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ADVANCED PATTERN PART TEST-4 (APT-4)

TARGET : JEE (MAIN+ADVANCED) 2018

DATE : 11-02-2018 **COURSE : VIJAY (07JR)**

HINTS & SOLUTIONS

MATHEMATICS

1. If the lines..............

Sol. The given lines intersect each other if

$$\begin{vmatrix} 2-1 & 3-4 & 4-5 \\ 1 & 1 & \lambda \\ \lambda & 2 & 1 \end{vmatrix} = 0 \Rightarrow \lambda = 0, -1.$$

2. If arg $\left(\frac{z-2i}{z+2i}\right) = \frac{\pi}{6}$ ....

Sol. arg $\left(\frac{z-2i}{z+2i}\right) = \frac{\pi}{6}$

$\Rightarrow$ arg (z – 2i) – arg (z + 2i) = $\frac{\pi}{6}$

$\Rightarrow \tan^{-1}\left(\frac{y-2}{x}\right) - \tan^{-1}\left(\frac{y+2}{x}\right) = \frac{\pi}{6}$

$\Rightarrow \frac{xy-2x-xy-2x}{x^2+y^2-4} = \frac{1}{\sqrt{3}}$

$\Rightarrow x^2 + y^2 - 4 = -4\sqrt{3}\,x$

$\Rightarrow x^2 + y^2 + 4\sqrt{3}\,x - 4 = 0$

$\Rightarrow (x + 2\sqrt{3})^2 + y^2 = 12 + 4 = 4^2$

$\therefore$ centre $(-2\sqrt{3}, 0)$, radius = 4

3. Let ΔPQR be..............

Sol. $\vec{a}+\vec{b}+\vec{c} = 0$

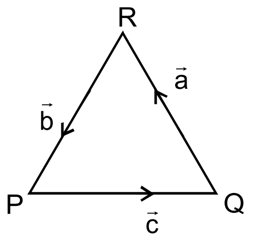
$\Rightarrow \vec{b}+\vec{c} = -\vec{a}$

$\Rightarrow 48 + \vec{c}^2 + 48 = 144$

$\Rightarrow \vec{c}^2 = 48$

$\Rightarrow \left|\vec{c}^2\right| = 4\sqrt{3}$

$\therefore \frac{|\vec{c}|^2}{2} - |\vec{a}| = 24 - 12 = 12$ Ans. (A)



Further

$\vec{a}+\vec{b} = -\vec{c}$

$\Rightarrow 144 + 48 + 2\vec{a}.\vec{b} = 48$

$\Rightarrow \vec{a}.\vec{b} = -72$ Ans. (D)

$\because \vec{a}+\vec{b}+\vec{c} = 0$

$\Rightarrow \vec{a}\times\vec{b}+\vec{a}\times\vec{c} = 0$

$\therefore \left|\vec{a}\times\vec{b}+\vec{c}\times\vec{a}\right| = 2\left|\vec{a}\times\vec{b}\right|$

$= 2.\sqrt{144.48-(72)^2} = 48\sqrt{3}$ Ans.(C)

4. If $x^2 + x + 1 = 0$...................

Sol. $N = \left(x+\frac{1}{x}\right)^2 + \left(x^2+\frac{1}{x^2}\right)^2 + \left(x^3+\frac{1}{x^3}\right)^2 + ... + \left(x^{81}+\frac{1}{x^{81}}\right)^2$

$x^2 + x + 1 = 0$ roots are ω and ω^2

first 3 terms repeated 27 times some value

$$27\left(\left(\omega+\frac{1}{\omega}\right)^2 + \left(\omega^2+\frac{1}{\omega^2}\right)^2 + \left(\omega^3+\frac{1}{\omega^3}\right)^2\right)$$

$$27\left((\omega+\omega^2)^2 + (\omega^2+\omega)^2 + (2)^2\right)$$

$27((-1)^2 + (-1)^2 + (2)^2) = 162$

N = 162

$N = 2.3^4$

Divisors = (1 + 1)(4 + 1) = 10

Prime factors are 2 and 3 so total = 2

Highest prime factor = 3

5. If $\vec{a} = \hat{i}+\hat{j}+\hat{k}$, ...

Sol. We have $\left(\vec{a}\times\vec{b}\right)\times\vec{a} = \left(\vec{a}.\vec{a}\right)\vec{b} - \left(\vec{b}.\vec{a}\right)\vec{a} = |\vec{a}|^2\,\vec{b} - 2\vec{a}$

$\therefore \vec{b} = \frac{\left(\vec{a}\times\vec{b}\right)\times\vec{a} + 2\vec{a}}{|\vec{a}|^2}$

Now, $\left(\vec{a}\times\vec{b}\right)\times\vec{a} = 4\hat{i} - 5\hat{j} + \hat{k}$ andऔर $|\vec{a}| = 3$.

$\therefore \vec{b} = \frac{\left(4\hat{i}-5\hat{j}+\hat{k}\right) + 2\left(\hat{i}+\hat{j}+\hat{k}\right)}{3} = 2\hat{i} - \hat{j} + \hat{k}$.

6. Projection of $\vec{a} = \hat{i}+\hat{j}+\hat{k}$, ...

Sol. $\frac{x+1}{2} = \frac{y+1}{-1} = \frac{z+3}{4} = r$

any point (2r – 1, –r – 1, 4r – 3)

lie on plane x + 2y + z = 6

2r – 1 – 2r – 2 + 4r – 3 = 6

4r = 12

A(5, –4, 9)

at r = 0 point is (–1, –1, –3)

and foot of perpendicular on plane is

$$\frac{x+1}{1} = \frac{y+1}{2} = \frac{z+3}{1} = \frac{-(-1-2-3-6)}{1+4+1}$$

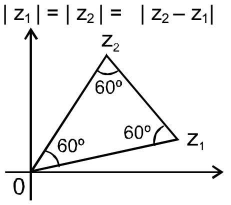
$= \frac{12}{6} = 2$

x = 1, y = 3, z = –1

$\frac{x-1}{4} = \frac{y-3}{-7} = \frac{z+1}{10}$

7. If the vertices of.............

Sol. $|z_1| = |z_2| = |z_2 - z_1|$



arg $\frac{z_1}{z_2} = \frac{\pi}{3}$ ⇒ $|\arg(z_1) - \arg(z_2)| = \frac{\pi}{3}$

8. Let $\vec{\alpha} = a\hat{i} + b\hat{j} + c\hat{k}$, ...

Sol. Given vectors are coplanar $\Rightarrow \begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix} = 0$

$\Rightarrow a^3 + b^3 + c^3 - 3abc = 0$

$\Rightarrow (a+b+c)\left[(a-b)^2 + (b-c)^2 + (c-a)^2\right] = 0$

$\Rightarrow a + b + c = 0$

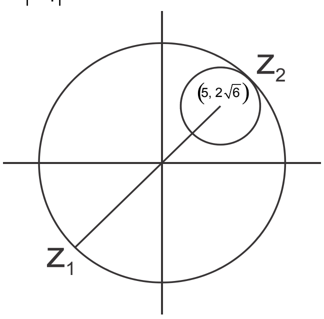
as $a \neq b$ and

$\Rightarrow \vec{v}.\left(a\hat{i} + b\hat{j} + c\hat{k}\right) = \vec{v}\left(b\hat{i} + c\hat{j} + a\hat{k}\right)$

$= \vec{v}.\left(c\hat{i} + a\hat{j} + b\hat{k}\right) = 0$

9. If $|Z_1| = 12$ and.............

Sol.



