JEE Main 2015
Answers & Explanations

Physics				Mathematics				Chemistry			
1	4	**16**	1	**31**	3	**46**	4	**61**	4	**76**	2
2	4	**17**	4	**32**	2	**47**	1	**62**	3	**77**	4
3	3	**18**	1	**33**	3	**48**	2	**63**	4	**78**	4
4	4	**19**	1	**34**	2	**49**	4	**64**	1	**79**	3
5	4	**20**	1	**35**	1	**50**	2	**65**	3	**80**	1
6	2	**21**	3	**36**	3	**51**	2	**66**	3	**81**	2
7	4	**22**	1	**37**	1	**52**	2	**67**	1	**82**	3
8	1	**23**	3	**38**	1	**53**	3	**68**	1	**83**	4
9	4	**24**	1	**39**	2	**54**	3	**69**	1	**84**	2
10	2	**25**	1	**40**	3	**55**	2	**70**	2	**85**	4
11	3	**26**	4	**41**	4	**56**	1	**71**	2	**86**	3
12	4	**27**	1	**42**	2	**57**	1	**72**	3	**87**	2
13	1	**28**	3	**43**	1	**58**	1	**73**	3	**88**	4
14	4	**29**	3	**44**	1	**59**	2	**74**	4	**89**	2
15	4	**30**	1	**45**	1	**60**		**75**	4	**90**	3

PART A – PHYSICS

1. 4 Centre of mass of a solid cone is $\frac{3h}{4}$ from the vertex. (factual)

2. 2 $I = \frac{\text{Power}}{4\pi r^2}$

$$\frac{I}{2} = \frac{1}{2} E^2_{(rms)} \epsilon_0 C$$

$$E = \sqrt{2} E_{rms}$$

3. 3 $\ell' = \ell\left(1 + \frac{Mg}{AY}\right)$

$$T = 2\pi\sqrt{\frac{\ell}{g}} \quad \ldots (1)$$

$$T_m = 2\pi\sqrt{\frac{\ell'}{g}} \quad \ldots (2)$$

$$\frac{T_m^{\,2}}{T^2} = \frac{\ell'}{\ell}$$

$$\frac{T_m^{\,2}}{T^2} = 1 + \frac{Mg}{AY}$$

$$Y = \left[\left(\frac{T_m}{T}\right)^2 - 1\right]\frac{A}{Mg}$$

4. 4 $P.E = \frac{1}{2}kx^2$

$$K.E = \frac{1}{2}k\left(A^2 - x^2\right)$$

5. 4 % change in frequency

$$= \frac{\frac{V}{V - V_s} - \frac{V}{V + V_s}}{\frac{V}{V - V_s}} \times 100$$

$$= \frac{2V_s}{V + V_s} \times 100$$

$$= \frac{2 \times 20}{320 + 20} \times 100 = 12\%$$

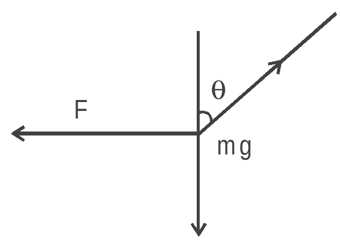
6. 2 $\frac{V}{R} = neAv_d$

$$R = \rho\frac{\ell}{A}$$

$$\rho = \frac{V}{neV_d\ell}$$

$$= 1.6 \times 10^{-5}\ \Omega m$$

7. 4



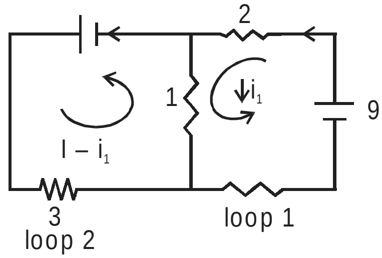
$$T\sin\theta = F$$
$$T\cos\theta = mg$$

$$\tan\theta = \frac{\mu_0 I^2 \ell}{2\pi d m g}$$

$$d = 2L\sin\theta,\ m = \lambda\ell$$

$$I = 2\sin\theta\sqrt{\frac{\pi\lambda g L}{\mu_0\cos\theta}}$$

8. 1



For loop 1

$5i + i_1 = 9$ ... (1)

For loop 2

$3i - 4i_1 = 6$ ... (2)

On solving (1) and (2)

