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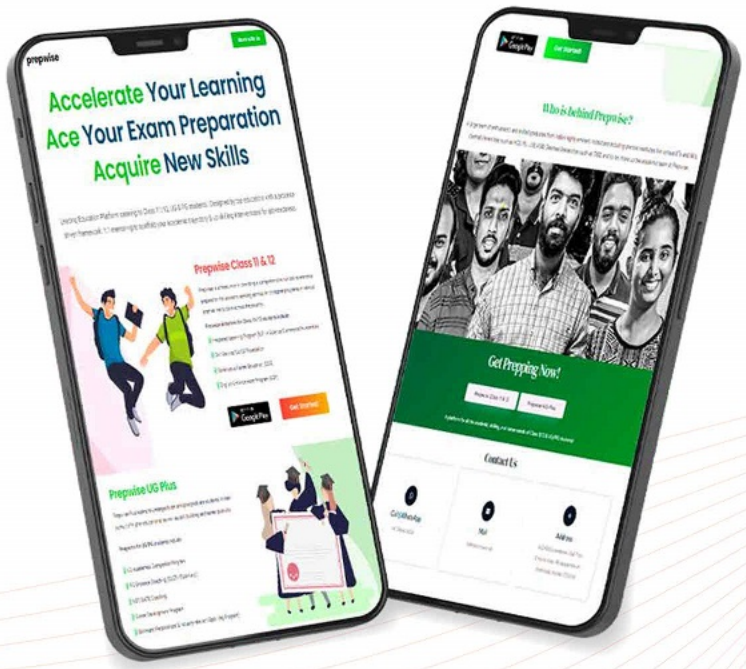

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Previous Year Question Paper

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Previous Year Question Paper

2022

Section II
Chemistry

Section Name:CHEMISTRY

Question:

Which of the following shows both Frenkel as well as Schottky defects?

A	Ag Br
B	NaCl
C	KCl
D	AgCl

Section Name:CHEMISTRY

Question:

Which of the following is correct for a hexagonal crystal system?

A	$a = b \neq c,\ \alpha = \beta = \gamma = 90°$
B	$a \neq b \neq c,\ \alpha = \beta = \gamma = 90°$
C	$a = b \neq c,\ \alpha = \beta = 90°, \gamma = 120°$
D	$a \neq b \neq c,\ \alpha = \gamma = 90°, \beta \neq 90°$

Section Name:CHEMISTRY

Question:

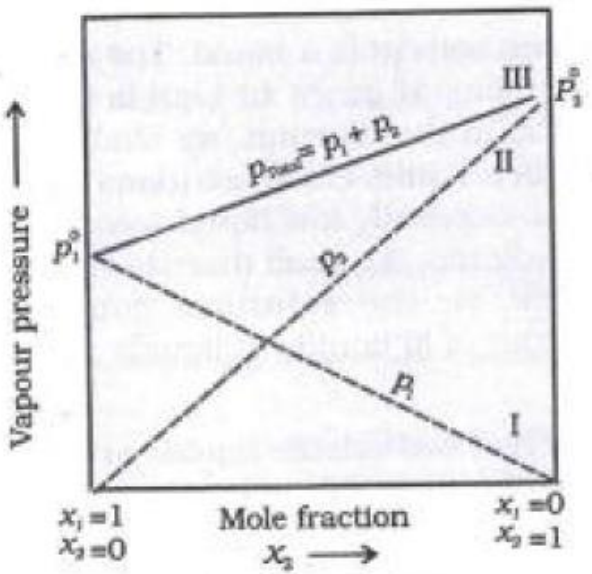
Efficiency of packing in body centered cubic structures is found to be:

A	33 %
B	74%
C	52.4 %
D	68 %

Section Name:CHEMISTRY

Question:

Observe the given graph and identify the correct statement for the solution.



A	Component 2 is more volatile than component 1.
B	Component 1 is more volatile than component 2.
C	Boiling point of component 1 is lower than that of component 2.
D	Volatility of a component depends upon its mole fraction.

Section Name:CHEMISTRY

Question:

18 g of a non-volatile solution A is dissolved in 1 kg of water, the boiling point of water is raised to 373.51 K. Given K_b for water is 0.52 K kg mol^{-1}, Boiling point for water is 373.15 K at 1.013 bar pressure.

