SINCE 1984

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STUDY CENTRE, PALA

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SESSION-2

SHIFT-1 MORNING

VIDEO SOLUTION

SCAN ME

MEMORY BASED QUESTIONS

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SHIFT 1-MORNING

MEMORY BASED QUESTIONS

MATHEMATICS

QN Let $A=\{1,2,3,4,5\}$ and $B=\{a,b,c\}$. Then the number of functions which are not on to are

QN The number of ways 4 boys and 3 girls are to be arranged in a row so that all 3 girls are not together is equal to

1) 2320 2) 1440 3) 4920 4) 4320

QN Let S_n is the sum of first n terms of an A.P and a_n is the n^{th} term of A.P. If first term of the given A.P is $\frac{10}{3}$ and $S_{30}=a_{30}^3$. Then, the common difference of the given A.P is

1) $\frac{5}{87}$ 2) $\frac{5}{83}$ 3) $\frac{4}{87}$ 4) $\frac{3}{83}$

QN The value of $A=\frac{\sin 3^0}{\cos 9^0}+\frac{\sin 9^0}{\cos 27^0}+\frac{\sin 27^0}{\cos 81^0}$ and $B=\tan 81^0-\tan 3^0$. The value of $\frac{A}{B}$ is equal to

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

QN The domain of the function $\cos^{-1}\left\{\frac{4x+2[x]}{3}\right\}$ where [.] is greatest integer function, is

1) $\left[0,\frac{3}{4}\right]$ 2) $\left[\frac{-3}{4},\frac{1}{4}\right]$ 3) $\left[\frac{-1}{4},\frac{1}{4}\right]$ 4) $\left[\frac{-1}{4},\frac{3}{4}\right]$

QN $y=\tan^{-1}\left(\frac{3\cos x-4\sin x}{4\cos x+3\sin x}\right)+\tan^{-1}\left(\frac{x}{1+\sqrt{1+x^2}}\right)$, then find $\frac{dy}{dx}$ at $x=\frac{\sqrt{3}}{2}$.

QN A is a matrix of order 3 such that $|A|=-4$. Then, the value of $\left|\text{adj}\left(\text{adj}\left(2\text{adj}(A)\right)^{-1}\right)\right|$ is

1) $\frac{1}{2^{16}}$ 2) $\frac{1}{2^{28}}$ 3) $\frac{1}{2^{30}}$ 4) $\frac{1}{2^{20}}$

QN If z is a complex number such that $|z+2|=|z-2|$ and $\arg\left(\frac{z-3}{z+i}\right)=\frac{\pi}{4}$, then the value of $|z|^2$ is

QN If the value of $\int_{-2}^{2}\left(|\sin x|+|x\sin x|\right)dx=\beta(1-3\cos\alpha)+\beta\sin\beta$ then $\beta=$

QN A line with direction ratios $<1,-1,2>$ intersects the lines $\frac{x}{2}=\frac{y}{3}=\frac{z+1}{3}$ and $\frac{x+1}{1}=\frac{y-2}{1}=\frac{z}{4}$ at the points P and Q respectively. If the length of the line segment PQ is α, then 225 α^2 is equal to

1) 1104 2) 1204 3) 1024 4) 1014

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MATHEMATICS

QN A circle centred at $\left(-\frac{1}{2},\frac{3}{2}\right)$ passes through P(1,2). Two chords PQ and PR are bisected by Y-axis.

If midpoint of QR is $S(\alpha,\beta)$, then $16(\alpha+\beta)$ is .....

QN Let $f(x)=f'(x)\times f''(x)$ and $f(0)=0,$ where f(x) is a polynomial function of n^{th} degree. The value of $36\left[f'(2)+f''(2)+\int_0^1 f(x)\,dx\right]$ is equal to

QN $f(x)=\min\left\{2x^2+3,6x\right\}+|x-1|\cos\left(x^2-\frac{1}{4}\right)$, then the number of points of non-derivaibility of f(x) is/are

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

QN Let mean and median of 9 observations 8,13,a,17,21,51,103,b,67 are 40 and 21 respectively where a > b. If mean deviation about median is 26 then 2a

QN If co-efficient of x^3 in $(1+x)^3+(1+x)^4+.....+....+(1+x)^{99}+(1+kx)^{100}$ is $\frac{100}{3}\left(\frac{101}{4}-43n\right)$ then the value of k^3+43n is

QN Parabola $y^2=4kx$ intersects $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1 \quad (a>b)$ at P and Q. If PQ is the latus rection of both parabola and ellipse, then eccenticity of ellipse is.