$i = \frac{-3}{23} = 0.13$ from Q to P

9. 4 $\theta = \frac{1.22\lambda}{D} = \frac{x}{25\text{ cm}}$

$\therefore x = \frac{1.22 \times 500\text{nm} \times 25\text{ cm}}{0.25 \times 2\text{ cm}}$

$= 30\ \mu\text{m}$

10. Here $i_0 = 0.1$ A

Upon closing K_2

$i = i_0 e^{-t/\tau}$

here $\tau = \frac{L}{R} = 0.2$ ms

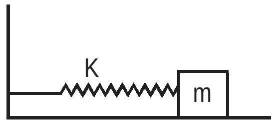
at t = 1 ms

$i = i_0 e^{-1/0.2}$

$i = i_0 e^{-5}$

$i = \frac{0.1}{150}$ mA $= 0.67$ mA

11. 3 This system is equivalent to damped oscillation of spring & mass.



m - corresponds to L- of electric circuit

K - corresponds to C- of electric circuit

If m is very massive, the spring will keep on moving for long time & the system will oscillate for longer time.

Similarly, If L is greater, system will damp slowly.

$\therefore$ Option (3).

12. 4 $V_2 = \frac{EC}{3 + C}$

$\therefore$ The appropriate graph is (4).

13. 1 For cube of max. volume,

$\sqrt{3}\ell = 2R$

Moment of inertia of cube

$= \frac{M_c \ell^2}{6}$

$M_c = \frac{M}{\frac{4}{3}\pi R^3} \times \ell^3 = \frac{2M}{\sqrt{3}\pi}$

$M_oI = \frac{4MR^2}{9\sqrt{3}\pi}$

14. $\frac{\Delta g}{gg} = \frac{2\Delta T}{T} + \frac{\Delta \ell}{\ell}$

$\Delta \ell = 1 \times 10^{-3}$ m

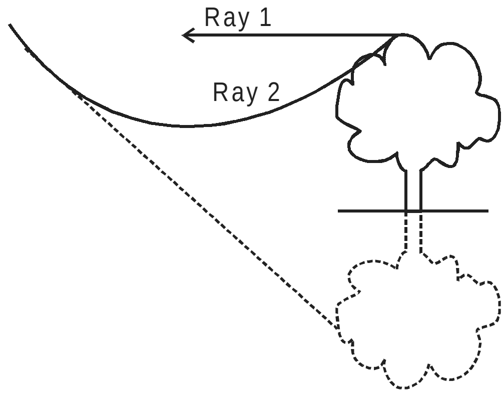
$\ell = 20 \times 10^{-2}$ m

$\Delta T = \frac{1}{100} = 0.01$ s

$T = \frac{90}{100} = 0.9$

$100 \times \frac{\Delta g}{g} = \left(2 \times \frac{0.01}{0.9} + \frac{10^{-3}}{20 \times 10^{-2}}\right) \times 100 = 3\%$

15. 4 The light is moving horizontally the refractive index will not change and it will continue to moving straight line.
For example in Mirage formation,



Light rays which moves horizontally keep on moving horizontally whereas one that goes downward, keep on deviating.

16. 1 Carrier wave frequency = 2000 KHz
Signal frequency = 5 KHz.
Frequency of resultant wave

$= (\nu_1 + \nu_2),\ \nu,\ (\nu_1 - \nu_2)$

$\therefore$ 2005, 2000, 1995 KHz.

17. 4 Entropy like internal energy is a state function. It only depends upon initial and final state & not on the process or path.
$\therefore$ The change in entropy in the two conditions will be same.
Only option is (4).
But actually none of the options are true because temp is given in celsius & Not Kelvin.

$\therefore$ Ans should be $\ell n\left\{\frac{473}{373}\right\}$.

18. 1 $P = \frac{1}{3}\left(\frac{U}{V}\right)$ or $PV = \frac{U}{3}$

But for ideal gas, PV = nRT = VT^4

V = Volume $\therefore V = \frac{4}{3}\pi r^3$

$PV = \frac{4}{3}\pi r^3 T^4 = nRT$

$\therefore rT = \text{const.}$, thus, $\left\{T \propto \frac{1}{r}\right\}$

19. 1 Initially the move with const. velocity relative to each other, & later one of the mass comes to rest while the other is still moving.