The molecular weight of the solid A is

A	58.0 g mol^{-1}
B	26.0 g mol^{-1}
C	55.0 g mol^{-1}
D	110. 0 g mol^{-1}

Question:

Based on solute solvent interactions, arrange the following in the order of increasing solubility in n – octane.

A. Cyclohexane
B. KCl
C. CH_3OH
D. CH_3NH_2
E. CH_3CN

Choose the correct answer from the options given below:

A	A<B<C<D<E
B	B<C<E<D<A
C	C<B<A<E<D
D	B<C<D<E<A

Section Name:CHEMISTRY

Question:

In a pseudo first order reaction, the rate constant –

A	is independent of the concentration of reactants.
B	depends on concentration of reactants present in small quantity.
C	depends on temperature.
D	depends on concentration of reactants present in excess.

Section Name:CHEMISTRY

Question:

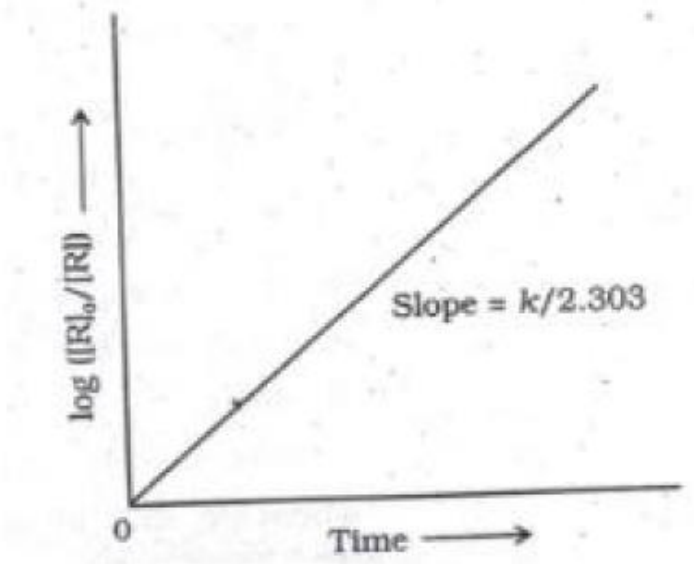
When the temperature of a reaction is increased by 20° C, the rate of reaction increases by

A	3 times
B	4 times
C	2 times
D	1.5 times

Section Name:CHEMISTRY

Question:

Observe the given graph. What will be the unit for the rate constant?



A	$mol\ L^{-1}s^{-1}$
B	$mol^{-1}\ L\ s^{-1}$
C	s^{-1}
D	$mol^{-2}\ L^{2}\ s^{-1}$

Section Name:CHEMISTRY

Question:

For a chemical reaction : -

$A + B \rightarrow$ Products

Experiment	$\frac{[A]}{\text{mol } L^{-1}}$	$\frac{[A]}{\text{mol } L^{-1}}$	$\frac{\text{Initial rate}}{\text{mol } L^{-1} S^{-1}}$
1.	0.1	0.1	2.0×10^{-3}
2.	0.2	0.2	4.0×10^{-3}
3.	0.1	0.2	2.0×10^{-3}

What is the overall order of chemical reaction?

A	3
B	1
C	2
D	0

Section Name:CHEMISTRY

Question:

Match List I with List II.

List I (Example of colloidal system)	List II (Types of colloid)
A. Smoke	I. Foam
B. Cheese	II. Aerosol
C. Soap lather	III. Emulsion
D. Milk	IV. Gel

Choose the correct answer from the options given below:

A	A- II, B- IV,C- I, D-III
B	A- I, B-II ,C- III, D- IV
C	A- I, B-III ,C- II, D- IV
D	A- IV, B-III ,C- II, D- I

Section Name:CHEMISTRY

Question:

The colloids that cannot be easily coagulated are

A	lyophobic colloids
B	lyophilic colloids
C	irreversible sols
D	associated colloids

Question:
Which of the following ores can be concentrated using froth floatation process?

A	Magnetite
B	Calamine
C	Copper pyrites
D	Bauxite

Section Name:CHEMISTRY

Question:

Match List I with List II.