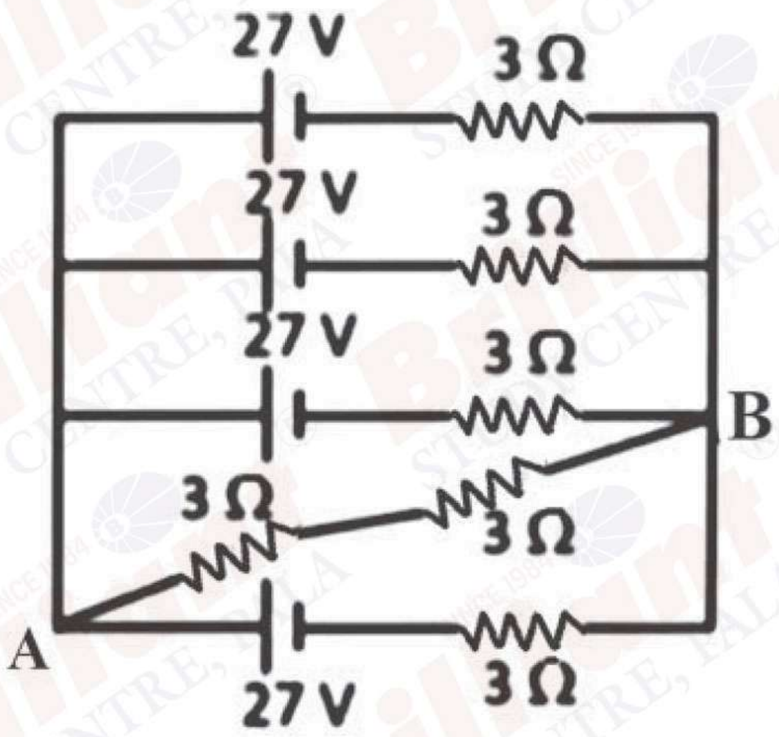
QN If $\frac{dy}{dx}=\left(1+x+x^2\right)\left(1-y+y^2\right)$ $y(0)=\frac{1}{2}$ then the value of $2y(1)-1$ is .....

QN Let A,B and C be vertices of a trizngle such that A (1,2) and midpoint of AB is (3,4) and centroid is (5,7). If the vertices of circumcentre of ΔABC is (α,β) then $12(\alpha+\beta)$ is .....

1) 72 2) 84 3) 64 4) 81

QN If fair coin is tossed 8 times, if the probability that first 6 throws contains 4 heads and last 5 throws contain exactly 3 heads is P then 96 P is equal to

QN. For the circuit given below, fi nd the V_{AB} and I_{AB}.



1) 18 V, 8 A 2) 18 V, 6 A 3) 24 V, 3 A 4) 24 V, 4 A

QN. A uniform sphere of mass m and radius R is divided into two equal parts one part of sphere has moment inertia I_1 about diameter and moment of inertia of disc of radius 2R and mass m about perpendicular axis through its center is I_2. Find $\frac{I_1}{I_2}$

1) 10 2) 2 3) 5 4) 1

QN. Inputs of A and B are given. Find output result Y of the circle.

1) $A+\overline{B}$ 2) $\overline{A}+B$ 3) $\overline{A}B$ 4) $A.\overline{B}$

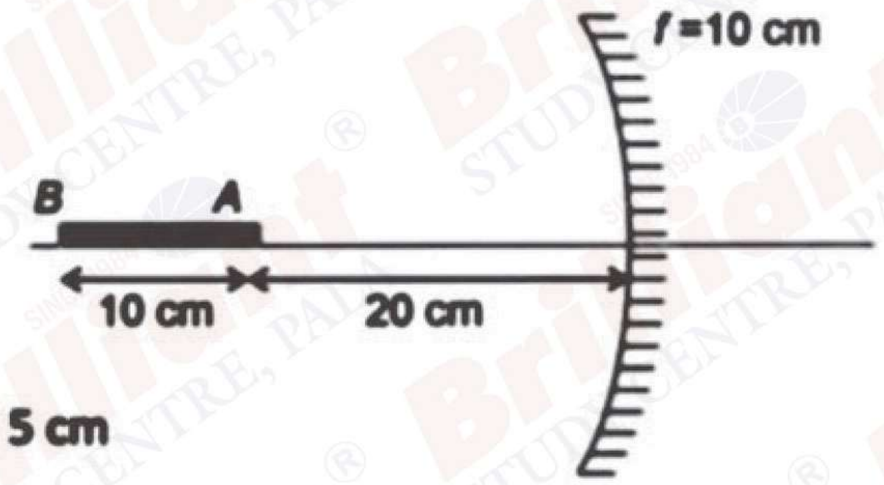
QN. Find coeffi cient of friction if time taken by block in rough surface is 50% more than time taken by smooth surface. The distance slide by the mass is same in both the cases.

