SINCE 1984

Brilliant®

STUDY CENTRE, PALA

JEE MAIN 2025

SESSION-2

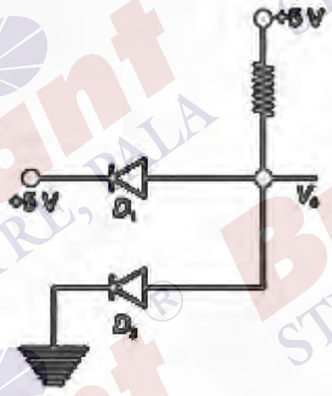
SHIFT -1

SCAN ME

VIDEO SOLUTION

MEMORY BASED QUESTIONS

1. Find output voltage in the given circuit



1) +5 volt 2) zero 3) 10 volt 4) –5volt

2. A fractional errors in x,y and z are 0.1,0.2 and 0.5 respectively maximum fractional error in $x^{-2}y^{\frac{3}{2}}z^{\frac{-2}{5}}$

1) 0.2 2) 0.7 3) 0.6 4) 0.3

3. For a nucleus of mass number A and radius R, mass density ρ . Then choose the correct option

1) $\rho \alpha A^{1/3}$ 2) ρ is independent of A 3) $\rho \alpha A$ 4) $\rho \alpha A^3$

4. A convex lens (f = 30cm) is in cotact with concave lens if = 20cm. Object is placed on the left side at a distance of 20cm. Find the image distance

1) 20cm 2) 10cm 3) 15cm 4) 25cm

5. There are two charged sphere of radius R and 3R. When the sphere are made to touch each other and then separate, the surface charge density becomes r_1 and r_2 respectively. Find $\frac{r_1}{r_2}$

1) 1/9 2) 9 3) 3 4) 1/3

6. A uniform disc of radius r is rotating about an axis passing through diameter with angular speed 800rpm. A torque of magnitude $25\pi Nm$ is applied on the disc for 40sec. If final angular speed of disc is 2100 rpm. Find radius of the disc if mass is 1kg

1) 40/3 2) $20\sqrt{\frac{3}{13}}$ 3) $20\sqrt{\frac{2}{13}}$ 4) $10\sqrt{\frac{3}{2}}$

7. A monoatomic gas is stored in a thermally insulated container. The gas is suddenly compressed to $(1/8)^{th}$ of its initial volume. Find ratio of final pressure to initial pressure.

1) 8 2) 16 3) 4 4) 32

8. Two balls are projected with same speed at different angles. If maximum height of 1^{st} is 8 times maximum height of 2^{nd} ball. Find the ratio of their time of flight

1) $1:2\sqrt{2}$ 2) $2\sqrt{2}:1$ 3) 2:1 3) 4:1

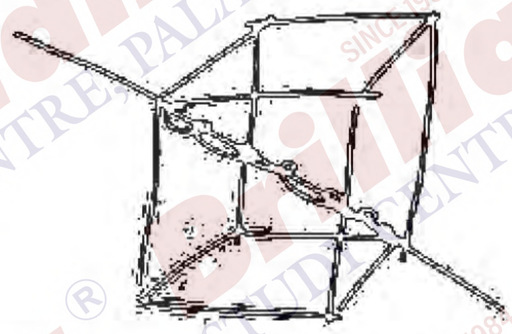
9. There are two charged spheres of radius 'R' and '3R'. when they touch each other, then separate , the surface charge densities ratio is

1) 1/9 2) 1/3 3) 3 4) 9

10. The amplitude and phase of the wave when two travelling waves given a $y_1(x,t) = 4\sin(\omega t - kx)$ and $y_2(x,t) = 2\sin\left(\omega t - kx = \frac{2\pi}{3}\right)$ are superimposed

1) $6, \frac{2\pi}{3}$ 2) $6, \frac{\pi}{3}$ 3) $2\sqrt{3}, \frac{\pi}{6}$ 4) $\sqrt{3}, \frac{\pi}{6}$