List I (Ore)	List II (Molecular form)
A. Haematite	I. $CuCO_3$. $Cu(OH)_2$
B. Malachite	II. Na_3AlF_6
C. Calamine	III. Fe_2O_3
D. Cryolite	IV. $ZnCO_3$

Choose the correct answer from the options given below:

A	A- III, B- I,C- IV, D-II
B	A-I , B-III ,C- II, D-IV
C	A- IV, B-II ,C-I , D-III
D	A- II, B- IV,C- III, D- I

Question:

The correct order of boiling points for hydrogen halides is

A. HCl
B. HBr
C. HF
D. HI

Choose the correct answer from the options given below:

A	HF < HI < HBr < HCl
B	HF < HCl < HBr < HI
C	HF > HCl > HBr > HI
D	HF > HI > HBr > HCl

Section Name:CHEMISTRY

Question:

In the reaction

$N_2\,(g) + 3H_2\,(g) \rightleftharpoons 2NH_3\,(g),\ \Delta_f H^{\theta} = -46.1\ kJ\ mol^{-1}$

the yield of ammonia is expected to be maximum at

A	high temperature and low pressure.
B	high temperature and high pressure.
C	low temperature and high pressure.
D	low temperature and low pressure.

Section Name:CHEMISTRY

Question:

The structure of SF_4 is

A	Square planer
B	Tetrahedral
C	Trigonal bipyramidal
D	Octahedral

Section Name:CHEMISTRY

Question:

Which of the following interhalogen compound does not exist?

A	BrF
B	BrF_3
C	BrF_2
D	BrF_5

Section Name:CHEMISTRY

Question:

The electronic configuration of Cu in +1 oxidation state is

A	$[Ar]\ 3d^{10}$
B	$[Ar]\ 3d^{9}\ 4s^{1}$
C	$[Ar]\ 3d^{10}\ 4s^{1}$
D	$[Ar]\ 3d^{9}4s^{2}$

Section Name:CHEMISTRY

Question:

Chemical formula and colour of manganate ion is ____

A	MnO_4^{2-}, Green
B	MnO_4^{-}, Green
C	MnO_4^{-}, Purple
D	MnO_4^{2-}, Purple

Question:
Which of the following elements is **not** regarded as a transition metal?

A	Cu
B	Sc
C	Mn
D	Zn

Section Name:CHEMISTRY

Question:

Coordination number of central metal ion in $[Cu(H_2O)_4\ en]^{2+}$ is

A	3
B	4
C	5
D	6

Section Name:CHEMISTRY

Question:

Oxidation number of cobalt ion in $[CoCl_2(en)_2]^+$ will be

A	2
B	3
C	4
D	5

Section Name:CHEMISTRY

Question:

Number of ions produced on hydrolysis of $Cr(NH_3)_4Cl_3$ reacting with $AgNO_3$ to give 1 mole of AgCl, will be

A	2
B	3
C	4
D	5

Section Name:CHEMISTRY

Question:

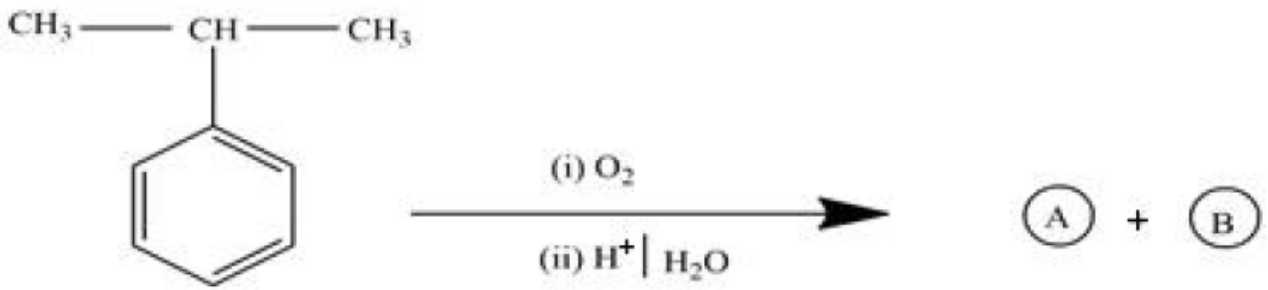
Hybridisation state of central metal ion in $[Fe(NH_3)_4(en)]^{2+}$ will be