1) $\mu=\frac{5}{7}$ 2) $\mu=\frac{5}{9}$ 3) $\mu=\frac{4}{7}$ 4) $\mu=\frac{4}{9}$

QN. Nuclei A and B from a nucleus $C\frac{BE}{N}$ for A, B and C are 3 MeV, 7 MeV and 6 MeV. T"hen energy produced in $2A^3+B^4\rightarrow C^{10}$

1) 8 MeV 2) 12 MeV 3) 14 MeV 4) 10 MeV

QN. A rod is placed along principal axis as shown. Find length of image.



1) 10 cm 2) 5 cm 3) 15 cm 4) 20 cm

QN. Radius of a soap bubble is increased from 1 cm to 2 cm. Work done in process is (S is surface tension)

1) $\pi S \times 10^{-2}$ J 2) $1.2\pi S$ J 3) $2.4\pi S \times 10^{-3}$ J 4) $\pi S \times 10^{-3}$ J

QN. There are two samples of gases:

Sample A $\rightarrow$ Number of moles is 2 and volume is $3V_0$

Sample B $\rightarrow$ Number of moles is 2 and volume is V_0

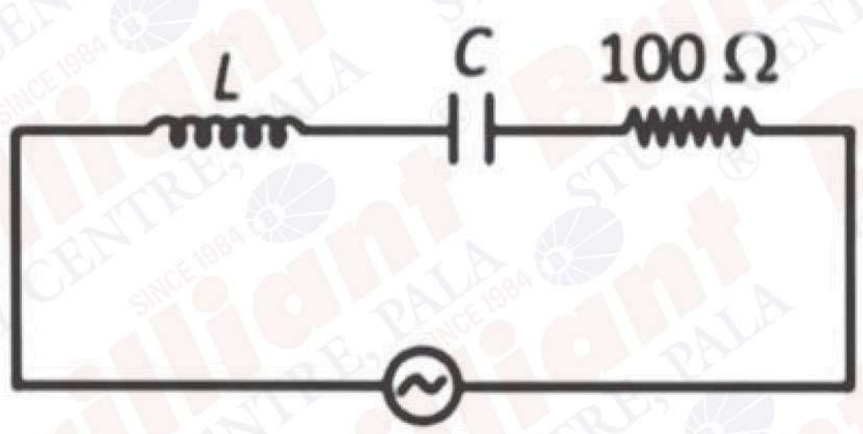
If relation between pressure and volume for both samples is $P = \frac{p_0}{\left(1+\left(\frac{v}{v_0}\right)^2\right)}$. Then find difference between temperature of sample B and sample A.

1) $\frac{P_0V_0}{10R}$ 2) $\frac{P_0V_0}{R}$ 3) $\frac{P_0V_0}{20R}$ 4) $\frac{P_0V_0}{8R}$

QN. A spiral coil having total 200 turns, inner radius 3 cm and outer radius 6 cm has 20 mA current through it, find its magnetic moment.

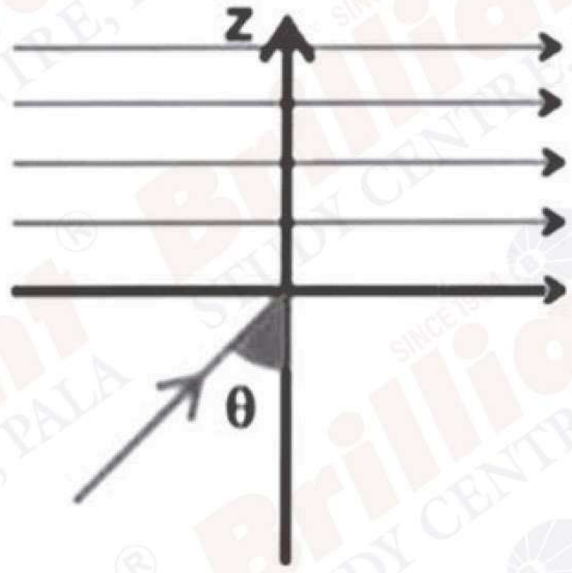
1) $42\pi \times 10^{-4}\,Am^2$ 2) $36\pi \times 10^{-3}\,Am^2$ 3) $84\pi \times 10^{-4}\,Am^2$ 4) $27\pi \times 10^{-4}\,Am^2$

