



**JEE
MAIN
FEB.
2021**

**26th Feb. 2021 | Shift - 2
CHEMISTRY**

JEE | NEET | Foundation

MOTION™

25000+
SELECTIONS SINCE 2007

Section - A

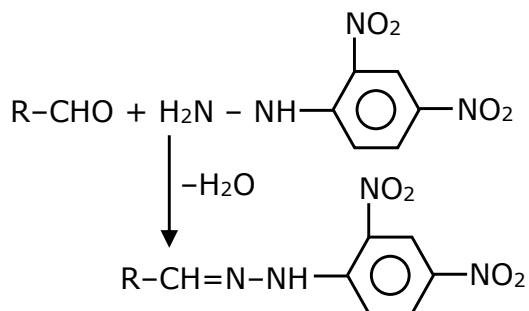
Topic- Carboxylic compound

Subtopic- Test of Carboxylic acid

Level-M

1. 2,4-DNP test can be used to identify:
 (1) aldehyde (2) halogens (3) ether (4) amine
 2,4-DNP परीक्षण जिसकी पहचान के लिए किया जाता है, वह है :
 (1) ऐल्डिहाइड (2) हैलोजन (3) ईथर (4) ऐमीन

Ans. (1)
Sol.

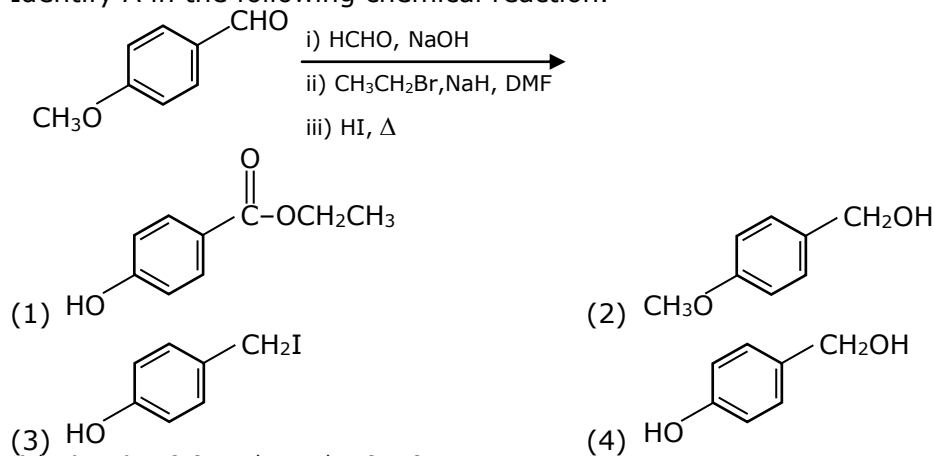


Topic- Aromatic compounds

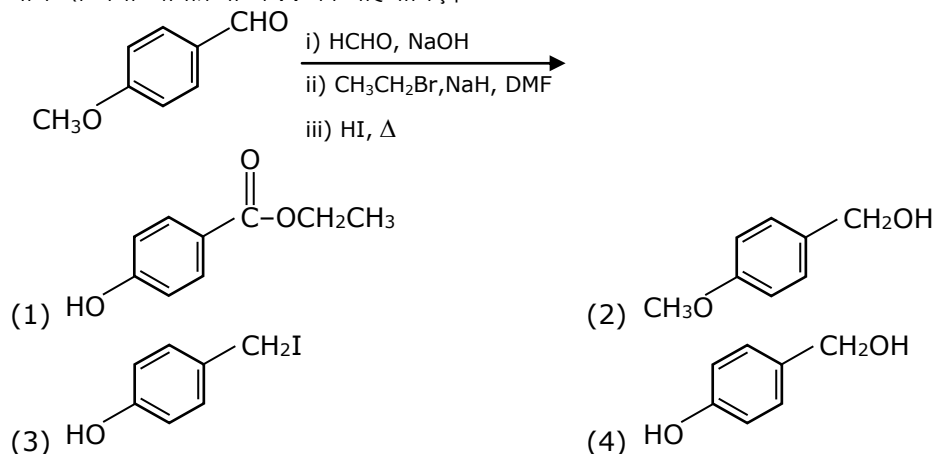
Subtopic- Electrophilic Aromatic substitution

Level-M

2. Identify A in the following chemical reaction.



नीचे दी गयी अभिक्रिया में A को पहिचानिए।

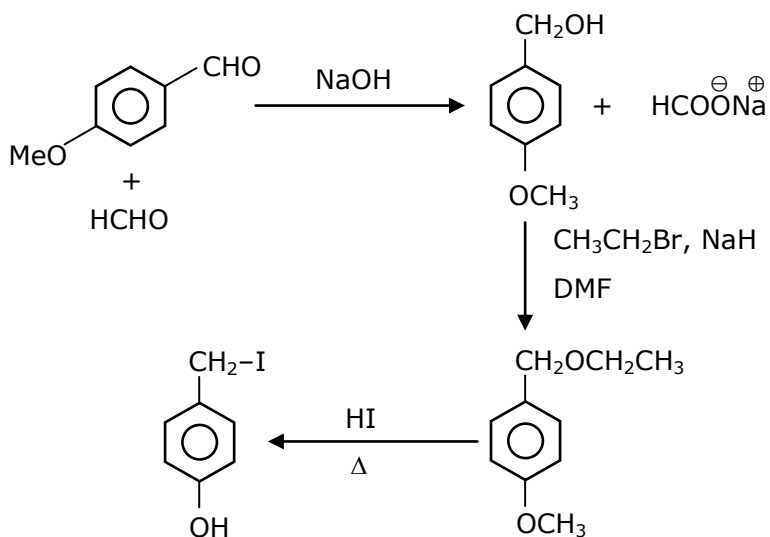


Toll Free : 1800-212-1799

www.motion.ac.in | Email : info@motion.ac.in

Ans. (3)

Sol.