10. If $\sqrt{5-12i}$ + ...

Sol. $\sqrt{5-12i} = \sqrt{(3-2i)^2} = \pm(3-2i)$

$\sqrt{-5-12i} = \sqrt{(2-3i)^2} = \pm(2-3i)$

$Z = -1-i, -5+5i, 5-5i, 1+i$

11. If $\vec{x} + \vec{y} = \vec{a}$, ...

Sol. $\vec{x} \times \vec{y} = \vec{b}$

$\vec{x} \times (\vec{a} - \vec{x}) = \vec{b}$

$\vec{x} \times \vec{a} = \vec{b}$

$\left(\vec{x} \times \vec{a}\right) \times \vec{a} = \vec{b} \times \vec{a}$

$\left(\vec{x}.\vec{a}\right)\vec{a} - \left(\vec{a}.\vec{a}\right)\vec{x} = \vec{b} \times \vec{a}$

$\vec{x} = \frac{\vec{a} + \vec{a} \times \vec{b}}{\vec{a}^2}$

$\therefore \vec{y} = \vec{a} - \vec{x} = \vec{a} - \frac{\vec{a} \times \vec{b} + \vec{a}}{\vec{a}^2}$

12. Let $\vec{a}$, $\vec{c}$ be.............

Sol. $\vec{a}.\vec{c} = |\vec{a}||\vec{c}| \cos\left(\cos^{-1}\frac{1}{4}\right)$

$\Rightarrow \vec{a}.\vec{c} = \frac{1}{4}$ ....(i)

taking dot product by $\vec{a}$, $\vec{b}$, $\vec{c}$

we have $\vec{a}.\vec{b} - 2(\vec{a}.\vec{c}) = k(\vec{a}.\vec{a})$

$\Rightarrow \vec{a}.\vec{b} - \frac{1}{2} = k \Rightarrow \vec{a}.\vec{b} = k + \frac{1}{2}$ ....(ii)

Similarly $\vec{b}.\vec{c} = 8 - \frac{k^2}{2} - \frac{k}{4}$ ....(iii)

and $\vec{b}.\vec{c} - 2 = k(\vec{a}.\vec{c})$ ....(iv)

from (ii), (iii) and (iv) we get

$8 - \frac{k^2}{2} - \frac{k}{4} - 2 = k\left(\frac{1}{4}\right) \Rightarrow k = 3, -4$

13. The equation.............

Sol. $\left(x - \frac{1}{26}\right)^2 + \left(y - \frac{3}{26}\right)^2 = \frac{k}{4}\left(\frac{5x - 12y + 1}{13}\right)^2$

14. Given α, β.............

Sol. $\alpha^4 + \alpha^3 + \alpha^2 + \alpha + 1 = 0$ and $\beta^3 + \beta^2 + \beta + 1 = 0$

$\left(1 + \alpha + \alpha^2 + \alpha^3\right)\left(1 + \alpha^4\right)\left(1 + \beta + \beta^2 + \beta^3\right)\left(1 + \beta^4\right) = 0$

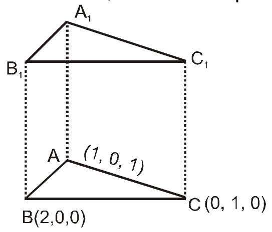
15. The volume of.............

Sol. Volume of prism = Area of base ABC × height or $3 = \frac{\sqrt{6}}{2} \times h$

$\Rightarrow h = \sqrt{6}$

Required point A_1 should be just above point A

i.e. line AA_1 is normal to plane ABC and $AA_1 = \sqrt{6}$



16. Let $\vec{a} = 2\hat{i} - \hat{j} + \hat{k}$ ....

Sol. Let the required vector be d = xi + yj + zk. For this to be coplanar with b and c. We must have

$$\begin{vmatrix} x & y & z \\ 1 & 2 & -1 \\ 1 & 1 & -2 \end{vmatrix} = 0$$

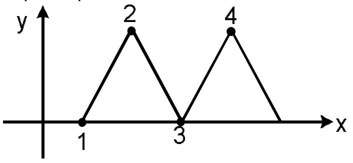
$$\Rightarrow x(-4+1) + y(-1+2) + z(1-2) = 0$$

$$\Rightarrow -3x + y - z = 0$$

The projection of d on a is $\frac{|a.d|}{|a|}$.So

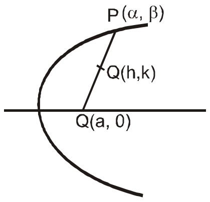
17. If |Z – 3| = min..............

Sol.



18. The locus of the..............

Sol.



h = $\frac{a+\alpha}{2}$, k = $\frac{\beta}{2}$ $\Rightarrow$ α = 2h – a, β = 2k

α, β satisfies the parabola

$\therefore$ $\beta^2 = 4a\alpha$ $\Rightarrow$ $4k^2 = 4a(2h - a)$

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

19. The vector ....

Sol. Given vector will be collinear and $\vec{a} = k\vec{b}$

$$x\hat{i} - 2\hat{j} + 5\hat{k} = k\left(\hat{i} + y\hat{j} - z\hat{k}\right)$$

$$(x-k)\hat{i}(-2-ky)\hat{j} + (5+kz)\hat{k} = 0$$

$$x = k \; y = \frac{-2}{k}$$

$$z = -\frac{5}{k}$$

20. Let C denote the..............

Sol. A $\cap$ B is the set of complex numbers represented by the shaded region in the figure where QC | | OX and CP makes an angle of $\frac{\pi}{3}$ with the positive x-axis

21. The unit vector..............

Sol. Direction ratio of L_1 are 3, 1, 2 and of L_2 are 1, 2, 3

Vector perpendicular to L_1 and L_2 is $\begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 3 & 1 & 2 \\ 1 & 2 & 3 \end{vmatrix}$

$= -\hat{i} - 7\hat{j} + 5\hat{k}$ unit vector is $\frac{-\hat{i} - 7\hat{j} + 5\hat{k}}{5\sqrt{3}}$

Hence 'B' is correct

22. The shortest..............

Sol. Shortest distance between L_1 and L_2 is

$\frac{|(\vec{b} - \vec{a}) \;.\; \vec{p} \times \vec{q}|}{|\vec{p} \times \vec{q}|}$, Now $\vec{p} \times \vec{q} = -\hat{i} - 7\hat{j} + 5\hat{k}$

and $\vec{b} - \vec{a} = 3\hat{i} + 4\hat{k}$

Hence $\left|\frac{-3+20}{5\sqrt{3}}\right| = \frac{17}{5\sqrt{3}}$.

Hence (D) is correct

23. Value of 2m is..............

24. Value of x and..............

Sol. (23 to 24)

Z = x + iy

$$z\bar{z} + (z-3)(\bar{z}-3) + (z-6i)(\bar{z}+6i)$$

$$= 3z\bar{z} - 3(z+\bar{z}) + 9 + 6(z-\bar{z})i + 36$$

$$= 3(x^2 + y^2) - 6x - 12y + 45$$

$$= 3\left[(x-1)^2 + (y-2)^2 + 10\right] \Rightarrow m = 30$$

25. Co-ordinates..............

Sol. Let $Q(x_2, y_2, z_2)$ be image of A(2, 1, 6) about mirror x + y – 2z = 3 then

$$\frac{x_2 - 2}{1} = \frac{y_2 - 1}{1} = \frac{z_2 - 6}{-2}$$

$$= \frac{-2(2+1-12-3)}{1^2 + 1^2 + 2^2} = 4$$

$$\Rightarrow (x_2, y_2, z_2) = (6, 5, -2)$$

26. If L_1 = 0 is the..............

Sol. Equation of reflected ray $L_1 = 0$ is , line joining $Q(x_2, y_2, z_2)$ and B(-10, -15, -14)

i.e. $\frac{x+10}{16} = \frac{y+15}{20} = \frac{z+14}{12}$

$$\Rightarrow \frac{x+10}{4} = \frac{y+15}{5} = \frac{z+14}{3}$$

(B is intersection point of L = 0 and plane)

27. $\vec{c}$ is ....