11. Given $\lambda = \frac{2nc}{m}$ (charge density) is for a wire which is passing through a diagonal of a closed cube of side length $\sqrt{3}$cm. flux is through cube is

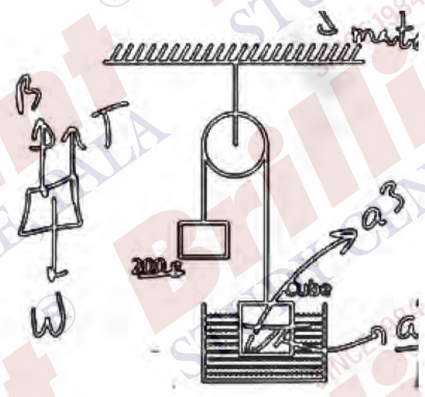


1) 1.44π 2) 0.72π 3) 2.16π 4) 6.84π

12. An electron is released in the field generated by a non - conductivity sheet of uniform surface charge density σ. The rate of change of de - Broglie wavelength associated with electron waves inversely as n^{th} power of distance travelled. Find the value of n

1) $-1/2$ 2) -1 3) $-1/4$ 4) 4

13. A cube of side 10cm is suspended from on end of a fine string of length 27cm, and a mass of 200 gram is connected to the other and of the string. When the cube is half immersed in water then the system remains in balance. Find density of national of cube



1) $800kg/m^3$ 2) $500kg/m^3$ 3) $700kg/m^3$ 4) $600kg/m^3$

14. A rod of linear mass density 'λ' and length 'l' is bent into the form of a ring of radius R. Moment of inertia of ring about any of its diameter is

1) $\frac{\lambda L^3}{12}$ 2) $\frac{\lambda L^3}{4\pi^2}$ 3) $\frac{\lambda L^2}{12}$ 4) $\frac{\lambda L^3}{8\pi^2}$

15. A force $6\hat{k}$ is applied for 5/3 seconds on a body of mas 2kg. If initial velocity of body was $3\hat{i} + 4\hat{j}$. Then find final velocity of the body

1) $3\hat{i} + \hat{j} + 5\hat{k}$ 2) $3\hat{i} + 4\hat{j} + 5\hat{k}$ 3) $3\hat{i} + 2\hat{j} - 5\hat{k}$ 4) $3\hat{i} + 4\hat{j} - 5\hat{k}$

16. A 3m long wire of radius 3mm shows an extension of 0.1mm when loaded vertically by a mass of 50kg in an experiment to determine young's modulus. The value of young's modulus of the wire as per this experiment is $P \times 10^{11} Nm^{-2}$, where the value of P is (Take $g = 3\pi m/s^2$)

1) 5 2) 25 3) 10 4) 2.5

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SHIFT 1-EVENING

MEMORY BASED QUESTIONS

CHEMISTRY

1. Consider the last electron of element having atomic on. 9 & choose correct options

1) Sum of total nodes = 1
2) n = 2; I = 0
3) Last electron enters in 2s subshell
4) There are $5e^-$ with I = 0

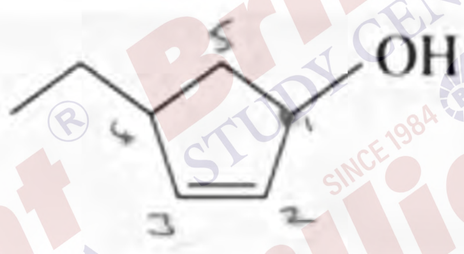
2. Which of the following has sp^3d^2 hybridisation?