Topic- Surface chemistry

Subtopic- Adsorption

Level-E

3. The nature of charge on resulting colloidal particles when FeCl₃ is added to excess of hot water is:

- (1) positive
- (2) neutral
- (3) sometimes positive and sometimes negative
- (4) negative

FeCl₃ को गर्म पानी के अधिक्य में मिलाने पर उत्पन्न कोलाइडल कणों पर प्रगट हाने वाले आवेश की प्रकृति है :

- (1) धनात्मक
- (2) अनावेशी
- (3) कभी धनात्मक कभी ऋणात्मक
- (4) ऋणात्मक

Ans. (1)

Sol. If FeCl₃ is added to excess of hot water, a positively charged sol of hydrated ferric oxide is formed due to adsorption of Fe³⁺ ions.

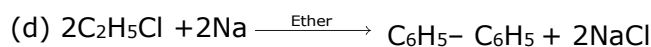
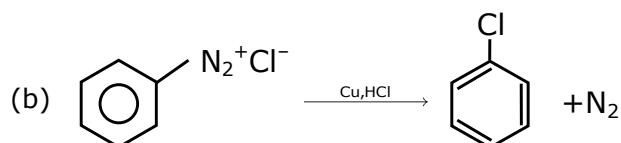
Toll Free : 1800-212-1799

www.motion.ac.in | Email : info@motion.ac.in

Topic- Alkyl Halide
Subtopic- Types of reactions
Level-M

4. Match **List-I** with **List-II**

List-I



List-II

(i) Wurtz reaction

(ii) Sandmeyer reaction

(iii) Fitting reaction

(iv) Gatterman reaction

Choose the correct answer from the option given below:

(1) (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

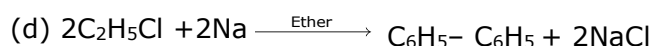
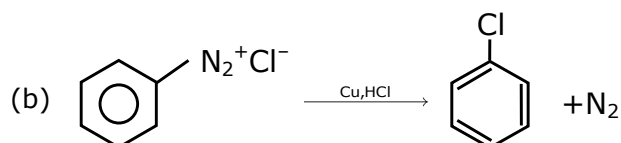
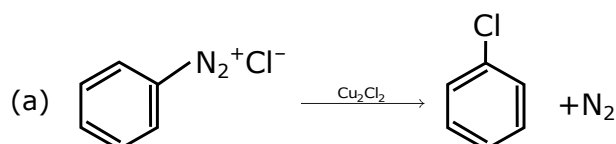
(2) (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)

(3) (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)

(4) (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)

सूची-I का सूची-II साथ सुमेल कीजिए :

सूची-I



सूची-II

(i) वुर्ट्ज अभिक्रिया

(ii) सैन्डमायर अभिक्रिया

(iii) फिटिंग अभिक्रिया

(iv) गाटरमान अभिक्रिया

Choose the correct answer from the option given below:

(1) (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

(2) (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)

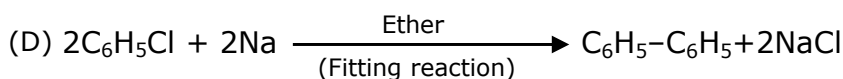
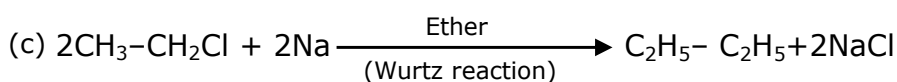
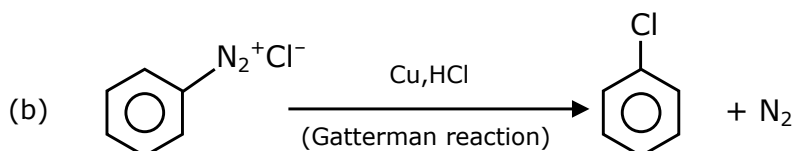
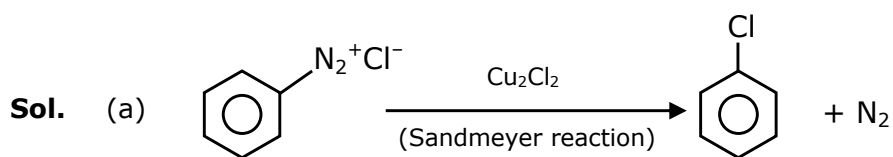
(3) (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)

(4) (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)

Toll Free : 1800-212-1799

www.motion.ac.in | Email : info@motion.ac.in

Ans. (3)



Topic- Chemical bonding

Subtopic- Hybridization

Level-E

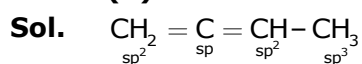
5. In $\overset{1}{\text{CH}_2} = \overset{2}{\text{C}} = \overset{3}{\text{CH}} - \overset{4}{\text{CH}_3}$ molecule, the hybridization of carbon 1, 2, 3 and 4 respectively are:

- (1) sp^2, sp, sp^2, sp^3 (2) sp^2, sp^2, sp^2, sp^3
(3) sp^2, sp^3, sp^2, sp^3 (4) sp^3, sp, sp^3, sp^3

$\overset{1}{\text{CH}_2} = \overset{2}{\text{C}} = \overset{3}{\text{CH}} - \overset{4}{\text{CH}_3}$ अणु में कार्बन 1, 2, 3 तथा 4 के संकरण क्रमशः है:

- (1) sp^2, sp, sp^2, sp^3 (2) sp^2, sp^2, sp^2, sp^3
(3) sp^2, sp^3, sp^2, sp^3 (4) sp^3, sp, sp^3, sp^3

Ans. (1)



Topic- Biomolecules

Subtopic- Carbohydrates Introduction

Level-M

6. Match List-I with List-II.

List-I

- (a) Sucrose
(b) Lactose
(c) Maltose

List-II

- (i) β -D-Galactose and β -D-Glucose
(ii) α -D-Glucose and β -D-Fructose
(iii) α -D-Glucose and α -D-Glucose

Choose the correct answer from the options given below:

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

Toll Free : 1800-212-1799

www.motion.ac.in | Email : info@motion.ac.in

सूची-I का सूची-II साथ सुमेल कीजिए :