28. Volume of..............

Sol. (27 to 28)

$$(\vec{a} \times \vec{b}) \times \vec{c} = \vec{a} \times (\vec{b} \times \vec{c})$$

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

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

$$\therefore\; \vec{a} \parallel \vec{c}$$

$$\therefore\; \vec{c} = 2\vec{a} \qquad \left(\because |\vec{c}| = 6\right)$$

$$\therefore\; \left[\vec{a}\;\vec{b}\;\vec{c}\right] = 0$$

$$\&\left[\vec{a}\ \vec{b}\ \ \vec{b}\times\vec{c}\right]=\left(\vec{a}\times\vec{b}\right).\left(\vec{b}\times\vec{c}\right)=-2\left(\vec{a}\times\vec{b}\right)^2$$

$$\left(\vec{a}\times\vec{b}\right)^2=\left|\vec{a}\right|^2\left|\vec{b}\right|^2-\left(\vec{a}.\vec{b}\right)^2 \ =9\times14-4=122$$

$$\therefore\left[\vec{a}\ \vec{b}\ \ \vec{b}\times\vec{c}\right]=-244$$

29. The possible..............

30. The given circle..............

Sol. (29 to 30)

Centre of circle = (1, 2)

radius of circle = $\sqrt{5+13}$ = $3\sqrt{2}$

line (x + iy) (1 – i) + (x – iy) (1 + i) – 24 = 0

x + y – ix + iy + x + y + ix – iy – 2k = 0

2x + 2y – 24 = 0

x + y – k = 0

line is secant if $\left|\dfrac{1+2-k}{\sqrt{2}}\right| < 3\sqrt{2}$

|3 – k| < 6

– 6 ≤ k – 3 < 6

– 3 < 4 < 9

⇒ a = – 3, b = 9

a + b = 6

31. Area of the..............

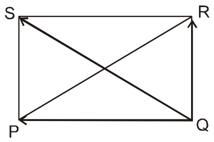
32. The volume of..............

Sol. (31 to 32)

$$\overrightarrow{PR}=\overrightarrow{PQ}+\overrightarrow{PS}$$

$$\overrightarrow{SQ}=\overrightarrow{PQ}-\overrightarrow{PS}$$

$$\overrightarrow{PS}=\frac{\overrightarrow{PR}-\overrightarrow{SQ}}{2}$$



V = $\left|\ \left[\overrightarrow{PQ}\quad \overrightarrow{PS}\quad \overrightarrow{PT}\right]\ \right|$

V = $\dfrac{1}{4}\ \left|\ \left[\overrightarrow{PR}+\overrightarrow{SQ}\ ,\ \ \overrightarrow{PR}-\overrightarrow{SQ}\ ,\ \ \overrightarrow{PT}\right]\ \right|$

V = $\dfrac{1}{2}\ \left|\ \left[\overrightarrow{PR}\ ,\ \ \overrightarrow{SQ}\ ,\ \ \overrightarrow{PT}\right]\ \right|$

$$\frac{1}{2}\begin{vmatrix}3 & 1 & -2\\ 1 & -3 & -4\\ 1 & 2 & 3\end{vmatrix}$$

$\dfrac{1}{2}$ (– 3 – 7 – 10) = 10

33. Orthocentre of..............

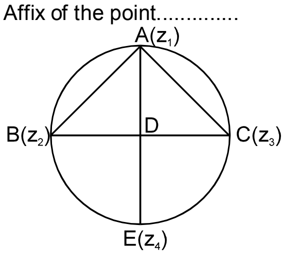
Sol. Circumcentre is (origin) O

Since orthocentre divides the segments joining circumcentre and the centroid in the ratio 3 : 2 externally.

∴ affix of orthocentre is $z_1 + z_2 + z_3$.

34. Affix of the point..............

Sol.



Let affix of E be z_4

$|z_1| = |z_2| = |z_3| = |z_4| = 1$

arg $\left(\dfrac{z_1-z_4}{z_2-z_3}\right) = \pm\ \dfrac{\pi}{2} \Rightarrow \dfrac{z_1-z_4}{z_2-z_3} + \left(\dfrac{\bar{z}_1-\bar{z}_4}{\bar{z}_2-\bar{z}_3}\right) = 0$

$$\Rightarrow \frac{z_1-z_4}{z_2-z_3} + \left(\frac{\frac{1}{z_1}-\frac{1}{z_4}}{\frac{1}{z_2}-\frac{1}{z_3}}\right) = 0$$

$$\Rightarrow \frac{z_1-z_4}{z_2-z_3}\left(1+\frac{z_2z_3}{z_1z_4}\right) = 0 \Rightarrow z_4 = -\frac{z_2z_3}{z_1}$$

35. Which of the..............

36. $(2 - z_1)(2 - z_2)$ ....

Sol. (35 to 36)

$(z - 1)(z^6 + z^5 + z^4 + z^3 + z^2 + z + 1) = 0$

$z^7 - 1 = 0 \Rightarrow z = (1)^{1/7}$

Its roots are 1, z_1, z_2, z_3, z_4, z_5, z_6

$1 + z_1^5 + z_2^5 + z_3^5 + ... + z_6^5 = 0$

$\therefore\ z_1^5 + z_2^5 + z_3^5 + ... + z_6^5 = -1$

$$\sum_{i=1}^{6} z_i^5 = -1\ ,\ \prod_{i=1}^{5} z_i = 1$$

$$\therefore\ \sum z_i^5 + \prod z_i = 0$$

$z^7 - 1 = (z - z_1)(z - z_2)(z - z_3)(z - z_4)(z - z_4)(z - z_5)(z - z_6)$

putting z = 2 we get

$(2 - z_1)(2 - z_2)(2 - z_3)(2 - z_4)(2 - z_4)(2 - z_5)(2 - z_6)$

$= 2^7 - 1 = 127$

37. The value of..............

38. The value of θ..............

Sol. (37 to 38)

$$z=\frac{1-i\sin\theta}{1+i\cos\theta}=\frac{(1-i\sin\theta)(1-i\cos\theta)}{(1+i\cos\theta)(1-i\cos\theta)}$$

$$=\frac{1-\sin\theta\cos\theta-i(\cos\theta+\sin\theta)}{1+\cos^2\theta}$$

37. If z is purely imaginary $1-\sin\theta\cos\theta=0$

or $\sin\theta\ \cos\theta = 1$ which is not possible

38. $\text{alg}(z)=\dfrac{\pi}{4}$

39. $[\vec{a}+\vec{b}\ \ \vec{b}+\vec{c}\ \ \vec{c}+\vec{a}]$ ....

40. $[\vec{a}\times\vec{b}\ \ \vec{b}\times\vec{c}\ \ \vec{c}\times\vec{a}]$ ....

Sol. (39 to 40)

$$\vec{a} = \frac{(\hat{u}+\hat{v})}{2|\cos\frac{\alpha}{2}|},\ \vec{b} = \frac{(\hat{v}+\hat{w})}{2|\cos\frac{\beta}{2}|},\ \vec{c} = \frac{(\hat{w}+\hat{u})}{2|\cos\frac{\gamma}{2}|}$$

39. $[\vec{a}+\vec{b}\ \ \vec{b}+\vec{c}\ \ \vec{c}+\vec{a}] = 2[\vec{a}\ \vec{b}\ \vec{c}]$

$$= 2\left[\frac{(\hat{u}+\hat{v})}{2|\cos(\alpha/2)|}\frac{(\hat{v}+\hat{w})}{2|\cos(\beta/2)|}\frac{(\hat{w}+\hat{u})}{2|\cos(\gamma/2)|}\right]$$

$$= 2\left[\frac{2[\hat{u}\ \hat{v}\ \hat{w}]}{8|\cos(\alpha/2)\cos(\beta/2)\cos(\gamma/2)|}\right]$$

$$= \frac{1}{2}[\hat{u}\ \hat{v}\ \hat{w}]\left|\sec\frac{\alpha}{2}\sec\frac{\beta}{2}\sec\frac{\gamma}{2}\right|$$