1) $[NiCl_4]^{2-}$
2) $[Ni(CO)_4]$
3) SF_6
4) $[NiCN)_4]^{2-}$

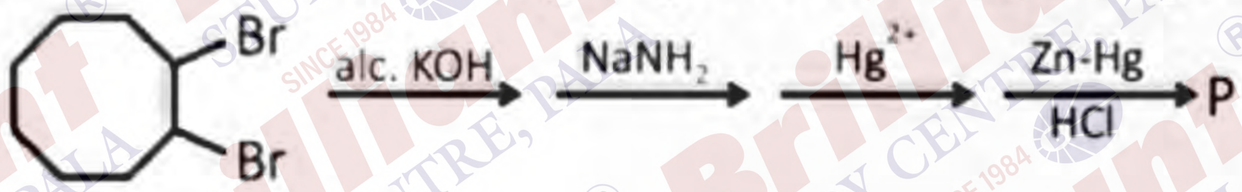
3. Atomic number of element with lowest first ionisation enthalpy is

1) 32
2) 19
3) 35
4) 87

4. Find the IUPAC name of the given compound

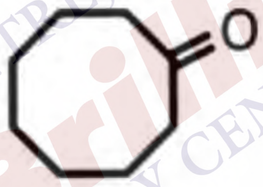


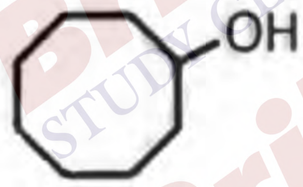
5. **Consider the following sequence of reactions given below**



The product P is

1


2


3


4


6. **Correct decreasing order of spin only magnetic moment values is**

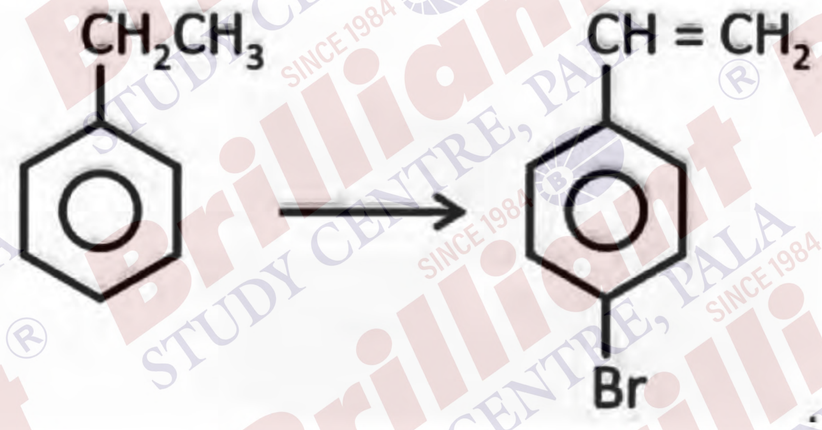
1 $Cr^{3+} > Cr^{2+} > Cu^{2+} > Cu^{+}$

2 $Cr^{3+} > Cr^{2+} > Cu^{+} > Cu^{2+}$

3 $Cr^{2+} > Cr^{3+} > Cu^{2+} > Cu^{+}$

4 $Cr^{2+} > Cr^{3+} > Cu^{+} > Cu^{2+}$

7. **The correct sequence of reagents to the added for the following conversion**



1 Br_2/Fe; alc. KOH; $Cl_2/FeCl_3$

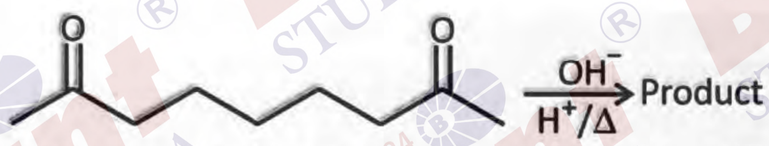
2 $Br_2/FeCl_3$; Cl_2/Δ; alc. KOH

3 $FeCl_3/Br_2$; alc. KOH; H^+/Δ

4 $Cl_2/FeCl_3$; $Br_2/FeCl_3$; alc. KOH

8. For a first order reaction, the ratio of time required is $\frac{t_1}{t_2}$, if t, is time consumed when reactant reaches $\frac{1}{4}$th of initial cone and t_2 is the time when it reaches $\frac{1}{8}$th of initial concentration

1) $\frac{2}{3}$ 2) $\frac{3}{4}$ 3) $\frac{3}{2}$ 4) $\frac{4}{3}$

9. 