सूची-I

- (a) सूक्रोस
- (b) लैक्टोस
- (c) माल्टोस

सूची-II

- (i) β -D-गैलैक्टोस तथा β -D-ग्लुकोस
- (ii) α -D- ग्लुकोस तथा β -D- फ्रक्टोस
- (iii) α -D- ग्लुकोस तथा α -D- ग्लुकोस

नीचे दिए विकल्पों में सही उत्तर चुनिए :

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

Ans. (4)

Sol. Sucrose \rightarrow α -D- Glucose and β -D- Fructose

Lactose \rightarrow β -D- Galactose and β -D- Glucose

Maltose \rightarrow α -D- Glucose and α -D- Glucose

Topic- Periodic Properties

Subtopic- nature of oxide

Level-E

7. Which pair of oxides is acidic in nature?

- (1) N_2O , BaO
- (2) CaO , SiO_2
- (3) B_2O_3 , CaO
- (4) B_2O_3 , SiO_2

कौन सा ऑक्साइडों का युग्म अम्लीय प्रकृति का है ?

- (1) N_2O , BaO
- (2) CaO , SiO_2
- (3) B_2O_3 , CaO
- (4) B_2O_3 , SiO_2

Ans. (4)

Sol. B_2O_3 and SiO_2 both are oxides of non-metal and hence are acidic in nature.

Topic-Hydrogen & its compound

Subtopic-

Level-M

8. Calgon is used for water treatment. Which of the following statement is NOT true about calgon?

- (1) Calgon contains the 2nd most abundant element by weight in the earth's crust.
- (2) It is also known as Graham's salt.
- (3) It is polymeric compound and is water soluble.
- (4) It does not remove Ca^{2+} ion by precipitation.

केलॉगॉन का उपयोग जल के उपचार में किया जाता है। केलॉगॉन के संदर्भ में निम्न में से कौन सा कथन सत्य नहीं है ?

- (1) केलॉगॉन में, भार अनुसार भू-पर्पटी में दूसरा अति बाहुल्य तत्व संनिहित है।
- (2) इसको ग्राहम लवण के नाम से भी जाना जाता है।
- (3) यह बहुलकी यौगिक है और जल में विलयशील है।
- (4) यह Ca^{2+} आयन को अवक्षेप में परिवर्तित करके पृथक नहीं करता है।

Ans. (1)

Sol. $Na_6(PO_3)_6$ or $Na_6P_6O_{18}$

Order of abundance of element in earth crust is

$O > Si > Al > Fe > Ca > Na > Mg > K$

So second most abundant element in earth crust is Si not Ca.

Toll Free : 1800-212-1799

www.motion.ac.in | Email : info@motion.ac.in

Topic- Alcohol

Subtopic- Test of alcohol

Level-M

9. Ceric ammonium nitrate and $\text{CHCl}_3/\text{alc. KOH}$ are used for the identification of functional groups present in _____ and _____ respectively.

- (1) alcohol, amine (2) amine, alcohol (3) alcohol, phenol (4) amine, phenol

सेरिक अमोनियम नाइट्रेट तथा $\text{CHCl}_3/\text{ऐल्कोहॉल KOH}$ का उपयोग क्रमशः _____ तथा _____ ग्रुप की पहचान के लिए किया जाता है।

- (1) ऐल्कोहॉल, ऐमीन (2) ऐमीन, ऐल्कोहॉल (3) ऐल्कोहॉल, फीनॉल (4) ऐमीन, फीनॉल

Ans. (1)

Sol. Alcohol give positive test with ceric ammonium nitrate and primary amines gives carbyl amine test with $\text{CHCl}_3, \text{KOH}$.

Topic- P-block

Subtopic- Boron family & compound of boron

Level-E

10. Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R.

Assertion A: In TlI_3 , isomorphous to CsI_3 , the metal is present in +1 oxidation state.

Reason R: Tl metals has fourteen f electrons in its electronic configuration.

In the light of the above statements, choose the most appropriate answer from the options given below:

- (1) Both A and R are correct and R is the correct explanation of A
(2) A is not correct but R is correct
(3) Both A and R are correct R is NOT the correct explanation of A
(4) A is correct but R is not correct

नीचे दो कथन दिए गए हैं एक अभिकथन A और दूसरे कारण R है।

अभिकथन A : CsI_3 के समाकृतिक TlI_3 में, धातु +1 ऑक्सीकरण अवस्था में उपस्थित है।

कारण R : Tl धातु के इलेक्ट्रान विन्यास में चौदह f इलेक्ट्रान होते हैं।

उपरोक्त कथनों के संदर्भ में नीचे दिये विकल्पों में से सर्वाधिक उचित उत्तर चुनिए :

- (1) दोनों A तथा R सही हैं और R, A की सही व्याख्या है।
(2) A सही नहीं है परन्तु R सही है।
(3) दोनों A तथा R सही हैं परन्तु R, A की सही व्याख्या नहीं है।
(4) A सही है परन्तु R सही नहीं है।

Ans. (3)

Sol. TlI_3 is $\text{Tl}^+ \text{I}_3^-$

CsI_3 is $\text{Cs}^+ \text{I}_3^-$

Thallium shows Tl^+ state due to inert pair effect.

Topic- Periodic Properties

Subtopic- Electronic efficiency

Level-E

11. The correct order of electron gain enthalpy is:

- (1) $\text{S} > \text{Se} > \text{Te} > \text{O}$ (2) $\text{O} > \text{S} > \text{Se} > \text{Te}$
(3) $\text{S} > \text{O} > \text{Se} > \text{Te}$ (4) $\text{Te} > \text{Se} > \text{S} > \text{O}$

इलेक्ट्रान लब्धि एन्थैल्पी का सही क्रम है :

- (1) $\text{S} > \text{Se} > \text{Te} > \text{O}$ (2) $\text{O} > \text{S} > \text{Se} > \text{Te}$
(3) $\text{S} > \text{O} > \text{Se} > \text{Te}$ (4) $\text{Te} > \text{Se} > \text{S} > \text{O}$

Ans. (1)

Sol. Electron gain enthalpy of O is very low due to small size.