40. $\therefore\ [\vec{a}\times\vec{b}\ \ \vec{b}\times\vec{c}\ \ \vec{c}\times\vec{a}] = [\vec{a}\ \vec{b}\ \vec{c}]^2$

$$= \left[\frac{((\hat{u}+\hat{v})\times(\hat{v}+\hat{w}))\cdot(\hat{w}+\hat{u})}{8|\cos\frac{\alpha}{2}\cos\frac{\beta}{2}\cos\frac{\gamma}{2}|}\right]^2$$

$$= \left[\frac{2[\hat{u}\ \hat{v}\ \hat{w}]}{8|\cos\frac{\alpha}{2}\cos\frac{\beta}{2}\cos\frac{\gamma}{2}|}\right]^2$$

$$= \frac{[\hat{u}\ \hat{v}\ \hat{w}]^2}{16}\sec^2(\alpha/2).\sec^2(\beta/2).\sec^2(\gamma/2)$$

PHYSICS

1. Photons of energy 5 eV.......................

Sol. $KE_{max} = (5 - \phi)$ eV

when these electrons are accelerated through 5V, they will reach the anode with maximum energy $= (5 - \phi + 5)$eV

$\therefore\ 10 - \phi = 8$

$\boldsymbol{\phi = 2}$**eV Ans.**

Current is less than saturation current because if slowest electron also reached the plate it would have 5eV energy at the anode, but there it is given that the minimum energy is 6eV.

2. An electron makes a transition.......................

Sol. Magnetic field at centre (site of nucleus)

$$B = \frac{\mu_0 I}{2r} = \frac{\mu_0 qf}{2r} = \frac{\mu_0 qv}{2r \times 2\pi r}$$

$\Rightarrow B \alpha \frac{1}{r^2}$ and $B \alpha v$

$\therefore\ B\ \alpha\ \frac{1}{n^5}$

$\frac{B_1}{B_2} = \frac{(2)^5}{(1)^5}$ (Since, $n_1 = 1$ to $n_2 = 2$)

$\therefore\ B_1 = 32\ B_2$

Also, $mvr = n.\frac{h}{2\pi}$, therefore angular momentum is changed by $\frac{h}{2\pi}$.

3. X-ray from a tube with a target.......................

Sol. $\frac{\lambda_0}{\lambda_1} = 4 \Rightarrow \frac{(Z_1-1)^2}{(Z-1)^2} = 4 \Rightarrow Z_1 = 2Z - 1$

$\frac{\lambda_0}{\lambda_2} = \frac{1}{4} \Rightarrow \frac{(Z_2-1)^2}{(Z-1)^2} = \frac{1}{4} \Rightarrow Z_2 = \frac{Z+1}{2}$.

4. A string is holding a solid block.......................

Sol. Let σ is density of liquid & ρ is density at object

$B_i = \sigma vg$ $\quad B_f = \sigma v(g + a) = B_i\left(\frac{g+a}{a}\right)$

$T_i = (\sigma - \rho)vg$

$T_f = (\sigma - \rho)\ v\ (g + a) = T_i\left(\frac{g+a}{a}\right)$

5. Two radioactive materials A & B.......................

Sol. When no. of nuclei or equal $4N_0\ e^{-3\lambda t} = 2N_0 e^{-2\lambda t}$

$\Rightarrow\ t = \frac{\ell n2}{\lambda}$

when decay rate equal

$3\lambda\ 4N_0e^{-3lt} = 2\lambda\ 2N_0e^{-2\lambda t}$

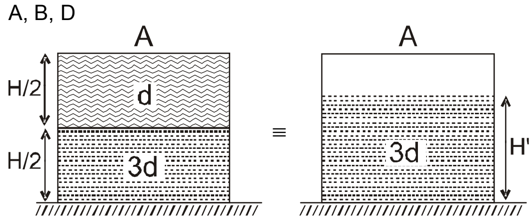
$t = \frac{\ell n3}{\lambda}$

at $t = \frac{\ell n4}{\lambda}$ decay rate of A $= (3\lambda)\ (4N_0)\ e^{-3\lambda\frac{\ell n4}{\lambda}}$

at $t = \frac{\ell n4}{\lambda}$ decay rate of B $= 2\lambda\ 4N_0\ e^{-2\lambda\frac{\ell n4}{\lambda}}$

6. A container of large uniform cross.......................

Sol. A, B, D



$\frac{H}{2}\times d + \frac{H}{2}\times 3d = H'\times 3d$

$\Rightarrow H' = \frac{2H}{3}$

$V_{efflux} = \sqrt{2g(H'-h)}$

V_{efflux} is maximum when $h = H'/2$

$\therefore\ V_{max} = \sqrt{\frac{2gH}{3}}$

Range $R = V_{efflux} \times \sqrt{\frac{2(H'-h)}{g}}$

$R_{max} = \frac{2H}{3}$

7. In a radioactive decay.......................

Sol. $N_A\ 2\lambda = N_B\ 9\lambda$

$\Rightarrow N_A = 4.5\ N_B$

8. A fusion reaction consists of.......................

Sol. Mass defect $\Delta m = 4m_H - m_{He}$

$= 4(1.007825) - 4.002603 = 0.028697$ u $= 0.028697$ u $\times 932 \dfrac{\text{MeV}}{\text{u}} = 26.7$ MeV

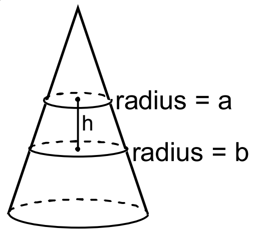
9. In an α decay the parent........................

Sol. $X_z^{200} = y_{z-2}^{200-4} + He_2^4$

10. An elastic ring of mass....................

Sol. (A) initial acceleration of any point on circumference of ring is g cos θ

(B*) initial acceleration of centre of ring is g $\sin\theta \cos\theta$

(C) 

$\tan\theta = \dfrac{b-a}{h}$

$h = (b - a) \cot\theta$

$mg (b - a) \cot\theta = \dfrac{1}{2} k(2\pi b - 2\pi a)^2$

$mg (b - a) \cot\theta = \dfrac{1}{2} 4\pi^2 k(b - a)^2$

$b - a = \dfrac{mg \cot\theta}{2\pi^2 k}$

(D) at the moment maximum vertical displacement acceleration of centre of ring is upward.

11. In Young double slit........................

Sol. $2I_0 = I_0 + I_0 + 2I_0 \cos\phi \quad \Rightarrow \quad \cos\phi = 0$

$\phi = \dfrac{\pi}{2}, 2\pi - \dfrac{\pi}{2}, 2\pi + \dfrac{\pi}{2}, 4\pi - \dfrac{\pi}{2}$ ......

$\Delta X = \dfrac{\lambda}{4}, \dfrac{3\lambda}{4}, \dfrac{5\lambda}{4}, \dfrac{7\lambda}{4}$ ......

$\Rightarrow \quad y = \dfrac{\lambda D}{4d}, \dfrac{3\lambda D}{4d}, \dfrac{5\lambda D}{4d}, \dfrac{7\lambda D}{4d}$ ......