A	sp^3
B	dsp^2
C	$d^2 sp^3$
D	sp^3d^2

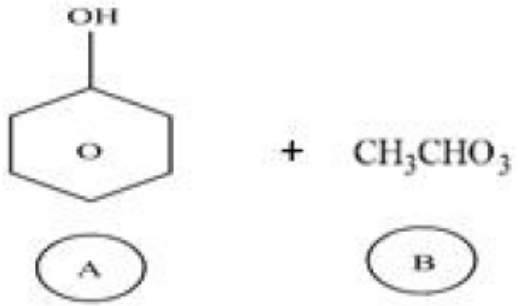
Section Name:CHEMISTRY

Question:

What are the products obtained in the chemical reaction?



A



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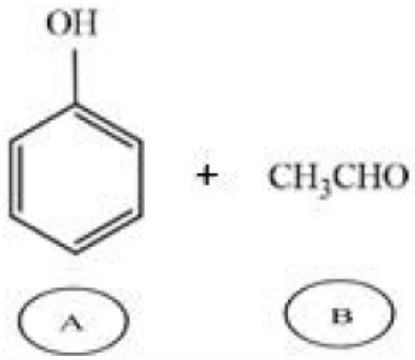

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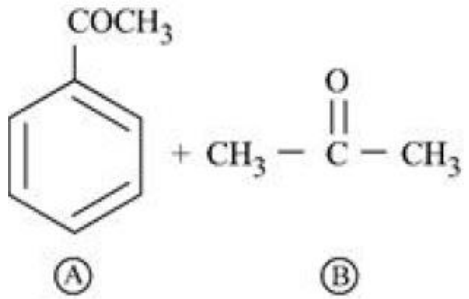

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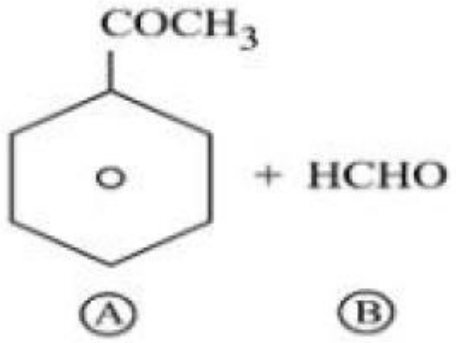


Section Name:CHEMISTRY

Question:

The IUPAC name of glycerol is

A	2 – Methyl phenol
B	Propane – 1, 2, 3 – triol
C	2 – Methylpropan-2-ol
D	2 – Methylcyclopentanol

Section Name:CHEMISTRY

Question:

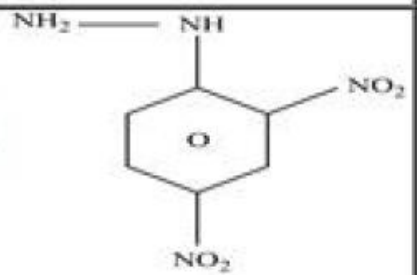
Which set of reagents will be most suitable to bring about the following change?

2, 4, 6 – Trinitrochlorobenzene to picric acid

A	NaOH, 623 K, 300 atm
B	Hot conc sulphuric acid
C	Warm water
D	Acidified water

Question:

Match List I with List II

Reagent (R)	Name of the product formed on addition to carbonyl compounds (P)
A. NH_2 NH CO NH_2	I. Imine
B. NH_2 –OH	II. Hydroazone
C. NH_2 NH_2	III. 2, 4 – Dinitrophenylhydrazone
D. 	IV. Semicarbazone

Choose the correct answer from the options given below:

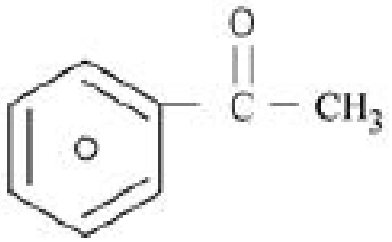
A	A- I, B- III,C- IV, D-II
B	A- IV, B- I,C- II, D- III
C	A- II, B- III,C-IV, D- I
D	A- II, B- III,C- I, D- IV