Toll Free : 1800-212-1799

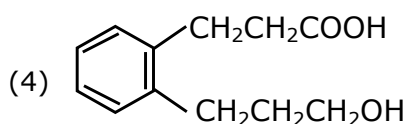
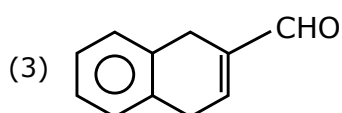
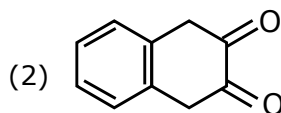
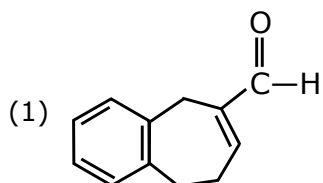
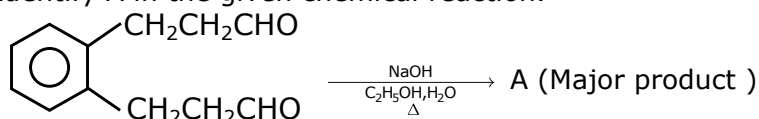
www.motion.ac.in | Email : info@motion.ac.in

Topic- Carbonyl compound

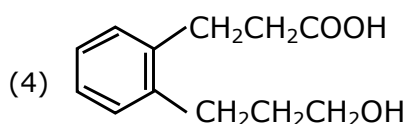
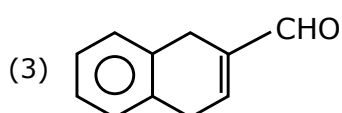
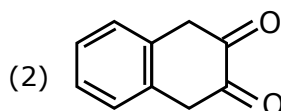
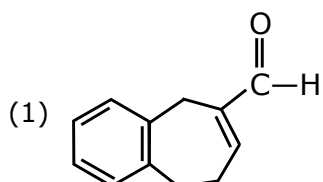
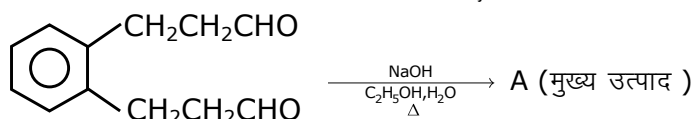
Subtopic- Chemical reaction of carbonyl compound

Level-M

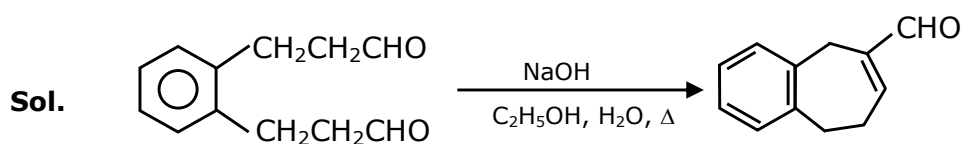
12. Identify A in the given chemical reaction.



दी गयी रसायनिक अभिक्रिया में A को पहचानिए :



Ans. (1)



(Internal aldol condensation)

Topic- Metallurgy

Subtopic-Introduction

Level-E

13. Match List-I with List-II

List-I

- (a) Siderite
- (b) Calamine
- (c) Malachite
- (d) Cryolite

List-II

- (i) Cu
- (ii) Ca
- (iii) Fe
- (iv) Al
- (v) Zn

Toll Free : 1800-212-1799

www.motion.ac.in | Email : info@motion.ac.in

Choose the correct answer from the options given below:

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

सूची-I का सूची-II साथ सुमेल कीजिए :

सूची-I	सूची-II
(a) सिडेराइट	(i) Cu
(b) कैलामाइन	(ii) Ca
(c) मेलकाइट	(iii) Fe
(d) क्रायोलाइट	(iv) Al
	(v) Zn

नीचे दिये गये विकल्पों में से सही उत्तर चुनिये :

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

Ans. (2)

Sol.

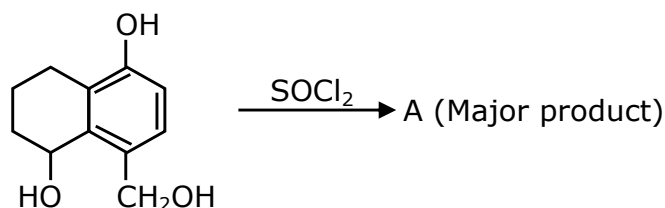
Siderite	- FeCO ₃
Calamine	- ZnCO ₃
Malachite	- CuCO ₃ .Cu(OH) ₂
Cryolite	- Na ₃ AlF ₆

Topic- Aromatic compounds

Subtopic- Electrophilic substitution reaction

Level-M

14. Identify A in the given reaction

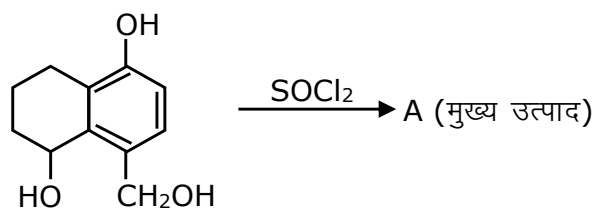


- (1)
- (2)
- (3)
- (4)

Toll Free : 1800-212-1799

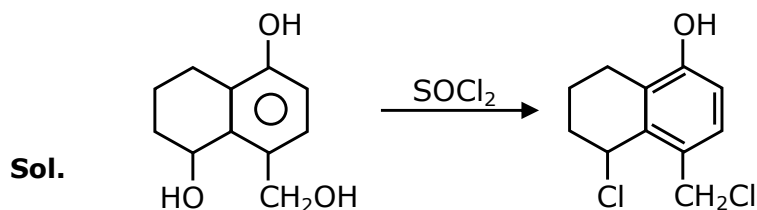
www.motion.ac.in | Email : info@motion.ac.in

दी गयी अभिक्रिया में A को पहिचानिए :



- (1)
- (2)
- (3)
- (4)

Ans. (2)



