ANSWERS KEY

CHEMISTRY

1. c	2. d	3. b	4. c	5. b	6. d	7. c	8. a	9. d	10. b	11. a	12. c	13. c
14. b	15. b	16. b	17. b	18. c	19. d	20. c	21. b	22. b	23. b	24. b	25. a	26.
27. c	28. c	29. c	30. b									

PHYSICS

1. a	2. b	3. b	4. c	5. c	6. c	7. d	8. b	9. b	10. d	11. b	12. b	13. d
14. c	15. b	16. a	17. d	18. a	19. b	20. b	21. a	22. a	23. c	24. b	25. d	26. b
27. a	28. a	29. a	30. d									

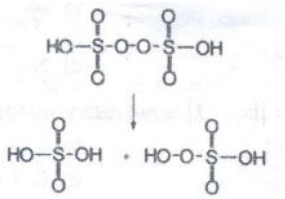
MATHEMATICS

1. d	2. a	3. b	4. a	5. b	6. b	7. a	8. a	9. c	10. b	11. b	12. c	13. a
14. d	15. d	16. a	17. d	18. d	19. a	20. b	21. a	22. a	23. b	24. d	25. c	26. a
27. a	28. c	29. b	30. d									

HINTS AND EXPLANATION

CHEMISTRY

Sol 1.



Hydrolysis of peroxodisulphuric acid produces sulphuric acid and peroxomonosulphuric acid

Sol 2.

Electronegativity of an element is its tendency to acquire elections.

Sol 3.

$K_a = 1.0 \times 10^{-9}$;

$$a = \sqrt{\frac{K_a}{c}} = \sqrt{\frac{1.0\ x\ 10^{-9}}{0.1}} = 1.0\ x\ 10^{-4}$$

$[H^+] = c\alpha = 0.1 \times 1.0 \times 10^{-4} = 1.0 \times 10^{-5}$

$pH = -\log [H^+] = -\log (1.0 \times 10^{-5}) = 5$

Sol 4.

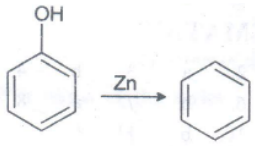
$CH_3COOH + NaOH \rightarrow CH_3COONa + H_2O$

Weak acid strong base

CH_3COONa is a salt of weak acid and strong base so its aqueous solution is basic

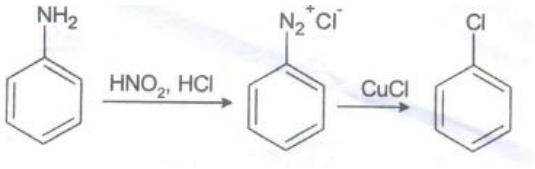
Sol 5.

Phenol on heating with Zn dust forms benzene.



Sol 6.

An aromatic amine quickly reacts with HNO_2, HCI to form an aryl diazonium salt, which decomposes in the presence of copper (I) chloride to form the desired aryl halide. The reaction is called Sandmeyer reaction



Sol 7.

Wurtz reaction is used for converting alkyl halides into alkanes; $RX + Na + XR \rightarrow R - R$

Clemmensen reduction, Wolf Kishner reaction and reaction with HI/P are used for conversion of

$>C = O$ to $>ch_2$.

Sol 8.

For the cell, Zn $|Zn^{2+}$ (0.1M)|| Cu^{2+} (0. 01 M| Cu; the cell reaction is

Zn (s) + Cu2+ (aq) → Zn^{2+} (aq) + Cu (s)

Applying Nernst equation.

$E_{cell} = E^0_{Cell} - \frac{0.0591}{n} \log \frac{a_{Zn^{2+}}}{a_{Cu^{2+}}}$

$E_{cell} = 1.10 - \frac{0.0591}{2} \log \frac{0.1}{0.01}$

$= 1.10 - \frac{0.051}{2} \log 10$

= 1.10 – 0.0295 = 1.07045 V = 1.07 V

Sol 9.

$M_1V_1 + M_2 V_2 = M_3 V_3$

0.1 x 100 + 0.2 x 25 = M_3 x 125

10 + 5 = 15 = M_3 x 50

M_3 = 15 / 125 = 0. 12 M

Sol 10.