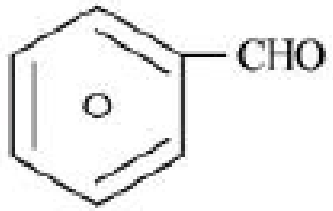
Question:

$$RCOCl + H_2 \xrightarrow{Pd,BaSO_4} X + HCl$$

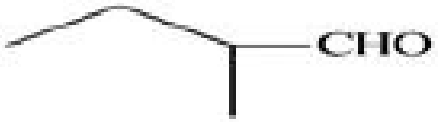
X can be

A. CH_3COCH_3

B. 

C. 

D. $CH_3CH_2COCH_3$

E. 

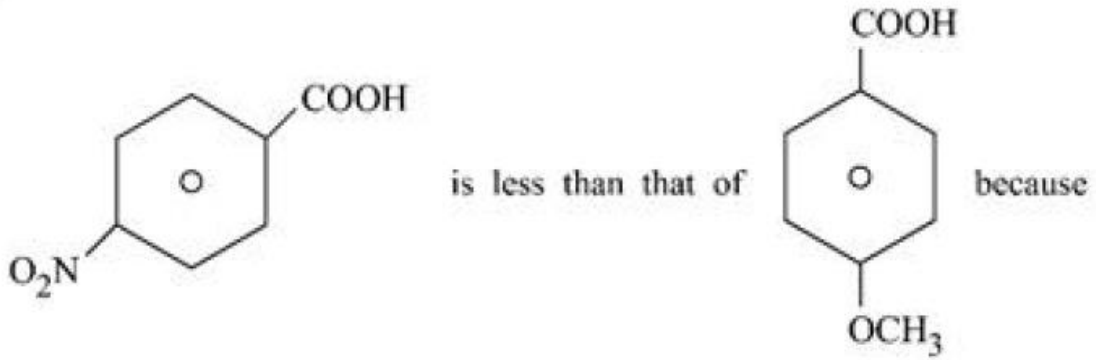
Choose the correct answer from the options given below:

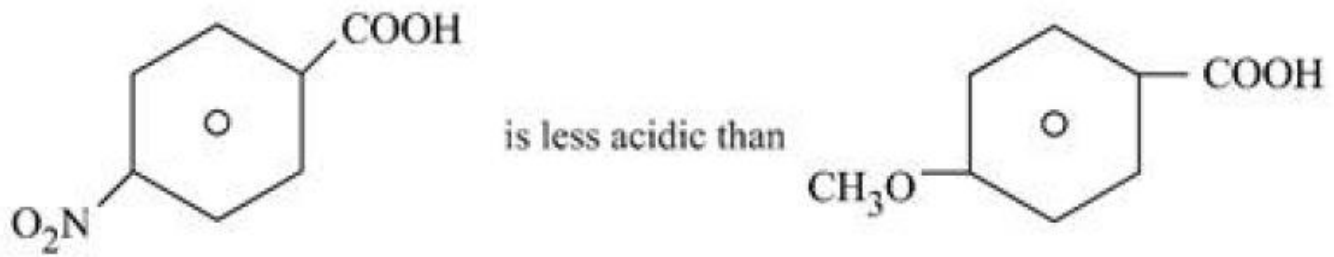
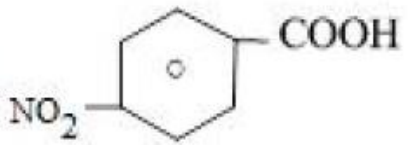
A	A, B and C only
B	B, C and D only
C	C and E only
D	B and D only

Section Name:CHEMISTRY

Question:

pKa value of



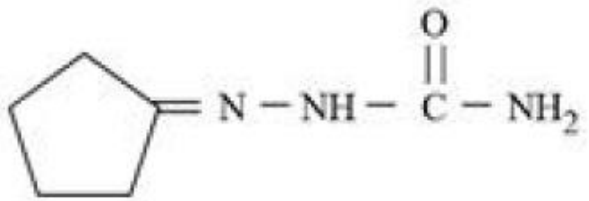
A	NO_2 is an electron donating group which increases electron- density on ring.
B	NO_2 is an electron- withdrawing group which decreases electron- density on ring.
C	
D	Hyperconjugation is more in 