Topic- s-block

Subtopic- group IA

Level-M

15. Match List-I with List-II.

List-I

- (a) Sodium Carbonate
- (b) Titanium
- (c) Chlorine
- (d) Sodium hydroxide

List-II

- (i) Deacon
- (ii) Caster-Kellner
- (iii) Van-Arkel
- (iv) Solvay

Choose the correct answer from the option given below:

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

Toll Free : 1800-212-1799

www.motion.ac.in | Email : info@motion.ac.in

रिपिटर्स बैच का सर्वश्रेष्ठ परिणाम सिर्फ मोशन के साथ

MOTION™

सूची-I का सूची-II साथ सुमेल कीजिए :

सूची-I	सूची-II
(a) सोडियम कार्बोनेट	(i) डेकॉन
(b) टाइटेनियम	(ii) कास्टनर-कैलनर
(c) क्लोरीन	(iii) वॉन-आरकैल
(d) सोडियम हाइड्रॉक्साइड	(iv) साल्वे

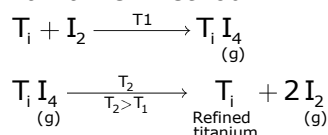
नीचे दिये गये विकल्पों में से सही उत्तर चुनिये :

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

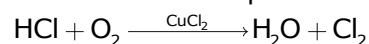
Ans. (2)

Sol. Sodium carbonate Na_2CO_3 & NaHCO_3

Titanium : Van arkel method



Chlorine : Decon's process



Sodium hydroxide :- Caster-Kellner cell

Topic- Chemical bonding

Subtopic- MOT

Level-M

16. Match List-I with List-II.

List-I (Molecule)	List-II (Bond order)
(a) Ne_2	(i) 1
(b) N_2	(ii) 2
(c) F_2	(iii) 0
(d) O_2	(iv) 3

Choose the correct answer from the options given below:

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

सूची-I का सूची-II साथ सुमेल कीजिए :

सूची-I (अणु)	सूची-II (आबन्ध क्रम)
(a) Ne_2	(i) 1
(b) N_2	(ii) 2
(c) F_2	(iii) 0
(d) O_2	(iv) 3

नीचे दिये गये विकल्पों में से सही उत्तर चुनिये :

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

Ans. (1)

Sol. Ne_2O $\text{BO} = 0$
 N_2 $\text{BO} = 3$
 F_2 $\text{BO} = 1$
 O_2 $\text{BO} = 2$

As per molecular orbital theory

Toll Free : 1800-212-1799

www.motion.ac.in | Email : info@motion.ac.in

Topic-Hydrogen & its compound

Subtopic-Introduction

Level-M

17. Which of the following forms of hydrogen emits low energy β^- particles?
 (1) Proton H^+ (2) Deuterium 2_1H (3) Protium 1_1H (4) Tritium 3_1H
 निम्नलिखित में से हाइड्रोजन का कौन सा रूप निम्न ऊर्जा के β^- कणों का उत्सर्जन करता है ?
 (1) प्रोटान H^+ (2) ड्यूटीरियम 2_1H (3) प्रोटियम 1_1H (4) ट्राइटियम 3_1H

Ans. (4)

Sol. Tritium isotope of hydrogen is radioactive and emits low energy β^- particles. It is because of high n/p ratio of tritium which makes nucleus unstable.

Topic- GOC

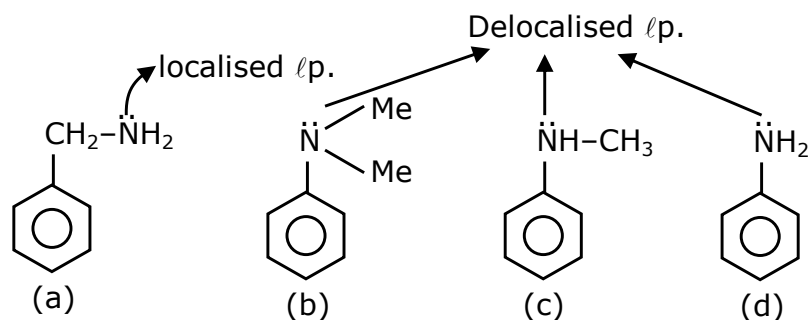
Subtopic- Basic strength of organic compounds

Level-M

18. A. Phenyl methanamine B. N, N-Dimethylaniline
 C. N-Methyl aniline D. Benzenamine
 Choose the correct order of basic nature of the above amines.
 (1) $D > C > B > A$ (2) $D > B > C > A$ (3) $A > C > B > D$ (4) $A > B > C > D$

- A. फेनिल मेथेनऐमीन B. N, N-डाइमेथिल ऐनिलीन
 C. N-मेथिल ऐनिलीन D. बेन्जीनऐमीन
 नीचे दिए गये विकल्पों में से उपरोक्त ऐमीनों की क्षारीय प्रकृति का सही क्रम चुनिए :
 (1) $D > C > B > A$ (2) $D > B > C > A$ (3) $A > C > B > D$ (4) $A > B > C > D$

Ans. (4)
 Sol.

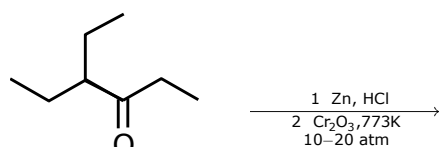


Topic- Carbonyl compound

Subtopic- Chemical reaction of carbonyl compound

Level-M

19.