$y_1 = 10t - \frac{1}{2}gt^2$

$y_2 = 40t - \frac{1}{2}gt^2$

$y_2 - y_1 = 30t$ when both were moving.
When only 2nd body is moving

$y_2 = 40t - \frac{1}{2}gt^2$

$y_1 = -240$ m

$\therefore y_2 - y_1 = 40t - \frac{1}{2}gt^2 + 240$

Which is a parabolic.

20. 1 Variation of potential in a solid sphere is

$V = V_{sphere}\left\{\frac{3R^2 - r^2}{2R^3}\right\}$ Inside the surface

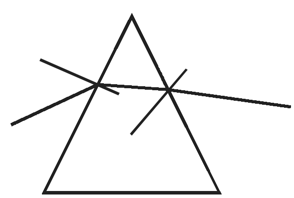
$V = V_{surface} \times \frac{1}{r}$ Outside the surface

Where $V_{surface} = \frac{Q}{4\pi\varepsilon_0}$

at centre, r = 0, $V = \frac{3V_0}{2R}$

Similarly we can find R_2, R_3 & R_4.
Solving we get $R_2 < (R_4 - R_3)$

21.



For light to jjust come out r_2 must be less θ_c.

$$\theta_c = \sin^{-1}\left(\frac{1}{\mu}\right)$$

But $r_1 + r_2 = A$

$$r_1 = A - r_2$$

$$r_2 < \sin^{-1}\left(\frac{1}{\mu}\right)$$

$$r_1 > A - \sin^{-1}\left(\frac{1}{\mu}\right)$$

But $\frac{\sin\theta}{\sin r_1} = \mu$

$$\theta = \sin^{-1}(\mu \sin r_1)$$

$$\therefore \theta > \sin^{-1}\left(\mu\left(\sin\left(A - \sin^{-1}\left(\frac{1}{\mu}\right)\right)\right)\right)$$

22. 1 $\bar{\tau} = \bar{\mu} \times \bar{B}$ $\quad \bar{\mu}$ is along the direction of right hand thumb.

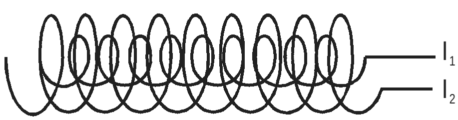
In (b) $\rightarrow \bar{\mu} \parallel \bar{B}$

$\therefore$ Stable.

In (d) $\rightarrow \bar{\mu}$ Antiparallel to $\bar{B}$.

$\therefore$ Unstable.

23. 3



The magnetic field of Inner solenoid is only inside it.

$\therefore$ Exerts no force on solenoid outside.

From Newton's 3rd low, outer solenoid field will also exert No force on solenoid inside.

24. 1 $\overline{P_f} = \overline{P_1} + \overline{P_2}$

$$|P_f| = \sqrt{P_1^2 + P_2^2} = 2\sqrt{2}\,mV = 3mV_f$$

$$\therefore V_f = \frac{2\sqrt{2}}{3}V$$

$$\therefore \frac{\Delta K}{K_i} = \frac{\frac{1}{2}m(2V)^2 + \frac{1}{2}(2m)V^2 - \frac{1}{2}(3m)\left(\frac{2\sqrt{2}}{3}\right)^2 V^2}{\frac{1}{2}m(2V)^2 + \frac{1}{2}(2m)V^2}$$

$= 56\%$

25. 1 $\bar{\tau} = \frac{\lambda}{\bar{\nu}}$ $\quad \lambda$ = mean free path.

$\bar{\nu}$ = Average velocity

$$\lambda = \frac{1}{\sqrt{2}\pi n d^2}$$

n = no. of molecules per unit volume

$$\lambda = \frac{\nu}{\sqrt{2}\pi N d^2}$$

$$\bar{\nu} \propto \sqrt{T}$$

$$\therefore \bar{\tau} \propto \frac{V}{\sqrt{T}}$$

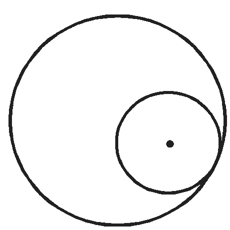
But in adiabatic expansion

$$TV^{\gamma-1} = K$$

$$\tau \propto \frac{V \times V^{\left(\frac{\gamma-1}{2}\right)}}{}$$

$$\tau \propto V^{\frac{r+1}{2}}$$

26. 4



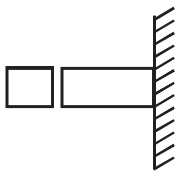
$V_{total} = V + V_{small}$

$\therefore V = V_{total} - V_{small}$

$$V = -\frac{GM}{2R^3}\left(3R^2 - \left(\frac{R}{2}\right)^2\right) + \frac{3GM}{2\times 8\times\left(\frac{R}{2}\right)}$$

Solving, we get $V = \frac{-GM}{R}$.