$\Delta n_{(g)}$ = 12 – 15 = - 3

$\Delta H = \Delta E + \Delta n_{(g)} RT$

or $\Delta H - \Delta E = \Delta n_{(g)} RT$

$\Delta H - \Delta E$ = -3 x 8.314 J mol^{-1} K^{-1} x 298 K

= - 7432. 716 J mol^{-1}= - 7.432 kJ mol^{-1}

Sol 11.

α = 10% = 01, c = 0.01,

$[H^+] = c\alpha$ = 0.1 x 2 x 0.01 = 1.0 x 10^{-3}

(onemol $H_2 CO_3$ gives two H^+ ions)

pK – log $[H^+]$ = - log (2.0 x 10^{-3})

= - log 2 + 3 = - 0.3010 + 3 = 2.699

Sol 12.

Lines in the Balmer series are in the visible region of spectrum.

Sol 13.

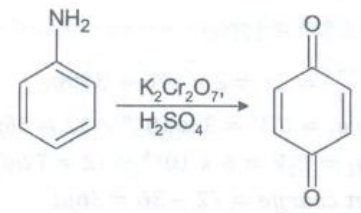
Chlorine cannot be died by passing over anhyd, $CaCl_2$

Sol 14.

Oxidation number of Br in $Br_2 = 0$; in Br = -1 and in $BrO_3 = +5$

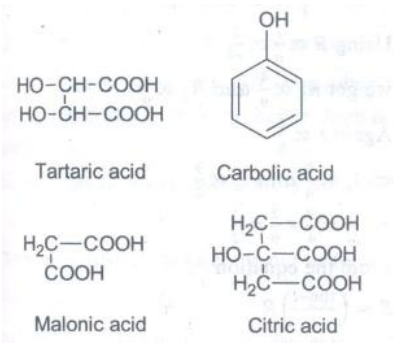
Sol 15.

The reaction between aniline and $K_2Cr_2O_7$ / H_2SO_4 gives p-benzoquinone.



Sol 16.

Carbolic acid (phenol) dones not contain a COOH group.



Sol 17.

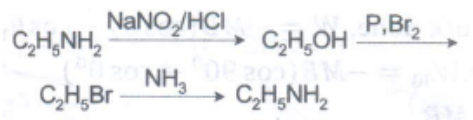
Trichloroacetic acid is the strongest acid out of the given options.

Sol 18.

In match box, sides $a \neq b \neq c$; $\alpha = ß = \gamma = 90°$, so the kind of symmetry is orthormbic.

Sol 19.

$X = C_2H_5OH$; $X = C_2H_5Br$; $Y = C_2H_2NH_2$



Sol 20.

Correct order of boiling points is

Alkane > alkene >> alkyne

Sol 21.

The conversion of a gas to a liquid is exothermic so more heat is liberated when HCI (1) is formed instead of HC (g), i.e., X < y.

Sol 22.

Incomplete combustion of petrol or diesel oil in automobile engines can be best detected by testing the fuel gases for the presence CO

Sol 23.

D-Aldopentose is represented by structure B. The compound contains a chain of five carbons, with terminal CHO group and penultimate carbon has Oh group on the right hand side.

Sol 24.

C_2H_4 and H_2O are neutral ligands, therefore oxidation state of Mo in the given complex is

2x – 8 = -2 2x – 6 or x = 3.

Sol 25.

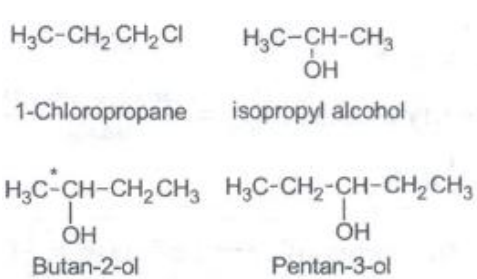
Freundlich's adsorption isotherm is $\frac{x}{m}\ kp^{1/n}$

Sol 26.

It is a metallic hydride

Sol 27.

Butan-2-ol is optically active due to presence of a chiral centre.



Sol 28.