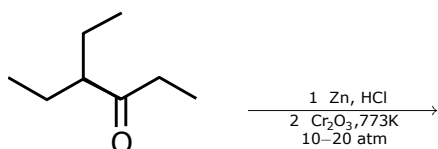


Considering the above reaction, the major product among the following is:

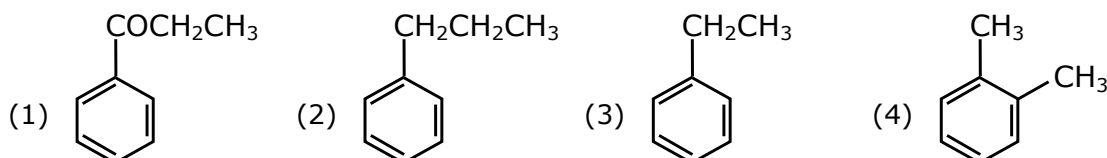
- (1) (2) (3) (4)

Toll Free : 1800-212-1799

www.motion.ac.in | Email : info@motion.ac.in

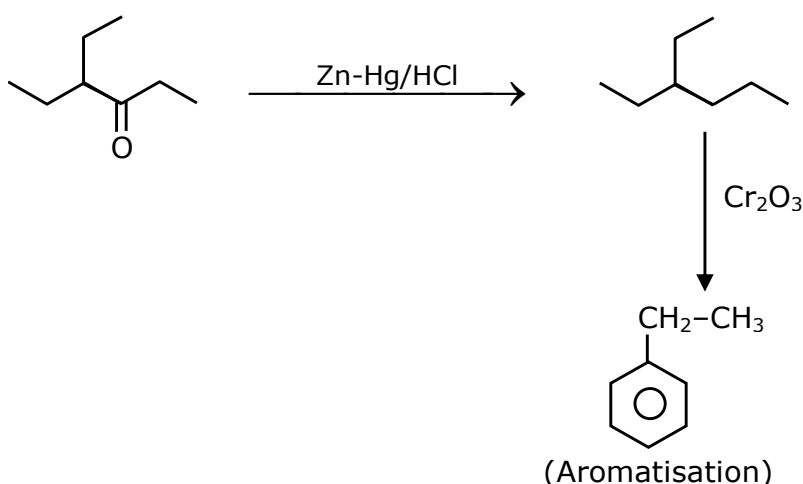


उपरोक्त अभिक्रिया का मुख्य उत्पाद है :



Ans. (3)

Sol.



Topic- Biomolecules

Subtopic-Test of protein

Level-M

20. Seliwanoff test and Xanthoproteic test are used for the identification of _____ and _____ respectively

- (1) ketoses, proteins (2) proteins, ketoses
(3) aldoses, ketoses (4) ketoses, aldoses

सेलिवानॉफ परीक्षण तथा जैन्थोप्रोटीइक परीक्षण का प्रयोग क्रमशः _____ तथा _____ की पहचान में किया जाता है।

- (1) कीटोस, प्रोटीन (2) प्रोटीन, कीटोस
(3) ऐल्डोस, कीटोस (4) कीटोस, ऐल्डोस

Ans. (1)

Sol. Seliwanoff test and Xanthoproteic test are used for identification of 'Ketoses' and proteins respectively.

Toll Free : 1800-212-1799

www.motion.ac.in | Email : info@motion.ac.in

Section - B

Topic- Liquid solution

Subtopic- Ideal Vs non ideal solution

Level-M

1. The NaNO_3 weighed out to make 50 mL of an aqueous solution containing 70.0 mg Na^+ per mL is _____ g. (Rounded off to the nearest integer)
 [Given: Atomic weight in g mol^{-1} . Na: 23; N: 14; O : 16]
 70.0 mg Na^+ प्रति mL के एक 50 mL जलीय विलयन को बनाने के लिए NaNO_3 की जितनी मात्रा आवश्यक होगी, वह है _____ g । (निकटतम पूर्णांक तक)
 [दिया है : परमाणु भार g mol^{-1} में Na: 23; N: 14; O : 16]

Ans. 13

Sol. $\text{Na}^+ = 70 \text{ mg/mL}$

$$\begin{aligned} W_{\text{Na}^+} \text{ in } 50\text{mL solution} &= 70 \times 50\text{mg} \\ &= 3500 \text{ mg} \\ &= 3.5 \text{ gm} \end{aligned}$$

$$\text{Moles of } \text{Na}^+ \text{ in } 50 \text{ ml solution} = \frac{3.5}{23}$$

$$\text{Moles of } \text{NaNO}_3 = \text{moles of } \text{Na}^+$$

$$= \frac{3.5}{23} \text{ mol}$$

$$\text{Mass of } \text{NaNO}_3 = \frac{3.5}{23} \times 85 = 12.934 \approx 13\text{gm Ans.}$$

Topic- Coordination chemistry

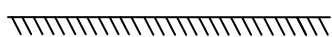
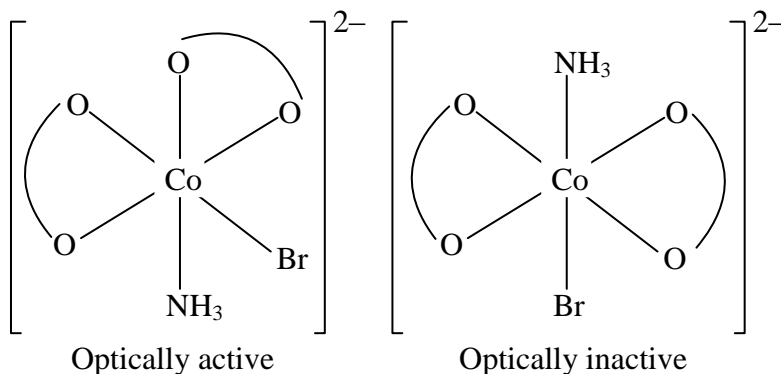
Subtopic-Isomerism

Level-T

2. The number of stereoisomers possible for $[\text{Co}(\text{ox})_2(\text{Br})(\text{NH}_3)]^{2-}$ is _____ [ox = oxalate]
 $[\text{Co}(\text{ox})_2(\text{Br})(\text{NH}_3)]^{2-}$ के त्रिविम समावयवों की संख्या है। _____ । [ox = ऑक्सैलेट]

Ans. 3

Sol. $[\text{Co ox}_2 \text{Br NH}_3]^{2-}$



Mirror image

$$\text{Total stereoisomer} = 2 (\text{gl}) + 1 \text{ POE (pair of enantiomers)} = 3$$

Toll Free : 1800-212-1799

www.motion.ac.in | Email : info@motion.ac.in

Topic- Thermochemistry

Subtopic- ΔH_f° , Hess's law

Level-M

3. The average S-F bond energy in kJ mol^{-1} of SF_6 is _____. (Rounded off to the nearest integer)

[Given : The values of standard enthalpy of formation of $\text{SF}_6(\text{g})$, $\text{S}(\text{g})$ and $\text{F}(\text{g})$ are - 1100, 275 and 80 kJ mol^{-1} respectively.]