The correct IUPAC name of the product is:-

1 1-acetyl-2-methyl cyclohexene

2 1-(2-methylcyclohexene-1-yl) ethanone

3 Cyclo-oct-2-en-1-one

4 2-Cycloocten-1-one

10. Match list-I with list-II and choose the correct option.

	List-I		List-II
(a)	Nucleophile (iv)	(i)	Tetrahedral shape
(b)	Electrophile (iii)	(ii)	Planar and sp^2 hybridized
(c)	Carbocation (ii)	(iii)	Species that accepts electron
(d)	Carbanion (i)	(iv)	Species that donate electron

1) a (i), b (ii), c(iv), d(iii)
2) a(iv), b(iii), c(ii), d(i)
3) a(iv), b(iii), c(i), d(ii)
4) a(iii), b(iv), c(ii), d(i)

11. Match List-I with List-II and select the correct option.

	List-I		List-II
A	dil $KMnO_4$	I	Unsaturation test
B	$FeCl_3$ test	II	Alcoholic -OH
C	Liberate CO_2 with $NaHCO_3$	III	Phenolic -OH
D	Ceric Ammonium nitrate test	IV	Carboxylic Acid

1 A-I, B-IV, C-III, D-II
2 A-IV, B-I, C-III, D-II
3 A-I, B-III, C-IV, D-II
4 A-III, B-II, C-IV, D-I

12. An aqueous solution of 0.1 M HA shows depression in freezing point of 0.2°C. If K_f (H_2O) = 1.86 K kg mol^{-1} and assuming molarity = molality, find the dissociation constant of HA.

1 4.50×10^{-5}

2 6.25×10^{-3}

3 5.625×10^{-4}

4 2.65×10^{-4}

13. Which of the following solution can form minimum boiling azeotrope?

1 $C_2H_5OH + H_2O$

2 n-heptane + n-hexane

3 $CH_3COOH + C_5H_5N$

4 $C_2H_5Br + C_2H_5I$

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SHIFT 1-EVENING

MEMORY BASED QUESTIONS

MATHS

1. The product of last 2 digits of $(1919)^{1919}$ is

1) 56 2) 63 3) 45 4) 54

2. $\int_{-1}^{3/2}\left|\pi^2 x\sin(\pi x)\right|dx$

1) $4\pi+1$ 2) $3\pi+1$ 3) $5\pi+1$ 4) $6\pi+1$

3. Two lines $\frac{x-1}{2}=\frac{y-z}{3}=\frac{z-3}{4}$ and $\frac{x-\lambda}{3}=\frac{y-3}{4}=\frac{z-4}{5}$ has shortest distance $\frac{1}{\sqrt{6}}$. If λ_1, λ_2 are values of λ, then radius of circle passing through (0, 0), $(\lambda_1,\lambda_2).(\lambda_2,\lambda_1)$ is——

4. Probability of event A is 0.7 and event B is 0.4 , $P\left(A\cap B^c\right)=0.5$, then the value of $P(B|_{A\cup B^c})$ is equal to

1) 1/2 2) 1/3 3) 1/4 4) 3/4

5. $\frac{1}{1^4}+\frac{1}{2^4}+\frac{1}{3^4}+.....=\frac{\pi^4}{90}$,

$\frac{1}{1^4}+\frac{1}{3^4}+\frac{1}{5^4}+....=\alpha$

$\frac{1}{2^4}+\frac{1}{4^4}+\frac{1}{6^4}+....=\beta$

Then find $\frac{\alpha}{\beta}$

1) 15 2) 14 3) 23 4) 18

6. There are 12 points in a plane in which 5 are collinear such that nop three of them are in straight line, then the number of triangle that can be formed from any 3 vertices from 12 points.