Section Name:CHEMISTRY

Question:

The structure representing semicarbazone of cyclopentanone correctly is: -

A



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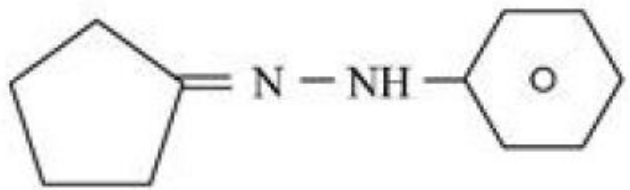

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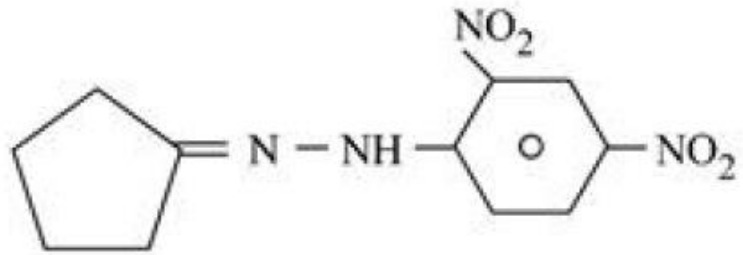

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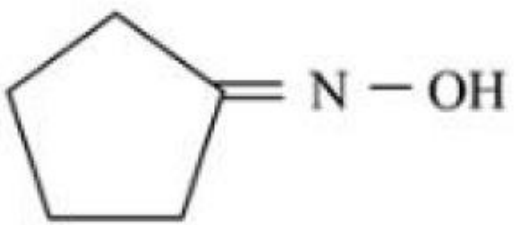

Section Name:CHEMISTRY

Question:

Beazenediazonium chloride when heated with warm water, would produce

A	benzene
B	phenol
C	chlorobenzene
D	aniline

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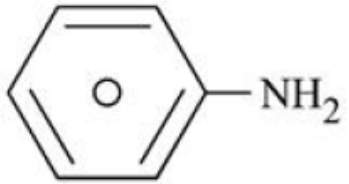
Section Name:CHEMISTRY

Question:

The reagent used in the Hinsberg test of primary, secondary and tertiary amines, is –

A



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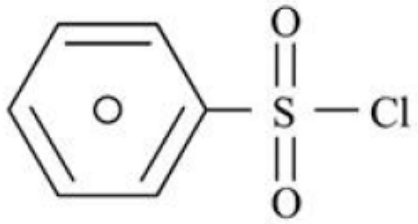

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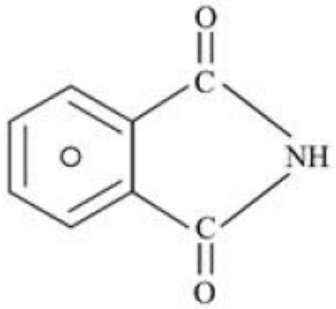

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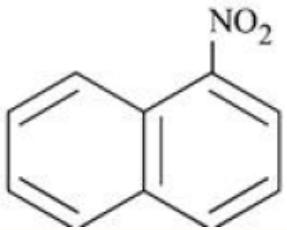


Section Name:CHEMISTRY

Question:

Which of the following is an oligosaccaharide?

A	Starch
B	Glucose
C	Ribose
D	Maltose

Question:

During denaturation of proteins

A	Secondary and tertiary structures remain intact.
B	Secondary and tertiary structures are destroyed.
C	Primary structures is destroyed.
D	Only tertiary structures remain intact.

Section Name:CHEMISTRY

Question:

The polymer used as a substitute for wool is

A	Polyether
B	Polyacrylonitrile
C	Polyester
D	Teflon

Section Name:CHEMISTRY

Question:

Which of the following polymers involve cross linkages?

A	Bakelite
B	PVC
C	Nylon 6
D	Novolac

Section Name:CHEMISTRY

Question:

The tranquilizer used to control depression and hypertension is

A	Equanil
B	Seldane
C	Maprobamate
D	Asprin

Section Name:CHEMISTRY

Question:

Which of the following is **not** an antiseptic?