SF_6 के लिए औसत S-F आबंध ऊर्जा kJ mol^{-1} में है _____। (निकटतम पूर्णांक तक)

[दिया है : $\text{SF}_6(\text{g})$, $\text{S}(\text{g})$ तथा $\text{F}(\text{g})$ के लिए मानक विरचन एन्थैल्पी क्रमशः - 1100, 275 तथा 80 kJ mol^{-1} है]

Ans. 309

Sol. $\text{SF}_6(\text{g}) \longrightarrow \text{S}(\text{g}) + 6\text{F}(\text{g})$

$$\Delta H_{\text{reaction}}^\circ = 6 \times E_{\text{S-F}} = \Delta H_f^\circ[\text{S}(\text{g})] + 6 \times \Delta H_f^\circ[\text{F}(\text{g})] - \Delta H_f^\circ[\text{SF}_6(\text{g})]$$

$$6 \times E_{\text{S-F}} = 275 + 6 \times 80 - (-1100)$$

$$= 275 + 480 + 1100$$

$$6 \times E_{\text{S-F}} = 1855$$

$$E_{\text{S-F}} = \frac{1855}{6} = 309.1667$$

$$\approx 309 \text{ kJ/mol Ans.}$$

Topic-Electro chemistry

Subtopic-Electro chemical cell

Level-M

4. Emf of the following cell at 298 K in V is $x \times 10^{-2}$.



The value of x is _____. (Rounded off to the nearest integer)

$$[\text{Given: } E_{\text{Zn}^{2+}/\text{Zn}}^\circ = -0.76\text{V}; E_{\text{Ag}^+/\text{Ag}}^\circ = +0.80\text{V}; \frac{2.303RT}{F} = 0.059]$$

निम्नलिखित सेल का 298 K पर (V में) $x \times 10^{-2}$ है।

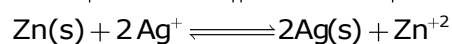


x का मान है _____। (निकटतम पूर्णांक तक)

$$[\text{दिया है : } E_{\text{Zn}^{2+}/\text{Zn}}^\circ = -0.76\text{V}; E_{\text{Ag}^+/\text{Ag}}^\circ = +0.80\text{V}; \frac{2.303RT}{F} = 0.059]$$

Ans. 147

Sol. $\text{Zn}(\text{s}) | \text{Zn}^{2+} (0.1\text{M}) || \text{Ag}^+ (0.01\text{M}) | \text{Ag}(\text{s})$



$$E^\circ = 0.80 + 0.76 = 1.56 ; Q = \left\{ \frac{\text{Zn}^{2+}}{(\text{Ag}^+)^2} \right\}$$

$$E = E^\circ - \frac{0.059}{n} \log(Q)$$

$$E = 1.56 - \frac{0.059}{2} \log \left[\frac{0.1}{(0.01)^2} \right]$$

$$E = 1.56 - \frac{0.059}{2} \log [10^3]$$

$$E = 1.4715 = 147.15 \times 10^{-2} \text{ volt}$$

$$= x \times 10^{-2}$$

$$X = 147.15 \approx 147 \text{ Ans.}$$

Toll Free : 1800-212-1799

www.motion.ac.in | Email : info@motion.ac.in

Topic- Atomic

Subtopic-Heisenberg's uncertainty principle

Level-M

5. A ball weighing 10g is moving with a velocity of 90ms^{-1} . If the uncertainty in its velocity is 5%, then the uncertainty in its position is _____ $\times 10^{-33}\text{m}$. (Rounded off to the nearest integer)
 [Given : $h = 6.63 \times 10^{-34} \text{ Js}$]
 एक गेंद जिसका भार 10g है 90ms^{-1} के वेग से गतिमान है। यदि इसके वेग में अनिश्चितता 5% है तो इसकी स्थिति में अनिश्चितता है _____ $\times 10^{-33}\text{m}$ । (निकटतम पूर्णांक तक)
 [दिया है : $h = 6.63 \times 10^{-34} \text{ Js}$]

Ans. 1

Sol. $m = 10 \text{ g} = 10^{-2} \text{ Kg}$
 $v = 90 \text{ m/sec.}$

$$\Delta v = v \times 5\% = 90 \times \frac{5}{100} = 4.5 \text{ m / sec}$$

$$m \cdot \Delta v \cdot \Delta x \geq \frac{h}{4\pi}$$

$$10^{-2} \times 4.5 \times \Delta x \geq \frac{6.63 \times 3 \times 10^{-34}}{4 \times \frac{22}{7}}$$

$$\Delta x \geq \frac{6.63 \times 7 \times 2 \times 10^{-34}}{9 \times 4 \times 22 \times 10^{-2}}$$

$$\Delta x \geq 1.17 \times 10^{-33} = x \times 10^{-33}$$

$$x = 1.17 \approx 1$$

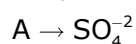
Topic-Redox

Subtopic-Basics of Oxidation number

Level-E

6. In mildly alkaline medium, thiosulphate ion is oxidized by MnO_4^- to "A". The oxidation state of sulphur in "A" is _____.
 हल्के क्षारीय माध्यम में, MnO_4^- थायोसल्फेट आयन को "A" में आक्सीकृत कर देता है। "A" में सल्फर की ऑक्सीकरण अवस्था है _____।

Ans. 6



∴ Oxidation no. of 'S' = +6 Ans.