$= \quad 2.5 \times 10^{-4}$ m, 7.5×10^{-4}, 12.5×10^{-4}

12. Two slits emit equal to intensity ....

Sol. $I_{max} = \left(\sqrt{I_1} + \sqrt{I_2}\right)^2$

$I_{min.} = \left(\sqrt{I_1} - \sqrt{I_2}\right)^2$

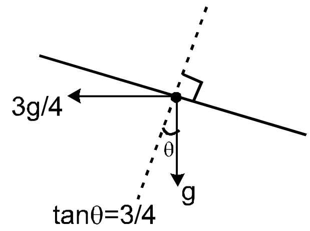
$\beta = \dfrac{\lambda D}{d}$

13. A container is filled with a liquid........................

Sol. for point A from top surface $P_A = \rho g.\ell_1$ and from right wall

$P_A = \dfrac{\rho 3g}{4}.\ell_2$

$\ell_1 = \dfrac{3}{4}\ell_2$ and



14. Ideal liquid of density ρ is........................

Sol. $h_0 = \dfrac{h}{2}$

$y = \dfrac{\omega^2 R^2}{2g} \Rightarrow \dfrac{h}{2} = \dfrac{\omega^2 R^2}{2g}$

$\omega = \sqrt{\dfrac{gh}{R^2}}$

$\dfrac{dp}{dx} = \rho\omega^2 x$

$\dfrac{dp}{dy} = -\rho g$

17. The wavelength of K_α X-rays........................

Sol. $\lambda_{K_2} = \dfrac{4}{3R(Z-1)^2}$

$\lambda_1 = \lambda_2 = \lambda_3$

18. Consider an atom made up of a protons........................

Sol. Rydberg $\propto$ mass of electron.

$\dfrac{1}{\lambda} = 3R\left[\dfrac{1}{n_2} - \dfrac{1}{3^2}\right]$ n = 1, 2

$\dfrac{1}{\lambda} = 3R\left[\dfrac{1}{(1)} - \dfrac{1}{9}\right]$

$\dfrac{1}{\lambda_2} = 3R\left[\dfrac{1}{(2)^2} - \dfrac{1}{9}\right]$

$\dfrac{1}{\lambda_3} = 3R\left[\dfrac{1}{(1)^2} - \dfrac{1}{(2)^2}\right]$

19. The electron in hydrogen atom........................

Sol. Time period $T_n = \dfrac{2\pi r_n}{V_n}$

$T \propto \dfrac{n^2}{1/n}$ i.e., $T \propto n^3$

$n_1 = 2n_2$

Hence, $n_1 = 2n_2$

Choice (b) and (c) are wrong.

20. In young's double slit experiment........................

Sol. $I \propto E^2$

21. Choose the correct........................

Sol. Using equation of continuity $A_1v_1 = A_2v_2$

$(12 \text{ cm}^2)v_A = (6 \text{ cm}^2)$ (8.0 m/s)

$v_A = 4.0$ m/s

22. Choose the correct ....

Sol. Applying Bernoulli's principle between point A and C that are at same horizontal level

$$\frac{1}{2}\rho.V_A^{\ 2} + p_A = \frac{1}{2}\rho.V_C^{\ 2} + p_{atm}$$

$\Rightarrow$ $p_A = (1.01 \times 10^5 \text{ N/m}^2) + \frac{1}{2} \times 13{,}600\ (8^2 - 4^2)$

$= 4.27 \times 10^5 \text{ N/m}^2$

23. The incorrect statement........................

Sol (A) $3^{Li^7} \rightarrow {}_2He^4 + {}_1H^3$

$\Delta m = [M_{Li} - M_{He} - M_{H^3}]$

= [6.01513 – 4.002603 – 3.016050]

= – 1.003523u

Δm is negative so reaction is not possible.

(B) $84^{Po^{210}} \rightarrow 83^{Bi^{209}} + 1^{P^1}$

Δm is negative so reaction is not possible.

(C) $1^{H^2} + 2^{He^4} \rightarrow 3^{Li^6}$

Δm is Positive so reaction is possible.

(D) $30^{Zn^{70}} + 34^{Se^{82}} \rightarrow 64^{Gd^{152}}$

Δm is Neagative so reaction is not possible.

24. The kinetic energy..............................

Sol $84^{Po^{210}} \rightarrow 2^{He^4} + 82^{Pb^{206}}$

$\Delta m = [\,M_{PO} - M_{He} - M_{Pb}] = 0.008421$ u

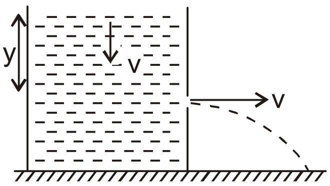
Q = 0.008421×932 MeV = 5422 KeV

$$K_\alpha = \frac{206}{210} \times 5422 \text{ KeV}$$

= 5320 KeV

26. The duration of time........................

Sol. The initial velocity of water coming out of hole is horizontal and hole is at a height $\frac{h}{4}$ from ground. Hence time taken by water to reach ground is $t = \sqrt{\frac{2(h/4)}{g}}$ which remains constant.



$\therefore$ x = vt where v is velocity of effux....

Since v decreases wth time x will decrease.

Let y be the height of water surface above hole

$$\therefore -\frac{dy}{dt} = \frac{av}{A} = \frac{a\sqrt{2gy}}{A}$$

$$\therefore \int_{3h/4}^{0} \frac{dy}{\sqrt{2gy}} = \int_0^t -\frac{a}{A}dt \qquad \therefore t = \frac{A}{a}\sqrt{\frac{3h}{2g}}$$

28. The ratio of active nuclei........................

Sol. **(27 to 28)**

$X \longrightarrow Y \longrightarrow Z$

$$A_0 = \lambda_X N_X(0) = \lambda_Y N_Y(0)$$

where $\lambda_X = \frac{\ell n 2}{2},\ \lambda_Y = \frac{\ell n 2}{1}$

Putting these values in the given equation for N_Y, we get, (at t = 0)

$$C_1 = -\frac{A_0}{2}.$$

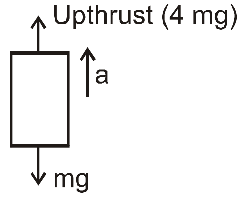
From equation (i)

$$N_Y = \frac{1}{\lambda_Y - \lambda_X}\left[A_0 e^{-\lambda_X t} - \frac{A_0}{2}e^{-\lambda_Y t}\right].$$

$$\frac{N_Y(t=4)}{N_Y(t=0)} = \frac{\frac{A_0}{\ell n 2}\left[\frac{2}{4} - \frac{1}{16}\right]}{\frac{A_0}{\ell n 2}[2-1]}.$$

29. The acceleration of........................

Sol.



30. Choose the.......................

Sol. The density of liquid is four times that of cylinder, hence in equlibrium postion one fourth of the cylinder is submerged.

So as the cylinder is released from initial postion, it moves by $\frac{3\ell}{4}$ to reach its equlibrium position. The upward motion in this time is SHM. Therefore required velocity is $v_{max} = \omega A$. $\omega = \sqrt{\frac{4g}{\ell}}$ and $A = \frac{3\ell}{4}$. Therefore $v_{max} = \frac{3}{2}\sqrt{g\ell}$

The required time is one fourth of time period of SHM. Therefore

$t = \frac{\pi}{2\omega} = \frac{\pi}{4}\sqrt{\frac{\ell}{g}}$

31. Chose the.......................

Sol. $\beta = \frac{\lambda D}{n_2 d} = \frac{3000 \times 10^{-10} \times 1 \times 2}{3 \times 1 \times 10^{-3}}$

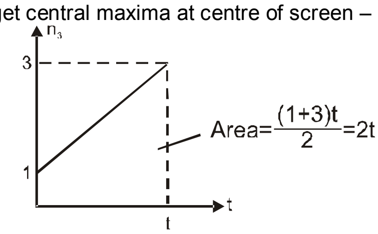
$= 2 \times 10^{-4}$ m = 0.2 mm.

Path difference,

$$\Delta x = n_1\, SS_2 + n_2 S_2 P - \left[(n_1 SS_1 + n_2 S_1 P) - \int_0^t (n_3 - n_2)dx\right]$$

$$= n_1\,(SS_2 - SS_1) + n_2(S_2P - S_1P) - \int_0^t n_3 dx + n_2 t$$

In order to get central maxima at centre of screen –



$$O = \frac{2\times(1\times10^{-3})^2}{2\times1} + 0 - 2t + \frac{3t}{2}$$

0.5 t = 1 μm.

t = 2 μm.