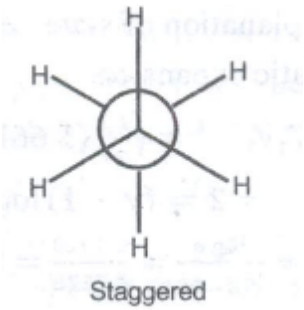
The large increase in rate of a reaction on rise in temperature is due to the increase in the fraction of molecules having energy > threshold

Sol 29.

Degree of hydration in an aqueous solution decreases as the size of metal ion increases and consequently ionic mobility increases.

Sol 30.

Dihedral angle in the staggered conformation of ethane is of 60°.



PHYSICS

Sol 1.

% age error in C = 0.1 / 2 x 100 = 5%

% age error in V = 0.5 / 25 x 100 = 2%

Error in Q = CV + (% age error in C + % age error in V)

= 2 x 25 + (5 + 2)% = 3.5 C

Sol 2.

Using $v^2 - u^2 = 2gh$

we have $v = \sqrt{2gh}$ at u = 0

$\therefore \frac{v_2}{v_1} = \sqrt{\frac{h_2}{h_1}} = \sqrt{\frac{1.8}{5}} = \frac{3}{5}$

Loss in velocity $= \frac{v_1 - v_2}{v_1} = 1 - \frac{v_2}{v_1}$

$= 1 - \frac{3}{5} = \frac{2}{5}$

Sol 3.

$$l_1 = 2l_2 = \frac{2}{3}l$$

Force constant $K \propto \frac{1}{length\ of\ spring}$

$\therefore K_1 = \frac{3}{2}K$

Sol 4.

As $P = Fv = C$

$\Rightarrow \frac{mdv}{dt}\ v = C$

orvdv$\frac{Cdt}{m}$

Integrating

$\frac{v_2}{2} = \frac{ct}{m}$

$\Rightarrow \left(\frac{ds}{dt}\right)^2 = \frac{2ct}{m}\ or\ \frac{ds}{dt} = \sqrt{\frac{2ct}{m}} \Rightarrow S \propto t^{3/2}$

Sol 5.

Velocity of C.M. $V_{cm} = \frac{(40 \text{ x } 2) + (30\ x - 3)}{40+30}$

$= -\frac{1}{7}m/s$

Sol 6.

Using $g_d = g\left(1 - \frac{d}{R}\right)$ as $d = \frac{R}{2}$

$g_d = g\left(1 - \frac{R}{2R}\right) = \frac{g}{2}$

$\therefore$weight $= mg_d = \frac{mg}{2} = \frac{w}{2}$

Sol 7.

Upthurst is zero because weight of liquid is zero due to zero gravity.

Sol 8.

Both statement are true but statement 2 is not the correct explanation of Statement 1.

Sol 9.

For adiabatic expansion

$TV^{\gamma-1} = T_1V_1^{\gamma-1} = \left(\frac{T}{2}\right)(5.66V)^{\gamma-1}$

or $(5.66)^{\gamma-1} = 2 \Rightarrow (\gamma - 1)\log 5.66 = \log 2$

i.e. $\gamma - 1 = \frac{\log 2}{\log 5.66} = \frac{0.3010}{0.7528} = 0.4$

$\Rightarrow \gamma = 1.4$

Sol 10.

From the equation $r = 1 + \frac{2}{f}$

$1.4 = 1 + \frac{2}{f} = 0.4$

$\Rightarrow f = \frac{2}{0.4}$

$\Rightarrow f = 5$

Sol 11.

The value of x is such that echoes are heard 0 1s and 2s

i.e. $510 = x + 2x = 3x$

$\Rightarrow x\frac{510}{3} = 100\ m$

$V = \frac{x+x}{1} = 2x = 2x\ 170 = 340\ m/s$

Sol 12.

Here $q_1 = c_1\ V = 3 \times 10^{-6} \times 12 = 36\ \mu C$

and $q_2 = c_2\ V = 6 \times 10^{-6} \times 12 = 72\ \mu C$

$\therefore$ Net charge $= 72 - 36 = 36\ \mu\ C$

This charge gets distributed among two capacitors

$\therefore V_1 = \frac{12}{3} = 4V\ and\ V_2 = \frac{24}{6} = 4V$

Sol 13.