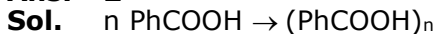
Topic- Liquid solution

Subtopic- Ideal Vs non ideal solution

Level-M

7. When 12.2 g of benzoic acid is dissolved in 100g of water, the freezing point of solution was found to be -0.93°C ($K_f(\text{H}_2\text{O}) = 1.86 \text{ K kg mol}^{-1}$). The number (n) of benzoic acid molecules associated (assuming 100% association) is _____.
 12.2 g बेंजोइक अम्ल को 100g जल में घोलने पर विलयन का हिमांक -0.93°C पाया गया है ($K_f(\text{H}_2\text{O}) = 1.86 \text{ K kg mol}^{-1}$)। बेंजोइक अम्ल के संगुणित अणुओं की संख्या है (100% संगुणन मान लीजिए) _____।

Ans. 2



$$N = \frac{1}{x} = i \text{ As } \alpha = 1$$

$$\Delta T_f = i \times k_f \times m$$

$$0.93 = \frac{1}{n} \times 1.86 \times \frac{12.2 \times 1000}{122 \times 100}$$

$$n = 2$$

Toll Free : 1800-212-1799

www.motion.ac.in | Email : info@motion.ac.in

Topic-Chemical Kinetic

Subtopic-Arrhenius equation

Level-M

8. If the activation energy of a reaction is 80.9 kJ mol^{-1} , the fraction of molecules at 700K , having enough energy to react to form products is e^{-x} . The value of x is _____.
(Rounded off to the nearest integer)

[Use $R = 8.31 \text{ JK}^{-1} \text{ mol}^{-1}$]

यदि एक अभिक्रिया की सक्रियण ऊर्जा 80.9 kJ mol^{-1} है, तो 700K पर अणुओं का वह अंश जिसके पास अभिक्रिया करके उत्पाद बनाने के लिए पर्याप्त ऊर्जा है, e^{-x} है। x का मान है _____।

(निकटतम पूर्णांक तक)

[दिया है : $R = 8.31 \text{ JK}^{-1} \text{ mol}^{-1}$]

Ans. 14

Sol. $E_a = 80.9 \text{ kJ/mol}$

Fraction of molecules able to cross energy barrier = $e^{-E_a/RT} = e^{-x}$

$$x = \frac{E_a}{RT} = \frac{80.9 \times 1000}{8.31 \times 700} = 13.91$$

$x \simeq 14$ Ans

Topic- Ionic Equilibrium

Subtopic-Salt of strong acid and weak base

Level-M

9. The pH of ammonium phosphate solution, if pK_a of phosphoric acid and pK_b of ammonium hydroxide are 5.23 and 4.75 respectively, is _____.

फॉस्फोरिक अम्ल pK_a तथा अमोनियम हाइड्रॉक्साइड का pK_b क्रमशः 5.23 तथा 4.75 है। अमोनियम फॉस्फेट विलयन की pH है _____।

Ans. 7

Sol. $(\text{NH}_4)_3\text{PO}_4 \rightleftharpoons 3\text{NH}_4^+ + \text{PO}_4^{3-}$

$$[\text{H}^+] = K_a \times \sqrt{\frac{k_w}{k_a \times k_b}}$$

$$\text{pH} = \text{p}K_a + \frac{1}{2} \text{p}K_w - \text{p}K_a - \text{p}K_b$$

$$\text{pH} = 5.23 + \frac{1}{2} \{14 - 5.23 - 4.75\}$$

$$\text{pH} = 5.23 + \frac{1}{2} (4.02) = 7.24 = 7 (\text{Nearest integer})$$

Topic-Solid State

Subtopic-FCC

Level-M

10. The number of octahedral voids per lattice site in a lattice is _____.
(Rounded off to the nearest integer)

एक जालक में अष्टफलकीय स्थानों की संख्या प्रति जालक स्थान है _____। (निकटतम पूर्णांक तक)

Ans. 1

Sol. Assuming FCC

No of lattice sites = 6 face centre + 8 corner = 14

No. of octahedral voids = 13

Toll Free : 1800-212-1799

www.motion.ac.in | Email : info@motion.ac.in

रिपिटर्स बैच का सर्वश्रेष्ठ परिणाम
सिर्फ मोशन के साथ

MOTION™

Another opportunity to
strengthen your preparation

UNNATI CRASH COURSE

JEE Main May 2021
at Kota Classroom

- ◆ 40 Classes of each subjects
- ◆ Doubt Clearing sessions by Expert faculties
- ◆ Full Syllabus Tests to improve your question solving skills
- ◆ Thorough learning of concepts with regular classes
- ◆ Get tips & trick along with sample papers

Course Fee : ₹ 20,000



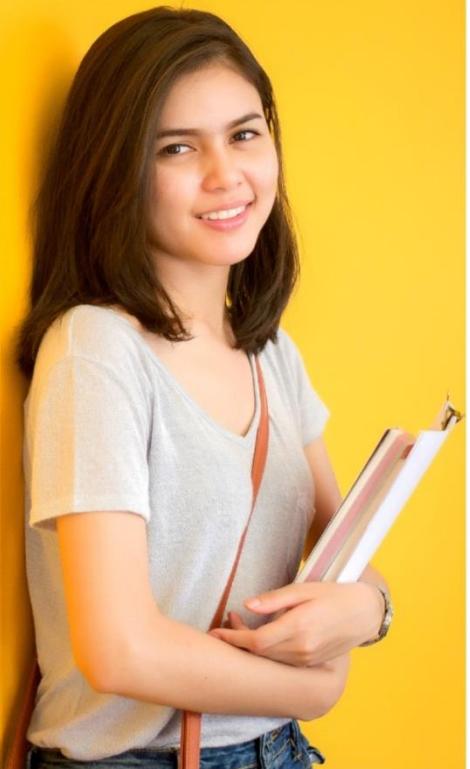
Start your JEE Advanced 2021
Preparation with

UTTHAN CRASH COURSE

at Kota Classroom

- ◆ Complete course coverage
- ◆ 55 Classes of each subject
- ◆ 17 Full & 6 Part syllabus tests will strengthen your exam endurance
- ◆ Doubt clearing sessions under the guidance of expert faculties
- ◆ Get tips & trick along with sample papers

Course Fee : ₹ 20,000



$$\text{Ratio} = \frac{13}{14} = 0.92857 = 1 \text{ (Nearest integer)}$$

Toll Free : 1800-212-1799

www.motion.ac.in | Email : info@motion.ac.in