27. 1



$\therefore f = 120N$

28. 3 Electric line of lence originate from +ve charge & end at –ve charge.
They will be continious & will not form kinks.
$\therefore$ Only option is (3).

29. 3 $K = \frac{1}{2}mV^2$

$U = \frac{-ke^2}{r}$

T = –K

As particle Jumps to ground state

$V\uparrow \quad \therefore KE\uparrow$

$r\downarrow \quad \therefore U\downarrow, T\downarrow$

30. 1 Option (1).

PART B – MATHEMATICS

31. 3 $(\vec{a}\times\vec{b})\times\vec{c} = \frac{1}{3}|\vec{b}||\vec{c}|\vec{a}$

$(\vec{a}.\vec{c})\vec{b} - (\vec{b}.\vec{c})\vec{a} = \frac{1}{3}|\vec{b}||\vec{c}|\vec{a}$

$\vec{a}.\vec{c} = 0$

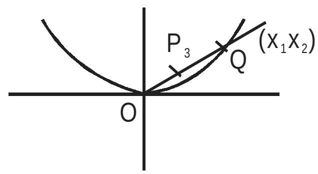
and $\frac{1}{3}|\vec{b}||\vec{c}| = -\vec{b}.\vec{c}$

$= -|\vec{b}||\vec{c}|\cos\theta$

$\cos\theta = -\frac{1}{3}$

$\therefore \sin\theta = \frac{2\sqrt{2}}{3}$

32. 2



Let P(h,k) and (x_1, y_1)

$h = \frac{x_1}{4}$ and $k = \frac{y_1}{4}$

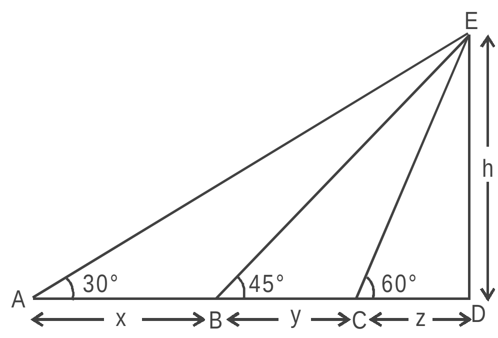
$x_1^2 = 8y_1$

$(4h)^2 = 8(4k)$

$\therefore h^2 = 2k$

$x^2 = 2y$

33. 3



$$\tan 60^\circ = \frac{h}{z}$$

$$z = \frac{h}{\sqrt{3}}$$

$$\tan 45^\circ = \frac{h}{y+z}$$

$$y = h - \frac{h}{\sqrt{3}} = \frac{h}{\sqrt{3}}(\sqrt{3}-1)$$

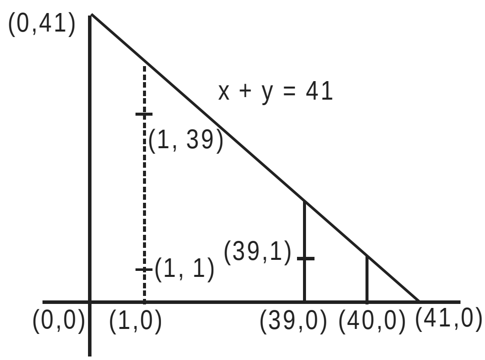
$$\tan 30^\circ = \frac{h}{x+y+z}$$

$$x + h = h\sqrt{3}$$

$$x = h(\sqrt{3}-1)$$

$$\frac{AB}{BC} = \frac{x}{y} = \frac{\sqrt{3}}{1}$$

34. 2



Total points = 1 + 2 + ...39

$$= \frac{39 \times 40}{2} = 780$$

35. 1 2x – 5y + z – 3 + λ(x + y + 4z – 5) = 0

$$(2+\lambda)x + (\lambda-5)y + (4\lambda+1)z - (3+5\lambda) = 0$$

$$\frac{2+\lambda}{1} = \frac{\lambda-5}{3} = \frac{4\lambda+1}{6} = k$$

$$3(\lambda+2) = \lambda - 5$$

$$2\lambda = -11$$

$$\lambda = -\frac{11}{2}$$

$$\therefore x + \frac{\lambda-5}{2+\lambda}y + \frac{4\lambda+1}{2+\lambda}z - \frac{3+5\lambda}{2+\lambda} = 0$$