Using $R \propto \frac{1}{\alpha} \propto \frac{1}{r^2}$

We get $R_1 \propto \frac{4}{9}$ and $R_2 \propto \frac{2}{9}$

Again $I \propto \frac{1}{R}$

$\Rightarrow I_1 \propto \frac{9}{4} and\ I_2 \propto \frac{9}{2}$

$\Rightarrow \frac{I_1}{I_2} = \frac{9}{4} x \frac{2}{9} = \frac{1}{2}$

Sol 14.

From the equation

$S = \left(\frac{100-t}{20}\right) R$

$S = \left(\frac{100-20}{20}\right) R = 4R$

and $S' = \left(\frac{100-40}{40}\right)(R + 15) = \frac{6}{4}(R + 15)$

As $S' = S$

$4R = \frac{6}{4}(R + 15)$

$\Rightarrow R = 9\ \Omega$

Sol 15.

Work done, $W = - MB (\cos \theta_2 - \cos \theta_1)$

i.e. $W_{90} = - MB (\cos 90° - \cos 0°) = MB / 2$

$= MV$

and $W_{60} = - MB (\cos 60° - \cos 0°) = MB / 2$

Given that $W_{90} = nW_{60}$

$n = \frac{W_{90}}{W_{60}} = \frac{MB}{MB/2} = 2$

Sol 16.

As we know that

$Q = CV$, $q_0 = CV_0$, $q = q_0 \cos\omega t$

or $\cos\omega t = \frac{q}{q_0} = \frac{v}{v_0} = \frac{6}{12} = \frac{1}{2}$

$\Rightarrow \omega t = \frac{\pi}{3}$ rad where $\omega = \frac{1}{\sqrt{LC}} = \frac{1}{\sqrt{(2\ x\ 10^{-6})(0.6\ x\ 10^{-3})}}$

$= \frac{10^5}{\sqrt{2}}\ rad/s$

Again $I = \frac{dq}{dt} = \frac{d}{dt}\ (q_0 \cos \omega t) =$ - q_0 w sin ωt

Or $I = CV_0 \omega t\ q_0 = CV_0$

I = (2 x 10^{-6}) (12) x $\frac{10^5}{12}\ x \frac{\sqrt{3}}{2}$

I = 0.6 A

Sol 17.

Time taken by loop to cover 5m is given by

$t_1 = \sqrt{\frac{2h}{g}} = \sqrt{\frac{2\ x\ 5}{10}} = 1s$

e.m.f induced, e = Blv

∴current I = $\frac{e}{r} = Blv$ And Force F = BIl = $\frac{B^2 l^2 v^2}{R}$ (upwards) But v = $\sqrt{2gh} = \sqrt{2\ x\ 10\ x\ 5} = 10m/s$

⇒ F = $\frac{(1)^2 x (0.25)^2\ x\ 10}{0.125} = 5N\ (upwards)$ But F = m = 0.5 x 10 5N (downwards) acceleration.

The time taken for complete entry into field $t_2 = \frac{2}{10} = 0.25$

When loop just stats to come out of field, then

$15 = 10t_3 + \frac{1}{2} g$ x t_3^2

Or $t_3^2 + 2t_3 - 3 = 0$

Solving $t_3 = 15$

∴ Total time taken = $t_1 + t_2 + t_3$

$= 1 + 0.2 + 1 = 2.25$

Sol 18.

As U $= \frac{1}{2}\epsilon_0 E^2$

$= \frac{1}{2}(8.85\ x\ 10^{-12})(48)^2 = 1\ x\ 10^{-8}\ J/\ m^3$

Sol 19.

Here $f = \frac{R}{2} = -\frac{40}{2} = -20\ cm$ Using $\frac{1}{u} + \frac{1}{v} = \frac{1}{f}$

$-\frac{1}{200} + \frac{1}{v} = -\frac{1}{20}$

$\frac{1}{V} = -\frac{1}{20} + \frac{1}{200} = -\frac{9}{200} \Rightarrow$ v $= -\frac{200}{9}$ cm

As$\frac{I}{O} = -\frac{v}{u} \Rightarrow$ I $= -\frac{\text{v}}{\text{u}}$ x 0

$= -\frac{200}{9\ x\ 200}\ x\ 5 = -\frac{5}{9} = -0.55\ cm$

Sol 20.