A	1% solution of phenol
B	Tincture of Iodine
C	Dettol
D	Iodoform

Passage:

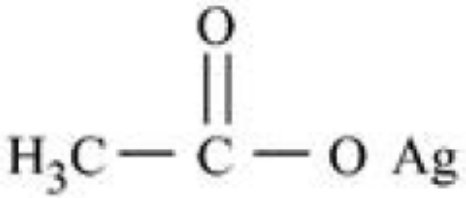
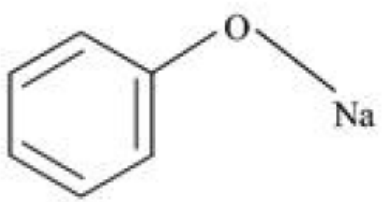
Read the passage given below to answer questions

Most of haloalkanes and haloarenes react with certain metals to give compound containing carbon metal bonds, called organometallic compounds. Grignard reagent is such organo magnesium compound. Grignard reagent can be prepared from halogen derivative of alkanes / arenes with magnesium metal in dry ether. These are highly reactive compounds and react with source of proton to give hydrocarbon. Grignard reagents undergo addition with carbonyl compounds to give corresponding alcohols.

Section Name:CHEMISTRY

Question:

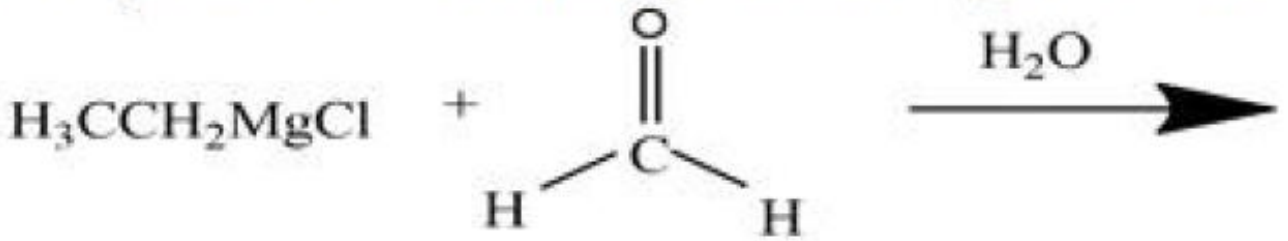
The organometallic compound from the following, is: -

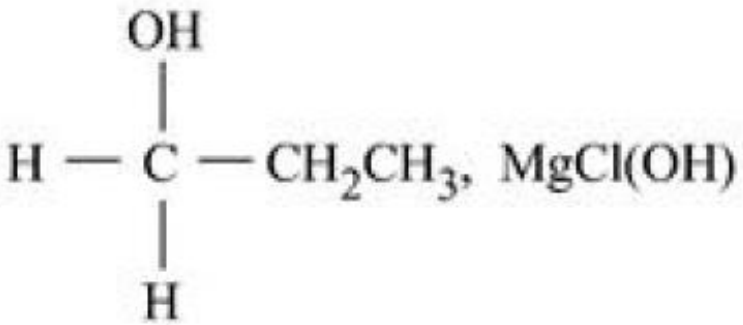
A	
B	$H_3CCOONa$
C	$H_3CMg\ Br$
D	

Section Name:CHEMISTRY

Question:

The products formed in the following reaction is: -



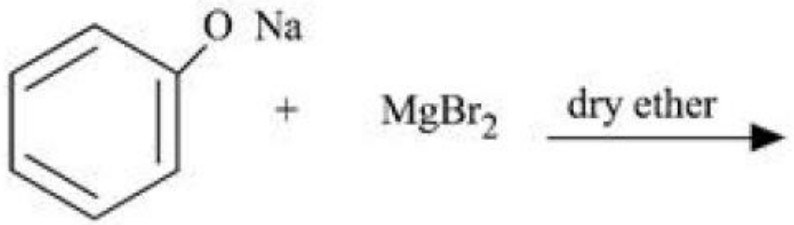
A	
B	H_3CCH_2OH, HCOOH
C	H_3CCH_3, MgCl(OH)
D	$H_3CCH_2CH_3$, MgCl(OH)