$$x + 3y + 6z - \frac{3+5(-\frac{11}{2})}{2-\frac{11}{2}} = 0$$

x + 3y + 6z – 7 = 0

36. 3 Total elements in A × B = 2 × 4 = 8

$$8_{C_0} + 8_{C_1} + \ldots\ldots 8_{C_8} = 2^8$$

$$\therefore 8_{C_3} + 8_{C_4} + \ldots\ldots 8_{C_8} = 2^8 - (8_{C_0} + 8_{C_1} + 8_{C_2})$$

= 2^8 – (1 + 8 + 28)
= 256 – 37
= 219

37. 1 2x – 3y + 4 = 0
Point of intersection (1, 2)
x – 2y + 3 = 0

$$\therefore \text{ radius } = \sqrt{(2-1)^2 + (3-2)^2} = \sqrt{2}$$

38. 1

$$\lim_{x\to 0} \frac{(1-\cos 2x)(3+\cos x)}{x \tan 4x}$$

$$= \lim_{x\to 0} \frac{2\sin^2 x(3+\cos x)}{4x^2 \frac{\tan 4x}{4x}}$$

$$= \frac{1}{2} \times 4 = 2$$

39. 2

$$\frac{x-2}{3} = \frac{y+1}{4} = \frac{z-2}{12} = \lambda$$

(3λ + 2, 4λ – 1, 12λ + 2)
3λ + 2 – (4λ – 1) + 12λ + 2 = 16
11λ = 11, λ = 1
$\therefore$ (5, 3 , 14)

$$\therefore \text{ Distance } = \sqrt{(5-1)^2 + 3^2 + (14-2)^2} = 13$$

40. 3

$$(1-2\sqrt{x})^{50} = 50_{C_0} - 2.50_{C_1}\sqrt{x} + 2^2.50_{C_2}x..........)$$

$$3^{50} = 50_{C_0} + 2.50_{C_1} + 2^2.50_{C_2} + ...$$

$$1 = 50_{C_0} - 2.50_{C_1} + 2^2.50_{C_2} + ...$$

$$\frac{3^{50}+1}{2} = 50_{C_0} + 2^2.50_{C_2} + ...+ 2^{50}.50_{C_{50}}$$

41. 4 $t_n = \frac{1^3+2^3+......+n^3}{1+3+5+.....} = \frac{\left[\frac{n(n+1)}{2}\right]^2}{n^2}$

$$= \frac{1}{4}(n+1)^2$$

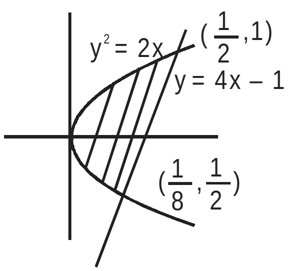
$$t_n = \frac{1}{4}(n+1)^2$$

$$S_9 = \frac{1}{4}(2^2+3^2+.....10^2)^2$$

$$= \frac{1}{4}\left[\frac{10\times 11\times 21}{6} - 1\right]$$

= 96

42. 2



$(4x-1)^2 = 2x$

$16x^2 - 8x + 1 - 2x = 0$

$16x^2 - 10x + 1 = 0$

$16x^2 - 8x - 2x + 1 = 0$

$(8x-1)(2x-1) = 0$

$$x = \frac{1}{2}, \frac{1}{8}$$

at $x = \frac{1}{2}$, $y = 4\times\frac{1}{2} - 1 = 1$

at $x = \frac{1}{8}$, $y = 4\times\frac{1}{8} - 1 = -\frac{1}{2}$

$$\int_{-1/2}^{1}\left(\frac{y+1}{4} - \frac{y^2}{2}\right)dy$$

$$= \left[\frac{y^2}{8} + \frac{y}{4} - \frac{y^3}{6}\right]_{-1/2}^{1} = \frac{9}{32}$$