Number of fringes $= \frac{Length\ of\ region}{Fringe\ \ width}$

Also Fringe width $\propto$ Wavelength

$\therefore$Now number of fringes $= \frac{600}{400}\ x\ 12 = 18$

Sol 21.

Given $i_p + 90^0 + r = 180^0$

i.e. $i_p = 90^0 - r$

As $i_p = -\ r = 22^0 \Rightarrow 90^0 - r - r = 22^0 \Rightarrow 2r = 68^0$

Orr $= 34^0$

Sol 22.

Making use of Moseley's law for K_α line, we get

$\frac{1}{\lambda} = \frac{3}{4}\ R\ \ (z-1)^2 \Rightarrow \frac{1}{0.76\ x\ 10^{-10}} = \frac{3}{4}(1.09\ x\ 10^7)\ (z-1)^2$

Or $\frac{4\ x\ 10^3}{0.76} = 3$ x $1.09\ (z-1)^2 \Rightarrow (z-1)^2 = \frac{4\ x\ 10^3}{0.76\ x\ 3\ x\ 1.09} = 1600$

$\Rightarrow z - 1 = 40$ or $z = 41$

Sol 23.

As r $\propto n^2$, v $\propto \frac{1}{n}$ *and* T $\propto \frac{r}{v}$

$\therefore \frac{r_1}{r_2} = \frac{n_1^2}{n_2^2}, \frac{v_1}{v_2} = \frac{n_2}{n_1}$ *and* $\frac{T_1}{T_2} = \frac{r_1 v_2}{r_2 v_1} = \frac{n_1^3}{n_2^3}$

i.e. $\frac{\theta}{1} = \frac{2^3}{1}$ $i.e. n_1 = 2c$ *and* $n_2 = 4$ and $n_2 = 1$

Sol 24.

Using $B = \frac{\square_0}{4\pi}\frac{ev}{r^2}$

$B = \frac{10^{-7}(1.6\ x\ 10^{-19})\ (2.2\ x\ 10^6)}{(0.5\ x\ 10^{-10})^2} = 14T$

Sol 25.

The truth table represents OR gate

Sol 26.

The frequencies given in the choices (3) and (4) have high penctrationpwer and will be digested by the earth, where as the radiatin of 10 KH_z in choice (1) will not be feasible due to the size of antenna.

Sol 27.

The potential difference will depend only on the charge on inner surface, in such cases. As the charge on the inner sphere is uncharged, the potential difference V will also remain unchanged.

Sol 28.

If the charge is positive, it will be accelerated parallel and will be anti parallel to the electric field if it is a negative charge. As the charge moves either parallel or anti parallel to electric and magnetic field, the net magnetic force on it will be zero and its path will be a straight line.

Sol 29.

As 36 km/h = 36 x $\frac{5}{18}$ = 10 km /s

The apparent frequency of sound heard by car

$f' = f\left(\frac{n+n_0}{n-n_s}\right) = 8\left(\frac{320+10}{320-10}\right) = 8.5\ KHz$

Sol 30.

As $\vec{L} = m\ (\vec{r}\ x\ \vec{v})$

The direction of angular momentum will be same as that of $(\vec{r}\ x\ \vec{v})$

MATHEMATICS

Sol 1.

$A \cup B$ will contains minimum number of elements, if A is subset of B and in that case in $(A \cup B) = 5$
Therefore option (d) is correct.

Sol 2.

Obviously $A = B$ is the correct answer.

Sol 3.

Given $w = \frac{z-1}{z+1}$

$\Rightarrow w = \frac{(z-1)\,)(z-1)}{(z+1)\,(z-1)}$

$= \frac{z^2-2\,z+1}{z^2-1}$

$= \frac{(x^2+y^2)-2\,(x+iy)+1}{x^2+y^2-1}$

$= \frac{(x^2+y^2-2x+1))-2iy}{x^2+y^2-1}$

$\Rightarrow \text{Re}\,(w) = \frac{(x^2+y^2-2x+1\,)}{x^2+y^2-1}$

Sol 4.