32. If thickness of the slab is........................

Sol. From previous equation :

$$0 = 1\ \mu m + \frac{3yd}{2D} - 0.5\ t$$

$$\frac{3}{2}\frac{yd}{D} = -0.5\ \mu m$$

$$y = -\left(\frac{10^{-6}}{3}\right)\left(\frac{1m}{1\times10^{-3}}\right)$$

$$= \frac{10^{-3}}{3} = \frac{-1}{3}\ \text{mm, below centre.}$$

33. Choose the........................

Sol. Total energy released from $Au^{198} \rightarrow Hg^{198}$ in ground state

= $(\Delta m_{loss})\ c^2$

= (197.9682 – 197.9662) (930)

= 1.86 MeV

Energy released from ^{198}Hg in first excited state → Hg in ground state

= (–1.6) – (–2) MeV

= 0.4 MeV

⇒ Energy released from $Ag^{198} \rightarrow Hg^{198}$ second excited state

= 1.86 – 0.4 = 1.46 MeV = max. K.E. of β_2 particle

34. The wave length ....

Sol. $\lambda_{\gamma_1} < \lambda_{\gamma_3} < \lambda_{\gamma_2}$

35. Select current ....

Sol. For Balmer series, $n_1 = 2$, (lower) $n_2 = 3,4,........$ (higher)

∴ In transition (VI), Photon of Balmer series is absorbed.

$n_1 = 2$, $n_2 = 3,4,........$

Sol. In transition II

$E_2 = -3.4$ eV, $E_4 = -0.85$ eV

ΔE = 2.55 eV

$$\Delta E = \frac{hc}{\lambda} \quad \Rightarrow \quad \lambda = \frac{hc}{\Delta E}$$

λ = 487 nm.

36. Which transition involves........................

Sol. For longest wavelength, energy difference should be minimum.

So in visible portion of hydrogen atom, minimum energy is in transition VI.

37. If the distance between........................

Sol. Fringe width will become double.

38. If the distance between the........................

Sol. Shift = $\frac{t(\mu-1)}{\lambda}\beta$

$$= \frac{2.2\times10^{-6}\times0.5}{4\times10^{-7}}\beta$$

$$= \frac{11}{4}\beta$$

So, intensity will become $\frac{I_0}{2}$

39. The time after which........................

Sol. $\lambda_{th} = \frac{hC}{\phi} = 6200$ A°

$\lambda \le \lambda_{th}$ for t = 0 to t = 80 sec

40. Choose the **CORRECT**........................

Sol. Number of photons incident at any time t ($0 \le t \le 80$) in interval dt'

$$dn_p = \frac{Pdt}{\left(\frac{hC}{\lambda}\right)}$$

$$n_p = \int_{t=0}^{t=80}\frac{\lambda P dt}{hC}\ (P = 100\ W) = 1.855 \times 10^{20}$$

Number of photons emitted in one hour

$$= \left(\frac{60\min}{3\min}\right) \times n_p$$

Number of photoelectrons emitted in one hour –

$= (20\ n_p) \times 0.01 = 3.71 \times 10^{21}$

CHEMISTRY

1. Which of the following ....

Sol. For ideal solution

$\Delta H_{solution} = 0$

$\Delta V_{solution} = 0$

$\Delta S_{solution} > 0$

$\Delta G_{mix} < 0$

2. Statement -1 : Net work ....

Sol. (A) $W_T = W_{1\to2} + W_{2\to3} + W_{3\to1}$

$$= 0 + (-P\Delta V) + \left(-2.303\ \ nRT\ \ \log\frac{v_2}{v_1}\right) = 184.22\,cal$$

process is cyclic

$\Delta U = 0, \quad q = -184.22\,cal$

(B) $W_T = W_{1\to2} + W_{2\to3} + W_{3\to1} \Rightarrow$

$$(-1\times22.4) + [0] + \left(-2.303\times RT\log\frac{22.4}{44.8}\right)$$

= –166.9 cal

q = +166.9 cal

(C) $W_T = \frac{1}{2}\times(20-10)(3-1)\ \ L-atm = -241.19\,cal$

q = 241.19 cal

(D) $W_T = W_{1\to2} + W_{2\to3} + W_{3\to4} + W_{4\to1}$

$= -5.6\ \ L-atm = -138.18\,cal$

q = +138.18 cal

3. Which of the following ....

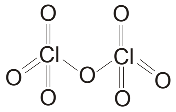
Sol. The expression is for reversible adiabatic process only.

Thermostat is necessary for an isothermal process.

4. Consider the following ....

Sol. $HClO_4 + P_2O_5 \longrightarrow \underset{(A)}{Cl_2O_7} + HPO_3$

meta-acid will undergo cyclization



six bonds are equal

5. $Cu(s) + dil\ HNO_3 \longrightarrow X(g)$..........

Sol. $3\ Cu(s) + 8HNO_3(dil.) \rightarrow 3Cu(NO_3)_2(aq) + 2\ NO(g) + 4\ H_2O(\ell)$

6. Consider the following ....

Sol. $SF_4 + XeF_4 \longrightarrow \underset{(A)}{SF_6} + \underset{(B)}{Xe}$

(μ=0)

soluble in hexane

7. In which of the following ....

Sol. (A) $H_3PO_3 \xrightarrow{\Delta} H_3PO_4 + PH_3$

(B) $H_3PO_2 \xrightarrow{\Delta} H_3PO_3 + PH_3$

(C) $2KClO_3 + 3H_2SO_4 \longrightarrow 2KHSO_4 + HClO_4 + 2ClO_2(g) + H_2O$

(yellow)

(D) $HBr + H_2SO_4 \longrightarrow Br_2(g) + SO_2 + H_2O$

(Redish Brown)

8. Select the correct ....

Sol. $\underset{\text{hot and conc.}}{NaOH} + I_2 \longrightarrow NaI + NaIO_3 + H_2O$

9. Sodium thiosulphate ....

Sol. Preparation:

(C) $6NaOH + 4S \xrightarrow{\Delta} Na_2S_2O_3 + 2Na_2S + H_2O$

(D) $Na_2SO_3 + S \xrightarrow{\Delta} Na_2S_2O_3$

10. Iodine can be obtained ....

Sol. Stronger oxidising halogen can displace the other halogen from it's salt solution.

11. Consider a setup of two..........

Sol. (A) Osmotic pressures of the two solutions are $\pi_1 = C_1RT$ and $\pi_2 = C_2RT$. So, if we apply these external pressures on both solutions, they will not show osmosis with a pure solvent since they both will be in equilibrium with pure solvent (as far as osmotic flow is concerned). This implies that for these values of external pressures, both solutions will also be in equilibrium with each other and osmosis will not occur between them.

If we add or subtract any common value of pressure from their values in option (A), the two solutions will still remain in equilibrium. In option (B), we have subtracted C_1RT from each side's external pressure of option (A). In option (D), we have added C_1RT on both sides (starting from option (A)), and the two solutions remain in equilibrium.