43. 1

44. 1 $\left|\frac{z_1 - 2z_2}{2 - z_1\overline{z_2}}\right| = 1$

$|z_1 - 2z_2|^2 = |2 - z_1\bar{z}|^2$

$(z_1 - 2z_2)(\overline{z_1} - 2\overline{z_2}) = 2z_1\overline{z_2})(2 - \overline{z_1}z_2)$

$$|z_1|^2 + 4|z_2|^2 - 2z_1\overline{z_2} - 2\overline{z_1}z_2$$

$$= 4 + |z_1|^2|z_2|^2 - 2z_1\overline{z_2} - 2\overline{z_1}z_2$$

$$|z_1|^2 + 4|z_2|^2 = 4 + |z_1|^2|z_2|^2$$

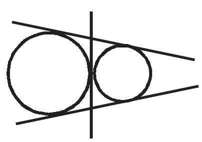
$$|z_1|^2 - 4 - |z_2|^2(|z_1 - 4) = 0$$

$$(|z_1|^2 - 4)(1 - |z_2|^2) = 0$$

$|z_1|^2 - 4 = 0$

$|z_1| = 2$

45. 1



$x^2 + y^2 - 4x - 6y - 12 = 0$

$x^2 + y^2 + 6x + 18y + 26 = 0$

$A(2, 3)$ $r_1 = 8$

B(–3, –9) $r_2 = 8$
AB = $r_1 + r_2$

46. 4 **Case I:** Four digit number
3 × 4 × 3 × 2 = 72

3	4	3	2

6, 7, 8

Case II: Five digit number
$\lfloor 5 = 120$
$\therefore$ Total = 72 + 120 = 192

47. 1 $(x\log x)\frac{dy}{dx} + y = 2x\log x$

$$\frac{dy}{dx} + \frac{y}{x\log x} = 2$$

$$I.F = e^{\int \frac{1}{x\log x dx} = e\log_e(\log x)} = \log_e x$$

$$\therefore y.\log_e x = 2\int \log_e x dx$$

$y\log_e x = 2x\log_e x - 2x + c$
y(e) = 2e – 2e + 2 = 2
at x = 1
c = 2

48. 2

49. 4 2m = l + n
l, G_1, G_2, G_3, n G.P.

$$r = \left(\frac{n}{l}\right)^{\frac{1}{4}}$$

$G_1^4 + 2G_2^4 + G_3^4 = (lr)^4 + 2(lr^2)^4 + (lr^3)^4$
$= nl^3 + 2n^2l^2 + ln^3$
$= nl[l+n]^2$
$= nl(2m)^2$
$= 4lm^2n$

50. 2

51. 2 $\int \frac{dx}{x^5(1+\frac{1}{x^4})^{\frac{3}{4}}}$

Let $1 + \frac{1}{x^4} = t^4$

$$-\frac{4}{x^5}dx = 4t^3dt$$

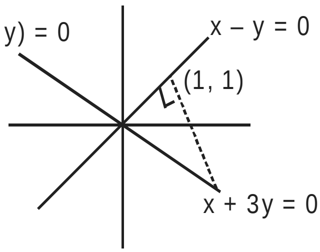
$$= -\int \frac{t^3dt}{t^3}$$

= –t + c

$$= -(1+\frac{1}{x^4})^{\frac{1}{4}} + C$$

$$= -(\frac{x^4+1}{x^4})^{\frac{1}{4}} + C$$

52. 2 (x + 3y)(x – y) = 0



53. 3 $\tan^{-1} = \tan^{-1}x + \tan^{-1}\frac{2x}{1-x^2}$
$= \tan^{-1}x + 2\tan^{-1}x$
$= 3\tan^{-1}x$

$$= \tan^{-1}\frac{3x - x^3}{1-3x^2}$$

54. 3 $g(3^-) = g(3^+)$
2k = 3m + 2
$g'(3^{-1}) = g'(3^+)$

$$\frac{k}{4} = m$$

$k = 4m$
$8m = 3m + 2$

$m = \frac{2}{5}$

$k + m = 4m + m = 5m = 2$

55. 2

56. 1 $I = \int_2^4 \frac{\log x^2}{\log x^2 + \log(6-x)^2} dx =$

$$\int_2^4 \frac{\log(6-x)^2}{\log(6-x)^2 + \log x^2} dx$$

$2I = \int_2^4 dx = 2$

$I = 1$

57. 1 $\frac{a_{10} - 2a_8}{2a_9} = \frac{\alpha^{10}\beta^{10} - 2(\alpha^8\beta^8)}{2(\alpha^9\beta^9)}$