QN. Power factor of the below circuit is 0.5. Find $|X_L = X_C|$. (take $\sqrt{3} = 1.73$)



1) 346 Ω 2) 173 Ω 3) 86.5 Ω 4) 58 Ω

QN. Electric field of EMW is given as $\vec{E}=\left(E_1\hat{i}+E_0\hat{j}+E_2\hat{k}\right)\sin\left(kx+kz-\omega t\right)$. Find reflected ray equation if θ is Brewster angle.



1) $\left(E_2\hat{i}+E_2\hat{k}\right)\sin\left(kx+kz-\omega t\right)$

2) $E_1\hat{i}+E_2\hat{k}\sin\left(kx-kz-\omega t\right)$

3) $E_0\hat{j}\sin\left(kx+kz-\omega t\right)$

4) $E_0\hat{j}\sin\left(kx-kz-\omega t\right)$

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

List-I (Naming reaction)	List-II (Reactions)
I) Wurtz reaction	P) R-X + AgF→R–F + AgX
II) Swarts reaction	Q) R–X + NaI →R–I + NaX
III) Finkelstein reaction	R) 2Ar–X + 2Na→Ar–Ar + 2NaX
IV) Fittig reaction	S) 2R–X + 2Na →R–R + 2NaX

1) I-P; II-Q; III-R; IV-S
2) I-S; II-P; III-Q; IV-R
3) I-P; II-S; III-Q; IV-R
4) I-R; II-P; III-Q; IV-S

QN. Statement-I : BP order is HI < HBr < HCl < HF

Statement-II : MP order is HI < HF < HCl < HBr

1) Statement I and statement-II are correct
2) Statement I is correct and statement-II is wrong
3) Statement-I is wrong and statement-II is correct
4) Statement-I is wrong and statement II is correct

QN. 

X . P gm of X react with $NaHCO_3$ then 11.2 dm^3 of gas obtained at STP.

Calculate P.

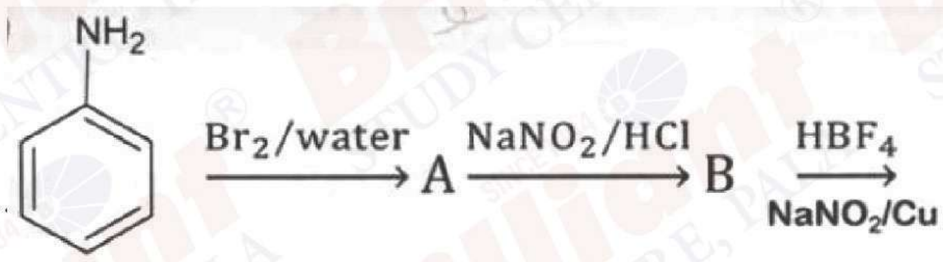
QN. Find the value of n, l, m and s for 19 th e^- of Cr atom?

1) n = 3, l = 2, m = 1, s =+½
2) n = 4, l = 0, m = 0, s = +½
3) n = 2, l = 1; m = 1, s = -½
4) n = 3, l =2, m = 0, s = 0

QN. Statement-I : The covalency of oxygen in general is 2 and the oxidation state of oxygen is +4 in OF_2

Statement-II : The anomalous behaviour of oxygen in its group is due to its small size and high electronegativity

1) Statement I and statement-II are correct
2) Statement I and statement-II are incorrect
3) Statement-I is correct but statement-II is incorrect

QN.  . What is the IUPAC name of final product 'C'?

1) 4-Bromo-1-nitrobenzene
2) 1,3,5-Trobromo-2-nitrobenzene
3) 1,3,5-Tribromobenzene
4) 1-Bromo-4-nitrobenzene

QN. 50 mL of 0.1 M NH_4OH mixed with 20 mL of 0.1 M HCl, the pH of the solution. The pK_b of NH_4OH is 4.74.

