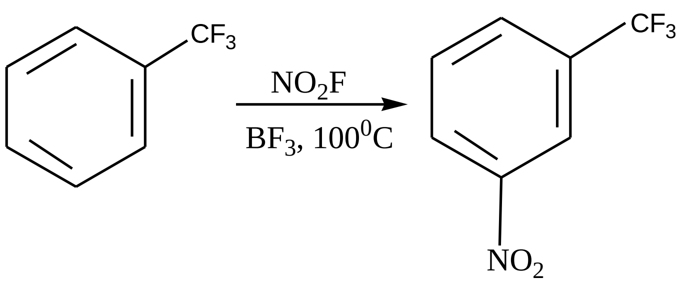
20. (c)In Boron it forms strong covalent bonds with neighboring atoms, thus boron atoms are closely packed in its solid state so large amount of heat is needed to break the bonds between atoms due to this Boron has extremely high M.P.

21. (d)Lyophilic colloids are stable due to salvation of dispersed phase particles by dispersion medium

22. (c)With more electronegative elements hydrogen is electropositive with metals (which are electro positive) hydrogen is electronegative

23. (b)In Cannizaro reaction rate determining step is transfer of hydride to the carbonyl group

24. (c)



$-CF_3$ Ring deactivating group, meta directing group

$$NO_2F + BF_3 \rightarrow \overset{\oplus}{N}O_2 + BF_4^{\ominus}$$

$\overset{+}{N}O_2$ electrophile attacks at meta position

25. (b) $(CH_3)_2CHC \equiv CH$

$$\begin{matrix} H_3C \\ CH_3 \end{matrix}\!\!>\! CH - C \equiv CH$$ due to acidic hydrogen gives Tollens test

$$\begin{matrix} H_3C \\ H_3C \end{matrix}\!\!>\! CH - C \equiv CH \xrightarrow[KMnO_4]{Hot\ alkaline} \begin{matrix} CH_3 \\ CH_3 \end{matrix}\!\!>\! CH - COOH + CO_2 \uparrow$$

26. (d) $M = \dfrac{M_1V_1 + M_2V_2}{V_1 + V_2}$

$$M = \frac{(1.5 \times 480) + (1.2 \times 520)}{480 + 520}$$

$$M = 1.344\ M$$

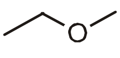
27. (a)Increase in size of alkyl group in ROH decreases the rate of esterification.

Since acidic strength order is

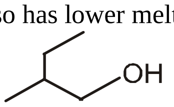
$$CH_3OH > 1^0 R - OH > 2^0 R - OH > 3^0 R - OH$$

28. (c) $XeF_6 + 3H_2O \rightarrow 6HF + XeO_3$

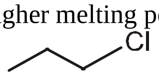
29. (b)



does not form H-bond so has lower melting point.

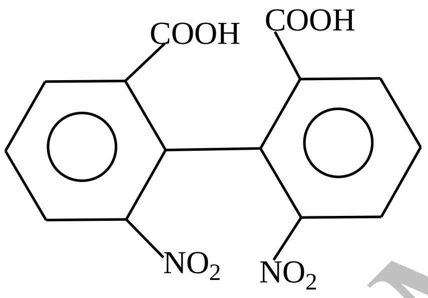


forms H-bond so has higher melting point.



has dipole moment so higher melting point.

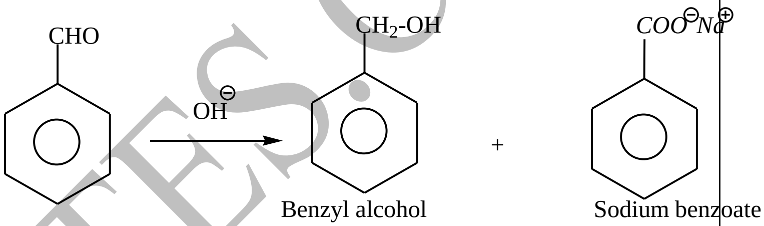
30. (c)



Two phenyl rings are perpendicular to each other to avoid sterichindrance plane of symmetry absent