$= \frac{\alpha^8(\alpha^2 - 2) - \beta^8(\beta^8 - 2)}{2(\alpha^9\beta^9)}$

$= \frac{\alpha^8(6\alpha) - \beta^8(6\beta)}{2(\alpha^9 - \beta^9)} = 3$

58. 1 $\lim_{x\to 0} \frac{f(x)}{x^2} = 2$

$f(x) = ax^4 + bx^3 + cx^2$

$\therefore c = 2$

$f'(x) = 4ax^3 + 3bx^2 + 4x$

$f'(1) = f'(2) = 0$

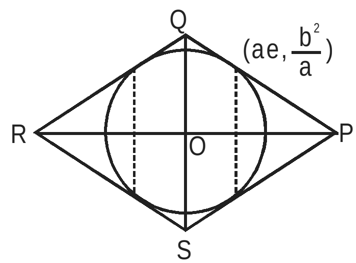
$\therefore 4a + 3b + 4 = 0$
$32a + 12b + 8 = 0$
$8a + 3b + 2 = 0$

$a = +\frac{1}{2}$

$4 + 3b + 2 = 0$
$b = -2$

$f(2) = \frac{1}{2}(2^4) - 2(2^3) + 2.2^2 = 0$

59. 2



Equation of PQ

$\frac{xae}{a^2} + \frac{y\frac{b^2}{a}}{b^2} = 1$

$\frac{x}{\frac{a}{e}} + \frac{y}{a} = 1$

Area of quadrilateral = 4 × Area of ΔOPQ

$= 4 \times \frac{1}{2} \times OP \times OQ$

$= 2\frac{a}{e} \times a$

$= 2\frac{a^2}{e}$

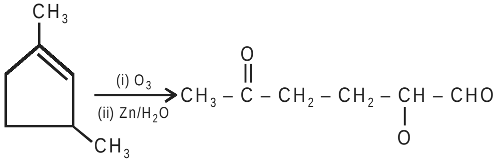
$= 2 \times \frac{9}{\frac{2}{3}} = 27$

$e = \sqrt{1 - \frac{5}{9}} = \frac{2}{3}$

60.

PART C – CHEMISTRY

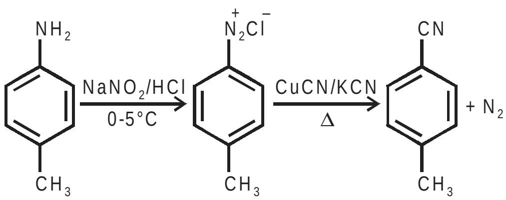
61. 4



62. 3 Vitamin C is water soluble.

63. 4 $BeSO_4$ has low lattice enthalpy than hydration enthalpy hence it is fairly soluble in water.

64. 1



65. 3 In b.c.c. lattice,

$$4r = \sqrt{3}a$$

$$r = \frac{\sqrt{3}}{4}a = \frac{\sqrt{3}}{4} \times 4.29A^\circ = \frac{1.732}{4} \times 4.29A^\circ$$

$$= 1.857A^\circ \approx 1.86A^\circ$$

66. 3 Colour of $Zn_2[Fe(CN)_6]$ is white while all others are of yellow colour.

67. 1 Energy of 2nd excited state of hydrogen is

$$\frac{-13.6}{2^2}$$

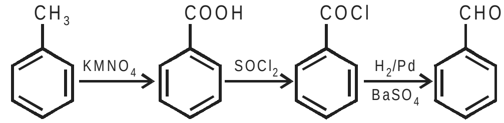
$$= -3.4 \text{ eV/atom}$$

68. 1

69. 1 Ionic radii increases with increase in negative charge.
So correct answer is:
$N^{3-} > 0^{2-} > F^-$

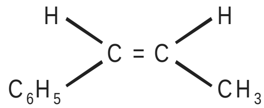
70. 2 Na_3AlF_6 acts as solvent for Aluminium Oxide.