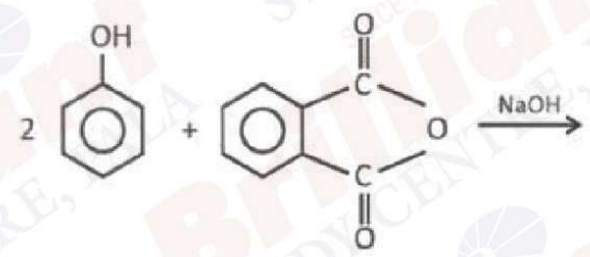
QN. The ratio of wave number of first line of Balmer series to the third line of Brackett series of hydrogen atom is

QN. Statement-I : Maltose is a non-reducing sugar

Statement-II : Lactose is a reducing sugar

1) Statement I and statement-II are correct
2) Statement I and statement-II are incorrect
3) Statement-I is correct but statement-II is incorrect
4) Statement-I is incorrect and statement II is correct

QN. Consider the following reaction



The colour of the compuond formed is

1) Violet
2) Red
3) Colourless
4) Pink

QN. Number of moles and number of molecules in 1.4187 L of SO_2 at STP respectively are

1) 0.1266 and 7.6238×10^{22}
2) 0.0633 and 7.6238×10^{22}
3) 0.1260 and 3.812×10^{22}
4) 0.0633 and 3.812×10^{22}

QN. If the wavelength of first line of Balmer series and of Brackett series of H are respectively λ_1 and λ_2

respectively, then value of $\frac{\lambda_1}{\lambda_2}$ is

1) 0.16
2) 0.04
3) 0.28
4) 0.35

QN. What will be the pH at 25°C of solution obtained by mixing of 100 mL, 0.5 M NH_4OH solution and 0.01 M, 25 mL NH_4Cl solution? (pK_b of NH_3 = 4.74)

1) 11.56 2) 9.0 3) 2.44 4) 4.5

QN. Match the following:-

	Species		M
(i)	Mn^{2+}	(P)	$\sqrt{24}$
(ii)	Co^{2+}	(Q)	$\sqrt{35}$
(iii)	Cu^{2+}	(R)	$\sqrt{15}$
(iv)	Cv^{2+}	(S)	$\sqrt{3}$

1) I - Q; II-R; III-S; IV-P
2) I - R; II-S; III-P; IV-Q
3) I - P; II-Q; III-R; IV-S
4) I - S; II-Q; III-P; IV-R

QN. Match the following:-

List-I (Amino acid)

I) Argnine
II) Lysine
III) Glutamic acid
IV) Aspartic acid

List-II (Single letter code)

P) D
Q) K
R) E
S) R

Choose the correct option

1) I-S; II-Q; III-P; IV-R
2) I-Q; II-S; III-P; IV-R
3) I-S; II-Q; III-R; IV-P
4) I-SP; II-Q; III-R; IV-S

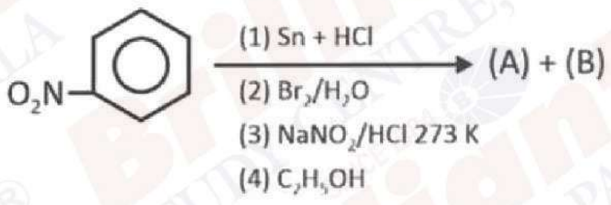
QN. $A + B \rightleftharpoons C;\ K_{eq} = 2.7 \times 10^{-5}$

$A + \frac{1}{3}B \rightarrow \frac{1}{3}C;\ K^1_{eq} = X$

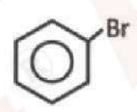
The value of X is

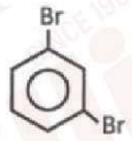
1) 9×10^{-6} 2) 3×10^{-2} 3) 2.7×10^{-5} 4) 4×10^{-2}

QN. Consider the reaction

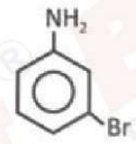


Identify 'A' (it is benzenoid product)

1) 

2) 

3) 

4) 

QN. If 'n' is the number of lone pairs of electrons in the equatorial position of the most stable structure of ClF_3, which of the following ions also have 'n' unpaired electrons?