12. The swimming pool inside ....

Sol. Energy for heating the water

Volume of water : $V_{water} = 22.5\ m^3$

$n_{water} = V_{water}\ \rho_{water}\ (M_{water})^{-1} = 22.5\ m^3 \times 10^6\ g\ m^{-3} \times (18\ g\ mol^{-1})^{-1} = 1.25 \times 10^6$ mol

$E_{water} = n_{water} \times C\rho \times \Delta T = 1.25 \times 10^6\ mol \times 75\ J\ K^{-1}\ mol^{-1} \times 16\ K = 1500$ MJ

Energy for heating the air

Volume of the house is

$V_{air} = (15m \times 8m \times 3m) + 0.5 \times (15m \times 8m \times 2m) = 480\ m^3$

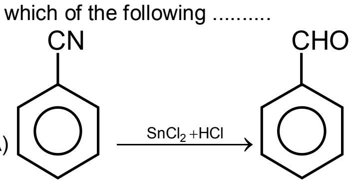
$n_{air} = pV/RT = 1.013 \times 10^5 Pa \times 480\ m^3/(8.314\ J(K\ mol)^{-1} \times 283\ K)^{-1} = 2.06 \times 10^4$ mol

$C\rho(air) = 3.5R = 29.1\ J\ K^{-1}\ mol^{-1}$(as both gases are diatomic)

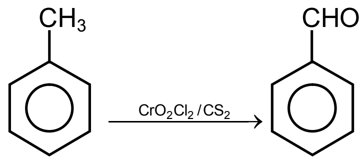
$E_{air} = n_{air} \times C\rho(air) \times \Delta T = 2.06 \times 10^4\ mol \times 29.1\ J\ K^{-1}\ mol^{-1} \times 20\ K \approx 12$ MJ

13. In which of the following ....

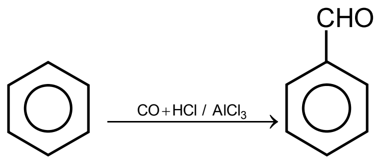
Sol. (A)



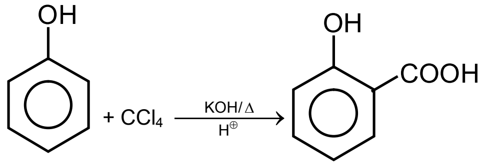
B)



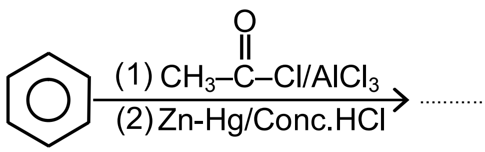
(C)



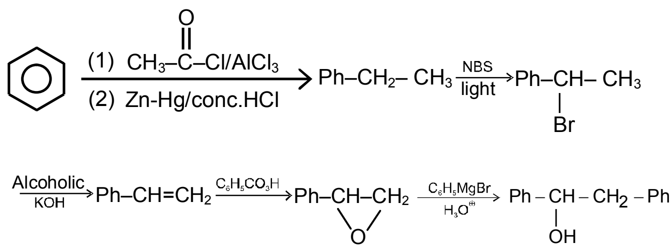
(D)

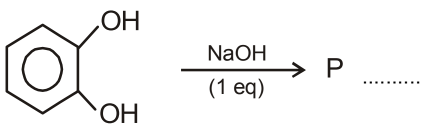


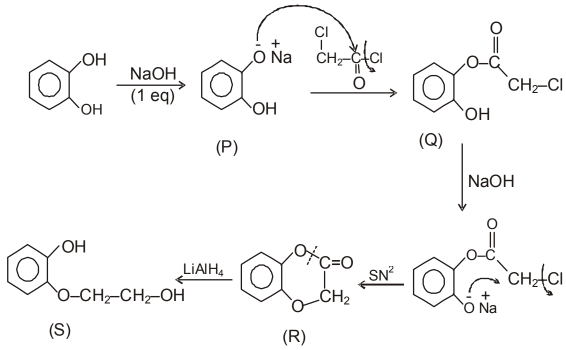
14.



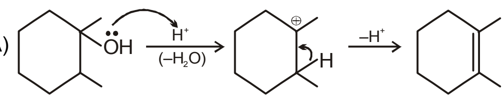
Sol.



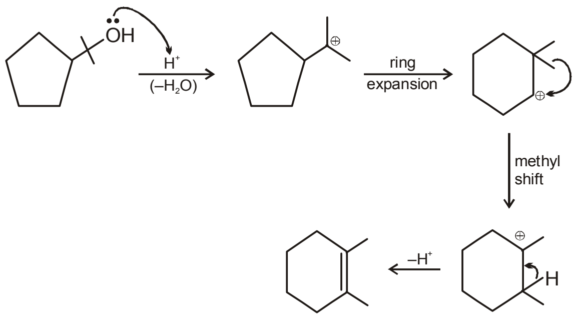
15. 

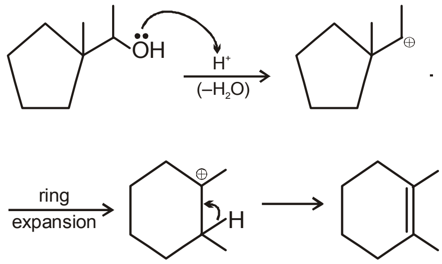
Sol. 

16. Which of the following ....

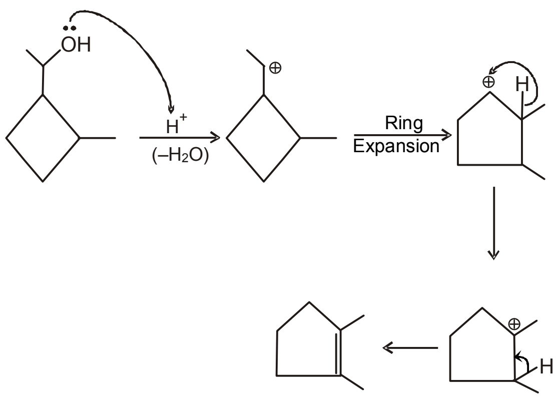
Sol. (A) 

(B)



(C) 

(D)

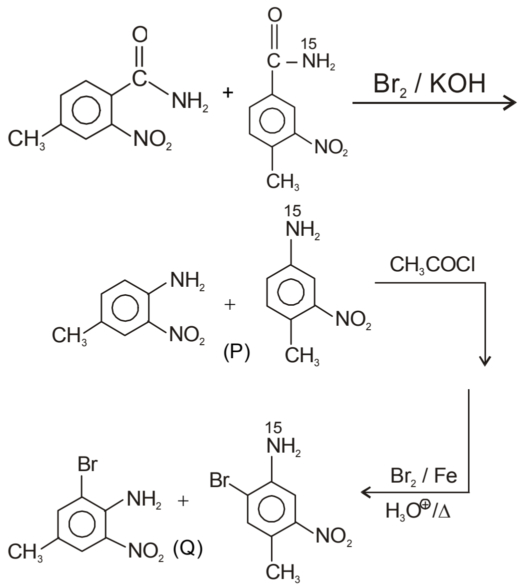


17. In which of the following ....

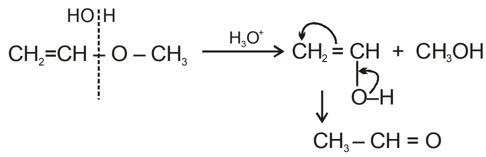
Sol. (A) Tollen's reagent does not oxidise C = C

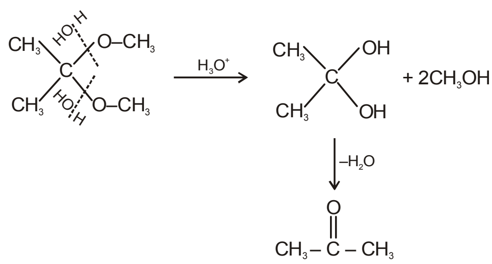
(C) E1Cb Mechanism

18. The correct option for ....

Sol. 