71. 2



72. 3 Higher order (>3) reactions are rare because of low probability of simultaneous collisoin of all the reacting species.

73. 3



shows geometrical isomerism as cis- and trans-forms

74. 4

75. 4

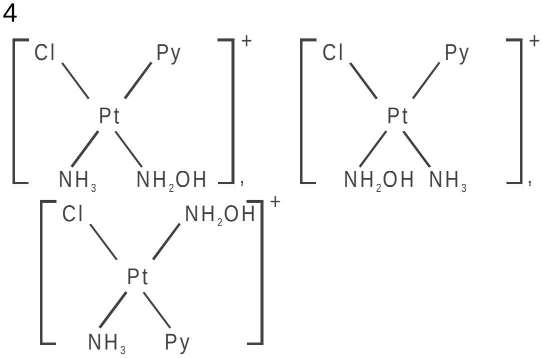
76. 2 $2(C_8H_7SO_3Na) + Ca^{2+} \rightarrow (C_8H_7SO_3)_2Ca + 2Na^+$
2 × 206 g of resin is reacted with = 1 mole of Ca^{+2}

$$1 \ \ldots\ldots\ldots\ldots\ldots\ldots \quad = \frac{1}{2 \times 206}$$

$$= \frac{1}{412} \text{ gm/mole}$$

77. 4 $2e^- + Cu^{2+} \rightarrow Cu$
By passing 2F charge, 1 mole of copper is deposited.

78. 4



79. 3 Percentage of Bromine

$$= \frac{80}{188} \times \frac{\text{Mass of AgBr formed}}{\text{Mass of substance}} \times 100$$

$$= \frac{80}{188} \times \frac{141 \times 10^{-3}}{250 \times 10^{-3}} \times 100 = \frac{4512}{188} = 24\%$$

80. 1 It is probably due to charge transfer from higher orbital of Mn–O to lower Manganese orbital. It is a type of Ligand to Metal charge transfer.

81. 2 Swarts reaction is used for the formation of alkyl flourides.

82. 3 Milliequivalent of CH_3COOH = 50 × 0.06 = 3
Left out m.eq. of CH_3COOH = 50 × 0.042 = 2.1
Adsorbed m.eq. of CH_3COOH = 3 – 2.1 = 0.9
Mass of CH_3COOH (Adsorbed)
= (0.9 × 60) mg. = 54 mg.

Adsorbed Per gram of charcoal = $\frac{54}{3}$

= 18 mg.

83. 4 $\frac{p^\circ - p_s}{p_s} = \frac{n}{N}$

$$\frac{185 - 183}{183} = \frac{\frac{1.2}{m}}{\frac{100}{58}}$$

$$\frac{2}{183} = \frac{1.2}{m} \times \frac{58}{100}$$

m = 63.684

84. 2 Interhalogen compounds are more reactive than halogens itself.

85. 4 $\Delta G^\circ = -2.303 RT \log K$
2494.2 = – 2.303 × 8.314 × 300 logK

$$\log K = -\frac{2494.2}{2.303 \times 8.314 \times 300} = -0.434$$

K = Antilog(–0.434) = 0.368

$$\text{Now } Q = \frac{\frac{1}{2} \times \frac{1}{2}}{\left(\frac{1}{2}\right)^2} = 1$$

As $Q > K$, Reverse reaction takes place.

86. 3 Nitrogen and oxygen react together at high temperature to form oxides of nitrogen but in atmosphere, oxides are not formed.

87. 2 Xe has highest boiling point due to strong forces as compared to other noble gases.

88. 4 Glyptal is used in paints and lacquers.

89. 2 $\Delta G^\circ = -2.303\ RT \log K_p$
$= -RT \ln K_p$

$-RT \ln K_p = [2 \times \Delta G^0_{NO_2}] - [1 \times 0 + 2 \times 86.6 \times 1000]$

$$x = -\frac{R \times 298 \ln K_p}{2} + 86600$$

$$x = 86600 - \frac{R \times 298 \times \ln 1.6 \times 10^{12}}{2}$$

$x = 0.5[2 \times 86600 - R \times 298 \ln 1.6 \times 10^{12}]$

90. 3 H_2O_2 can act as both oxidizing as well as reducing agent.