$|(x-1\,)+iy| < |(x-3\,)+iy|$

$\Rightarrow (x-1)^2 + y^2 < (x-3)^2 + y^2$

$\Rightarrow (x-1)^2 < (x-3)^2$

$\Rightarrow -(x-3) < x-1 < x-3$

$\Rightarrow 4 < 2x$

$\Rightarrow 2 < x$

Sol 7.

If $p + q + r = m$, then the number of ways of arranging 'm' things is $m! / p!q!r!$

Hence, the total number of different combinations of letters of the word ADVANCED are $\frac{8!}{2!2!}$

$= \frac{8\,x\,7\,x\,6\,x\,5\,x\,4\,x\,3\,x\,2\,x\,1}{(2\,x\,1)x(2\,x\,1)} = 10080$

Sol 8.

There are (m + 1) choices for each of n different books. So, the total number of choices is $(m + 1)^n$ including one choice in which we do not select any book. Hence, the required number of ways is

$(m + 1)^n - 1$

Sol 9.

$\frac{1}{1.2} - \frac{1}{2.3} + \frac{1}{3.4} - \ldots\ldots\ldots\ldots\ldots\ldots$

$= \left(1 - \frac{1}{2}\right) - \left(\frac{1}{2} - \frac{1}{3}\right) + \left(\frac{1}{3} - \frac{1}{4}\right)\ldots\ldots\ldots\ldots\ldots\ldots\ldots$

$= 1\ 2, \frac{1}{2} + \ 2.\frac{1}{3} - \ 2.\frac{1}{1}\ldots\ldots\ldots\ldots$

$= 2\left(1 - \frac{1}{2} + \frac{1}{3} - \frac{1}{4}\ldots\ldots\ldots\right) - \ 1$

$= 2 \log (1 + 1) - 1$

$= \log 2^2 - \log e = \log \frac{4}{e}$

Sol 10.

Here $a = {}^nC_r$, $b = {}^nC_{r+1}$ and $c = {}^nC_{c+2}$

Put n = 2, r = 0 we get a = 1, b = 2 and c = 1

Only option (b) holds the condition i.e.

$n = \frac{2ac + ab + bc}{b^2 - ac}$

Sol 12.

The r^{th} term of the series is given by

$t_r = (2r - 1)\ (2r + 1) = 4r^2 - 1$

Therefore, S_n, the sum to n terms of the series is given by

$S_n = 4 \sum_{r=1}^{n} r^2 - \ n = 4 \frac{n\ (n+1)(2n+1)}{6} - \ n$

$= \frac{2\left(2n^3 + 3n^2 + n\right) - 6n}{6} = \frac{8n^3 + 12n^2 + 4n - 6n}{6}$

$= \frac{8n^3 + 12n^2 - 2n}{6}$

$= \frac{4n^3 + 6n^2 - n}{3}$

Sol 13.

$\text{Lt}_{x \to 0} \frac{5^x - 6^x}{7^x - 8^x} = Lt_{x \to 0} \frac{5^x log\ 5 - 6^x\ log 6}{7^x log\ 7 - 8^x \log 8}$

$= \frac{\log 5 - \log 6}{\log 7 - \log 8} = \log\left(\frac{5}{6}\right) / log\ \left(\frac{7}{8}\right)$

Sol 14.

$\text{R}f'(0) = \lim_{h \to 0} \frac{f(0+h) - f(0)}{h}$

$= \lim_{h \to 0} \frac{|h|^2 - 0}{h} = \lim_{h \to 0} \frac{h^2}{h}$

$= \lim_{x \to 0} h^1 = 0$

$\text{L}f'(0) = \lim_{h \to 0} \frac{f(0-h) - f(0)}{-h}$

$= \lim_{h \to 0} \frac{|-h|^2}{h} = \lim_{h \to 0} \frac{h^2}{h}$

$= -\lim_{x \to 0} h^1 = 0$

$\therefore$ Rf' (0) = Lf' (0) = 0.

Hence, f' (0) = 0

Sol 15.

$y = ax^{n+1} + bx^{-n}$

$y' = a(n+1)\, x^n - bnx^{-n-1}$

$y'' = a\,(n+1)\, nx^{n-1} - bn\,(-n-1)\, x^{-n-2}$

$y'' = n\,(n+1)\,[ax^{n+1} + bx^{-n}]$

multiply x^2 on both sides

$x^2 \frac{d^2y}{dx^2} = n\,(n+1)[ax^{n+1} + bx^{-n}]$

$= n\,(n+1)y$

Sol 16.