1) 220 2) 210 30 230 4) 240

7. The number of rational terms in the binomial expansion of $\left(5^{\frac{1}{2}}+7^{\frac{1}{8}}\right)^{1016}$ is

1) 129 2) 128 3) 127 4) 130

9. Let the area pf the bounded by the region $(x, y) = \left\{0 \le 9x \le y^2, y \ge 3x - 6\right\}$ be A. Then 6A is equal to

10. $f(x) = x - 1$ & $g(x) = e^x$ for $x \in R$. If $\frac{dy}{dx} = \left(e^{-2\sqrt{x}} g\left(f\left(f(x)\right) - \frac{y}{\sqrt{x}}\right)\right.$, $y(0) = 0$ then $y(1) =$

A) $\frac{e-1}{e^4}$ B) $\frac{2e-1}{e^3}$ C) $\frac{1-e^2}{e^4}$ D) $\frac{1-e^3}{e^4}$

11. If $A = \begin{bmatrix} 2 & 2+p & 2+p+q \\ 4 & 6+2p & 8+3p+2q \\ 6 & 12+3p & 20+6p+3q \end{bmatrix}$, then the value of $\det(\text{adj}(3A))) = 2^m 3^n$, then m + n is equal to

1) 20 2) 24 3) 36 4) 18

12. f(x) is a positive function $I_1 = \int_{-1/2}^{1} 2x\, f\,(2x(1-2x)\,dx$ & $I_2 = \int_{-1}^{2} f\left(x(1-x)\right)dx$. The value of $\frac{I_2}{I_1}$

13. The sum of squares of roots of $|x-2|^2 - |x-2| - 2 = 0$ and $x^2 - 2|x-3| - 5 = 0$ equals to

14. Value of $\cot^{-1}\left(\frac{\sqrt{1+\tan^2 2}+1}{\tan 2}\right) - \cot^{-1}\left(\frac{\sqrt{1+\tan^2 2}-1}{\tan 2}\right)$ is

1) $\frac{\pi}{2} + \frac{5}{2}$ 2) $\frac{\pi}{2} - \frac{3}{2}$ 3) $2 - \frac{\pi}{2}$ 4) $3 + \frac{\pi}{2}$

15. Area of the region $\{(x,y): 0 \le y \le \sqrt{9x}, y^2 \ge 3-6x\}$ (in square units)

1) $\frac{1}{3}\left(\frac{9}{5}\right)^{1/2}$ 2) $\frac{3}{5}\left(\frac{8}{5}\right)^{1/2}$ 3) $\frac{1}{3}\left(\frac{7}{5}\right)^{1/2}$ 4) $\frac{1}{9}\left(\frac{7}{5}\right)^{1/2}$

16. Let $\vec{a}=\hat{i}+4\hat{j}+3\hat{k}$ and $\vec{b}=2\hat{i}+3\hat{j}+4\hat{k}$ and $\vec{c}$ is a vector perpendicular to $\vec{a}$ and lies in the plane of $\vec{a}, \vec{b}$ is equal to

1) $i+\hat{j}+\hat{k}$ 2) $-\hat{i}+\hat{j}-\hat{k}$ 3) $\hat{i}-\hat{j}+\hat{k}$ 4) $-\hat{i}-\hat{j}-\hat{k}$

17. Consider two statements

Statement 1: $\lim\limits_{x\to 0}\dfrac{\tan^{-1}x+\ell n\sqrt{\dfrac{1+x}{1-x}}2x}{x^5}=\dfrac{2}{5}$

Statement 2: The $\lim\limits_{x\to 1}x^{\left(\frac{2}{1-x}\right)}$ is equal to e^2 and can be solved by the method $e^{\lim\limits_{x\to 1}f(x)(g(x)-1)}$

1) Only Statenebt 1 is true
2) Only Statement 2 is true
3) Both Statement 1 and Statement 2 true
4) Both Statement 1 and Statement 2 False