19. Which of the following ....

Sol. (C) 

(D) 

21. If temperature at point ....

Sol. Process CA is isochoric $P_A = 2P_C$ so $T_A = 2T$

And process AB is isothermal $T_A = T_B = 2T$

22. What will be the value...........

Sol. Overall process is cyclic so $\Delta E = \Delta H = 0$

24. Compound T is used ....

Sol. P = B ; Q = BCl_3 ; R = $B(OH)_3$; S = B_2H_6 ; T = $NaBH_4$

28. Which of the following ....

Sol. $HOOC–CH_2–COOH \xrightarrow{P_4O_{10}} O=C=C=C=O + H_2O$

(linear molecule)

Oxidation state of carbon is +2 and zero

29. A saturated solution of a ....

Sol. Relative lowering in vapur pressure = mole fraction of solute

$$\frac{P_A^0 - P_s}{P_A^0} = \frac{3S}{3S + 55.55}$$

for MCl_2 the solubility is as

$$MCl_2\,(s) \rightleftharpoons \underset{S}{M^{+2}(aq)} + \underset{2S}{2Cl^-(aq)}$$

Since the solution is very dilute 3S + 55.55 ≅ 55.55

or $\frac{32 - 31.973}{32} = \frac{3S}{55.55}$

$\therefore$ S = $\frac{1}{64}$

Thus, the $K_{sp} = S \times (2S)^2 = 4 \times \left(\frac{1}{64}\right)^3$

Now in $\frac{1}{6.4}$ M NaCl, solubility of MCl_2 = 6.25 x 10^{-4} M

30. Freezing point of 1000 g ....

Sol. $|\Delta T_f| = K_f\, m = 1.89 \times \frac{125}{180} \times \frac{1000}{875} = 1.5$

So freezing point = –1.5 °C.

32. Which of the following ....

Sol. Molarity of HCl = $\frac{100\ \ m\ \ mole}{1000\ \ mL} = 0.1\ \ M$

pH = 1 change in pH = 6

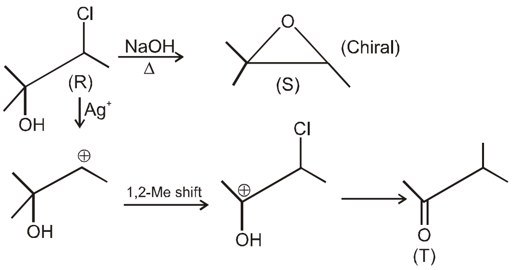
$$\underset{(P)}{HCl} + NaOH \longrightarrow \underset{(Q)}{NaCl} + H_2O$$

Q gives Cl_2 on electrolysis

33. 'R' can ....

34. 'T' can ....

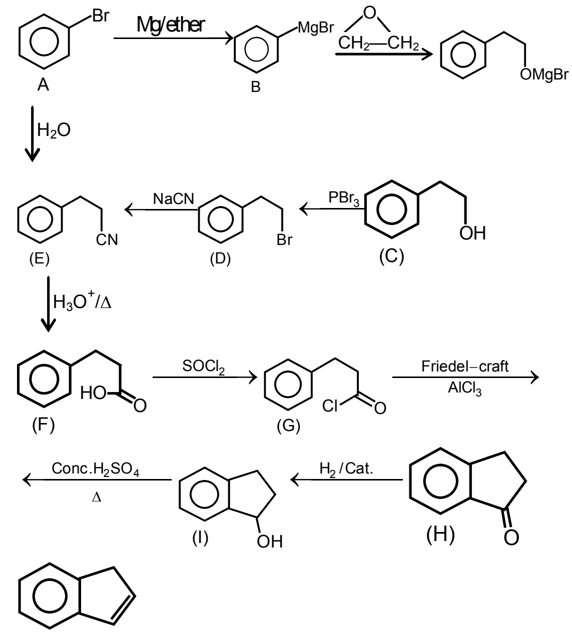
Sol. **(33 & 34)**



37. A may be ....

38. Find the correct ....

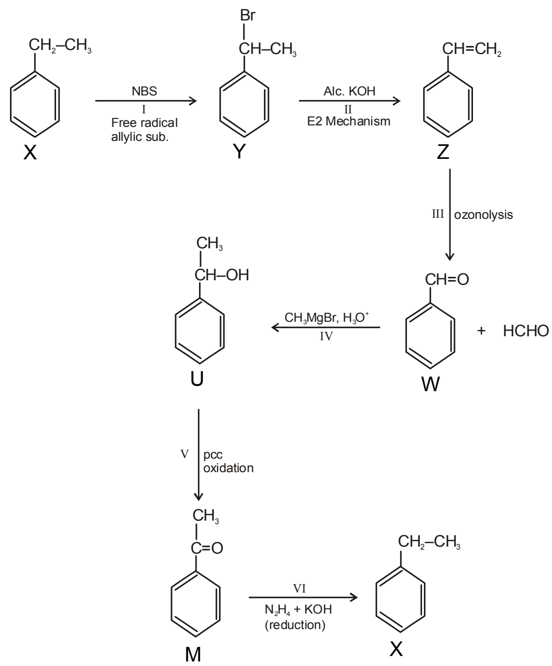
Sol. **(Q.37 & Q.38)**



39. Which of the following ....

40. Which of the following ....

Sol. **(39) & (40)**



ADVANCED PATTERN PART TEST-4 (APT-4)

Resonance® Educating for better tomorrow

TARGET : JEE (MAIN+ADVANCED) 2018

DATE : 11-02-2018 **COURSE : VIJAY (07JR)**

ANSWER KEY

CODE-0

MATHEMATICS

1.	(AD)	**2.**	(A)	**3.**	(ACD)	**4.**	(AB)	**5.**	(BC)	**6.**	(AC)	**7.**	(ABD)
8.	(ABCD)	**9.**	(ACD)	**10.**	(ABCD)	**11.**	(AD)	**12.**	(CD)	**13.**	(AC)	**14.**	(B)
15.	(AD)	**16.**	(AC)	**17.**	(AD)	**18.**	(ABCD)	**19.**	(ABCD)	**20.**	(A)	**21.**	(B)
22.	(D)	**23.**	(B)	**24.**	(C)	**25.**	(B)	**26.**	(C)	**27.**	(AD)	**28.**	(BC)
29.	(BC)	**30.**	(B)	**31.**	(B)	**32.**	(C)	**33.**	(A)	**34.**	(BD)	**35.**	(AC)
36.	(B)	**37.**	(D)	**38.**	(D)	**39.**	(A)	**40.**	(C)				

PHYSICS

1.	(A)	**2.**	(BC)	**3.**	(AC)	**4.**	(AC)	**5.**	(AC)	**6.**	(ABD)	**7.**	(AB)
8.	(ABCD)	**9.**	(ABC)	**10.**	(BC)	**11.**	(ABC)	**12.**	(ABCD)	**13.**	(ABC)	**14.**	(BCD)
15.	(ABC)	**16.**	(BC)	**17.**	(AD)	**18.**	(BCD)	**19.**	(AD)	**20.**	(AC)	**21.**	(A)
22.	(AC)	**23.**	(AD)	**24.**	(A)	**25.**	(BC)	**26.**	(A)	**27.**	(AC)	**28.**	(D)
29.	(C)	**30.**	(AC)	**31.**	(AC)	**32.**	(B)	**33.**	(BD)	**34.**	(A)	**35.**	(AD)
36.	(D)	**37.**	(AD)	**38.**	(A)	**39.**	(B)	**40.**	(AD)				

CHEMISTRY

1.	(ABC)	**2.**	(ABD)	**3.**	(ABD)	**4.**	(ABCD)	**5.**	(AB)	**6.**	(AC)	**7.**	(CD)
8.	(ABCD)	**9.**	(BD)	**10.**	(AB)	**11.**	(ABD)	**12.**	(CD)	**13.**	(ABC)	**14.**	(ACD)
15.	(ACD)	**16.**	(ABC)	**17.**	(AC)	**18.**	(BC)	**19.**	(ABCD)	**20.**	(AB)	**21.**	(BD)
22.	(AB)	**23.**	(ABC)	**24.**	(D)	**25.**	(AC)	**26.**	(AB)	**27.**	(ACD)	**28.**	(AB)
29.	(AC)	**30.**	(B)	**31.**	(BC)	**32.**	(BCD)	**33.**	(C)	**34.**	(D)	**35.**	(D)
36.	(ABC)	**37.**	(B)	**38.**	(ABC)	**39.**	(ABCD)	**40.**	(AC)				