$\int (cosec^2 x - 1)dx = -cotx - x + c$

Sol 17.

$I = \frac{1}{2}\int_0^{\frac{\pi}{2}}(1 - cos2x)dx$

$= \frac{1}{2}\left[x - \frac{sin\,2x}{2}\right]_0^{\pi/2}$

$= \frac{1}{2}\left(\frac{\pi}{2} - 0\right) = \frac{\pi}{4}$

Sol 18.

$\frac{d^2y}{dx^2} = \left[1 + \left(\frac{dy}{dx}\right)^2\right]^{3/4}$

$\Rightarrow\left(\frac{d^2y}{dx^2}\right)^4 = \left[1 + \left(\frac{dy}{dx}\right)\right]^2$

Therefore order = 2 and degree = 4

Sol 19.

Given three lines will be concurrent if

$\begin{bmatrix} p & q & r \\ q & r & p \\ r & p & q \end{bmatrix} = 0$, which gives p + q + r = 0

Sol 20.

$x^2 + 4x + 3y + 5 = 0$

$\Rightarrow x^2 + 4x = -3y - 5$

$\Rightarrow x^2 + 4x + 4 = -3y - 5 + 4$

$\Rightarrow (x + 2)^2 = 3y - 1$

$\Rightarrow (x + 2)^2 = -3\left(y + \frac{1}{3}\right)$

Sol 21.

Since $(\vec{a}\,.\,\vec{c})\,x\,\vec{c} = \vec{a}\,x\,(\vec{a}x\,\vec{c})$

$\therefore(\vec{a}.\vec{c})\vec{b} - (\vec{b}.\vec{c})\vec{a} = (\vec{a}.\vec{c})\vec{b}$

$\Rightarrow(\vec{b}.\vec{c})\vec{a} = (\vec{a}.\vec{b})\vec{c}$

Sol 22.

Exhaustive number of cases $= 6^3 = 216$. The same number can appear on each of the dice in the following ways: (1, 1, 1), (2, 2, 2) . . . . . (6, 6, 6)

So favourable number of cases $= 6$

Hence, required probability $= \frac{6}{216} = 1/36$

Sol 23.

The total number of ways in which 2 integers can be chosen from the given 40 integers is

$^{40}C_2 = 780.$

The sum of the selected numbers is odd if exactly one of them is odd and other is even.

Therefore, favorable number of cases.

$= {}^{20}C_1 \text{ x } {}^{20}c_1 = 400$

Hence, the required probability $= \frac{400}{780} = \frac{20}{39}$

Sol 25.

$\text{Sin}\,\frac{5\pi}{6} = \sin\left(\pi - \frac{5\pi}{6}\right)$

$\Rightarrow \sin^{-1}\left(\sin\frac{5\pi}{6}\right) = \sin^{-1}\left(\sin\left(\pi - \frac{5\pi}{6}\right)\right)$

$\Rightarrow \sin^{-1}\left(\sin\frac{5\pi}{6}\right) = \left(\pi - \frac{5\pi}{6}\right) = \frac{\pi}{6}$

Sol 27.

$\frac{1}{1.2} + \frac{1}{3.4} + \frac{1}{5.6} + ... \infty$

$= \left(1 - \frac{1}{2}\right) + \left(\frac{1}{3} - \frac{1}{4}\right) + \left(\frac{1}{5} - \frac{1}{6}\right) + ... to\ \infty$

log2

Sol 28.

$Rf'(1) = \lim_{h \to 0} \frac{f(1+h) - f(1)}{h}$

$= \lim_{h \to 0} \frac{[1+h]}{-h} = \lim_{h \to 0} \frac{0-1}{-h} = \infty$

$\therefore Rf'(1) \neq Lf'(1)$. So, $f'(1)$ does not exists.

Sol 29.

To find out the x intercept we will put y and z as 0, so x intercept is – 4.

Similarly y and z intercept is 2 and 4/3. Hence their sum is $4 + 2 + \frac{4}{3} = \frac{22}{3}$