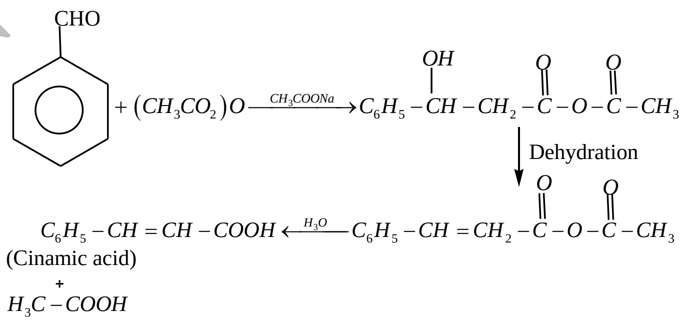
$\therefore$ Optically active

31. (b)



Cannizaro's reaction

32. (b)Perking reaction



33. (d)He is not lighter than H_2

34. (b)Given 3moles of electrons = 3F

In water electrolysis

$$H_2O \rightarrow 2H^+ + O^{-2} \left\{ \begin{matrix} 1\ mole\ H_2 \rightarrow 22.4\,lit \\ \frac{1}{2} mole\ O_2 \rightarrow \frac{11.2\ lit}{33.6\,lit} \end{matrix} \right\} at\ S.T.P$$

2 F needed

33.6 lit of gases need $\rightarrow 2F$

$x \qquad \leftarrow 3F$

$$x = \frac{33.6 \times 3}{2} = 50.4\ lit\left(gases\right)$$

35. (b)Cyanide process $\rightarrow$ extraction of Au

* Froth floatation process $\rightarrow$ pine oil
Electrolytic reduction $\rightarrow$ Extraction of Al
Zone refining $\rightarrow$ Ultrapure Ge
a-4, b-2, c-3, d-1

36. (a)No. of unpaired electrons

$\left[Fe\left(H_2O\right)_6\right]^{+2} \rightarrow 4$

$\left[Fe\left(CN\right)_6\right]^{3-} \rightarrow 1$

$\left[Fe\left(CN\right)_6\right]^{4-} \rightarrow 0$

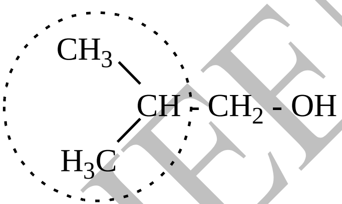
$\left[Fe\left(H_2O\right)_6\right]^{3+} \rightarrow 5$

37. (c)

$$\left[Co\left(NH_3\right)_5\left(NO_2\right)\right]Cl_2 + 2AgNO_3 \rightarrow \left[Co\left(NH_3\right)_5\left(NO_2\right)\right]^{+2}.2NO_3^- + 2AgCl\downarrow$$

38. (c)Carbionol is CH_3OH

iso propyl carbinol



39. (c)Minamata disease is due to industrial waste mercury into fishing water

40. (b)Greenish yellow gas is Cl_2 (note)

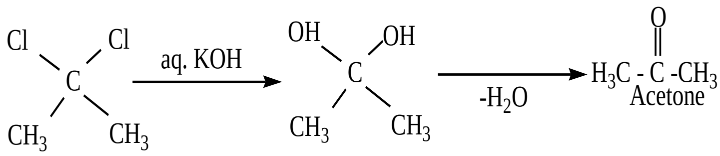
$$3Cl_2 + 6KOH \rightarrow 5KCl + KClO_3 + 3H_2O$$

$KClO_3$ used in fireworks and safety Matches

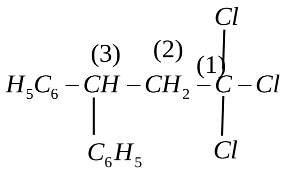
41. (d)None of these

42. (c)In electrical furnace around 3000^0C temperature can be obtained

43. (a)



44. (a)