A) V^{3+} B) Ti^{3+} C) Cu^{2+}

D) Ni^{2+} E) Ti^{2+}

1) A and C only 2) A, D and E only 3) B and C only 4) B and D only

QN. Statement-I : Actinoid contraction > Lanthanoid contraction (element to element)

Statement-II : Tb^{4+}, Ce^{4+} - oxidant

Statement-III : Yb^{2+}, Eu^{2+} - reductant

Mark the correct statement

1) I, II only 2) I, II only are correct

3) I, II, III are correct 4) Only II is correct

QN. The calculated spin only magnetic moment of $K_3[Fe(OH)_6]$ and $K_4[Fe(OH)_6]$ respectively are

1) 5.92 BM and 4.90 BM 2) 5.92 BM and 5.92 BM

3) 4.90 BM and 4.90 BM 4) 4.90 BM and 5.92 BM

QN. Arrange the following functional groups in increasing order of electron withdrawing effect

–CN, $–NO_2$, –I, –COOH

1) $–NO_2 < –CN < –I < –COOH$ 2) $–I < –COOH < –CN < –NO_2$

3) $–COOH < –I$, $–NO_2 < –CN$ 4) $–I < –COOH < –NO_2 < –CN$

QN. The number of moles of $F_2C_2O_4$ and $FeSO_4 \times (NH_4)_2SO_4 \times 6H_2O$ required to completely react with 2 mol of acidified $KMnO_4$ for each of them is respectively

1) 3.33 moles and 10 moles 2) 5 moles and 10 moles

3) 5 moles and 3.33 moles 4) 3.33 moles and 5 moles

QN. Consider the following reaction P →Q. If the reaction follows first order kinetics, find the fraciton of decomposed molecule at time t

1) $1 – e^{kt}$ 2) $1+e^{kt}$ 3) $1 -e^{–kt}$ 4) $1 + e^{–kt}$

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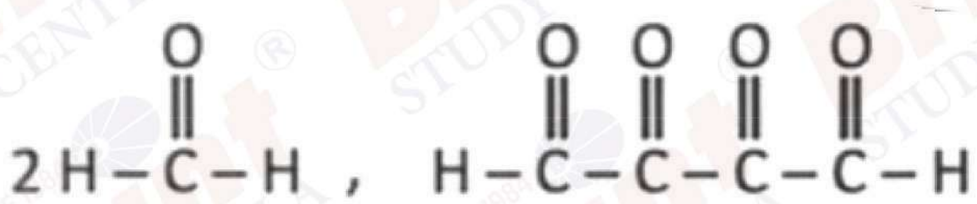
MEMORY BASED QUESTIONS

CHEMISTRY

QN. 4 gram of soltue is dissovled in a certain amount of solvent and its vapour pressure decreases from 760 mm to 750 mm. 4 gram of same solute is dissolved in same amount of that solvent that causes increase in boiling point by 0.15°C. Calculate the molar mass of solvent. [K_b = 0.5 K kg/mol]. Consider solute to be non-electrolyte.

1) 22.22 g/mol 2) 44.44 g/mol 3) 60 g/mol 4) 70 g.mol

QN. An organic compound on reductive ozonolysis gives the following product



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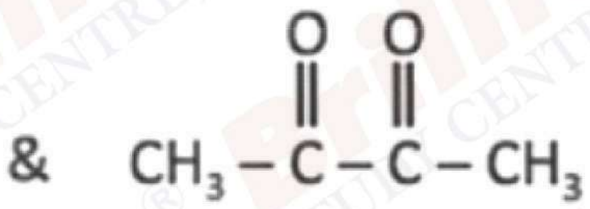
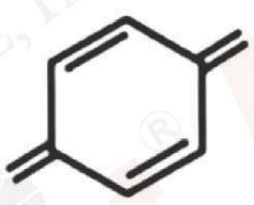
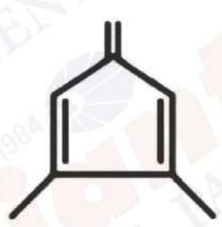
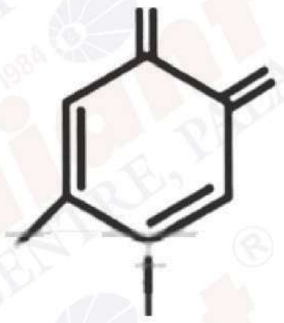


The structure of organic compound is

1) 

2) 

3) 

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