1,1,1 trichloro-3,3- diphenyl propane

45. (c)Sucrose is a non reducing sugar

46. (b)For acid buffer solution

$$pH = pKa + \log\frac{\left[N_sV_s\right]}{\left[N_aV_a\right]}$$

$$4.5 = 4.2 + \log\frac{\left[0.2 \times V_s\right]}{\left[0.1 \times V_a\right]}$$

$$0.3 = \log\frac{\left[0.2 \times V_s\right]}{\left[0.1 \times V_a\right]}$$

$$\because 0.3 = \log\ 2$$

$$\therefore \frac{0.2 \times V_s}{0.1 \times V_a} = 2$$

$$2 \times \frac{V_s}{V_a} = 2$$

$$\frac{V_s}{V_a} = \frac{1}{1} \Rightarrow 1:1 \qquad \therefore vol\ acid\ = 150\ ml$$

$$vol\ salt\ solution = 150ml$$

47. (a) $\because \alpha = \dfrac{\left(D-d\right)}{d\left(n-1\right)}\ \because n = 3$

$$\frac{10}{100} = \frac{\left(D-50\right)}{50\left(3-1\right)}$$

$$\frac{10}{100} = \frac{\left(D-50\right)}{50 \times 2}$$

$$10 = D - 50$$

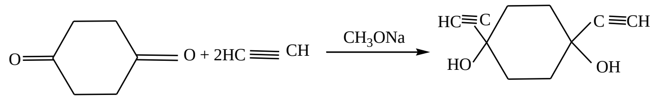
$D = 60$ (V.D of reactant)

$$\because M.Wt = 2 \times V.D$$

$$\Rightarrow 2 \times 60 = 120$$

48. (a)Edge has one octahedral void, face has no void while body diagonal contain one octahedral and two tetrahedral voids

49. (c)



$$2HC \equiv CH + 2CH_3ONa \rightarrow 2HC \equiv C^{-}\ Na^{\oplus} + 2CH_3OH$$

$$2HC \equiv C^{-} \quad 2Na^{\oplus}$$

(Nucleophile) attacks on carboxyl carbon

50. (b) $PCl_5 \rightarrow PCl_3 + Cl_2$

The reaction proceeds with increase in the number of moles of gaseous species

$\therefore$ low pressure required for decomposition high temperature required.

BIOLOGY

1. A
2. (b)
3. (b)
4. (b)
5. *(a) Ti*-plasmid present in the tumor cells of *Agrobacterium tumefaciens.*
6. (d)
7. (b)
8. (c)
9. (b)
10. (c)
11. (b)
12. (a)
13. (c)
14. (b)
15. (c)
16. (a)
17. (b)
18. (d)
19. (d)
20. (a)
21. (a)
22. (a)
23. (a)
24. (d)
25. (d)
26. (b)
27. (a)
28. (c)
29. (d)
30. (c)
31. (a)
32. (b)
33. (b)
34. (d) The earliest human civilizations around the river Nile in Egypt, the Chinese river valleys and the northern Indian plains are linked with crop cultivation.
35. (a)
36. D
37. (d)
38. (c)
39. (b)
40. (a)
41. (d)
42. (c)
43. (d)
44. (a)
45. (c)
46. (*b*) Water potential is the free energy of one mole of water at NTP. It is the fundamental concept to understand water movement. Solute potential and pressure potential are two main omponents which determine water potential.
47. (b)
48. (d)
49. (a)
50. (a)

01. (a)

02. (a)

03. (a)

04. (b)

05. (c)

06. (d)

07. (c)

08. (b)

09. (b)

10. (c)

11. (a)

12. (d)

13. (a)

14. (c)
15. (a)

16. (a)

17. (d)

18. (c)

19. (b)

20. (a)

21. (b)

22. (a)

23. (c)

24. (c)

25. (c)

26. (d)

27. (b)

28. (c)

29. (b)
30. (b)

31. (d)
32. (b)

33. (a)
34. (a)
35. (c)

36. (b)
37. (c)

38. (d)

39. (b)

40. (d)

41. (b)

42. (d)

43. (c)

44. (a)

45. (d)

46. (d)
47. (a)

48. (c)

49. (d)

50. (d)