Section Name:CHEMISTRY

Question:

The correct equation from the following representing the preparation of phenyl magnesium bromide is

A



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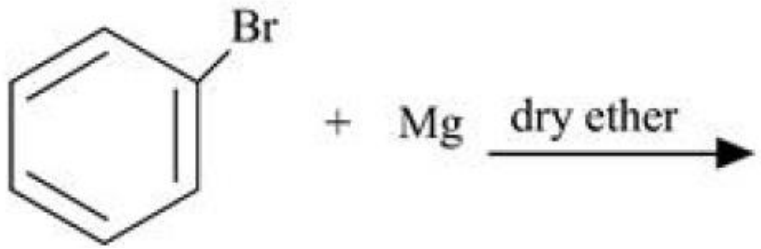

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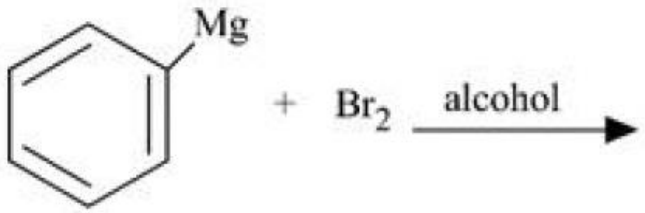

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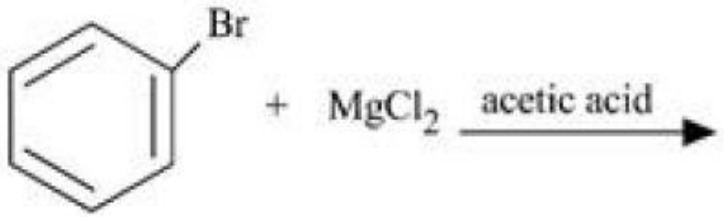

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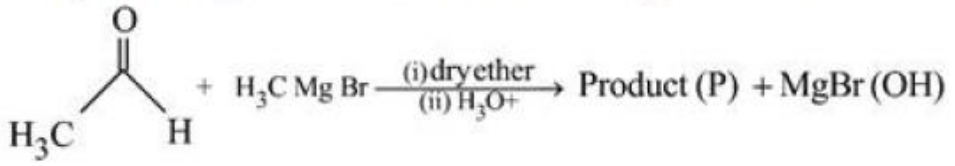
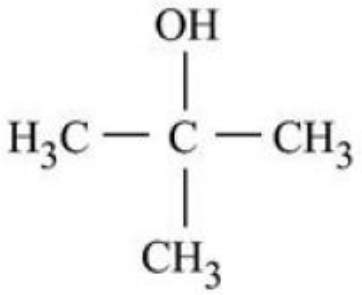
Section Name:CHEMISTRY

Question:

The product (P) formed in the following reaction is



A



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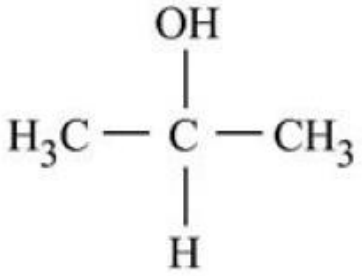
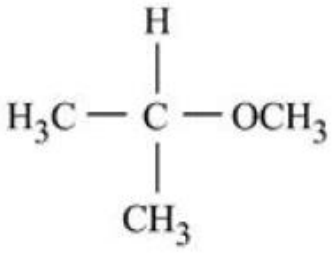


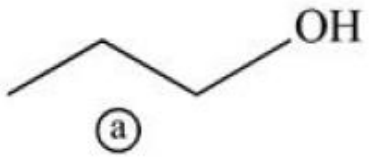
C

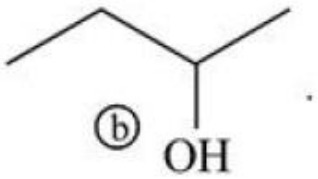


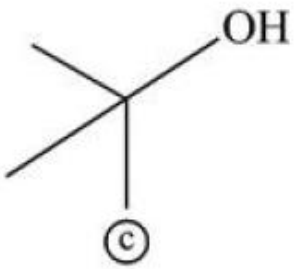
D H_3CCH_2COOH

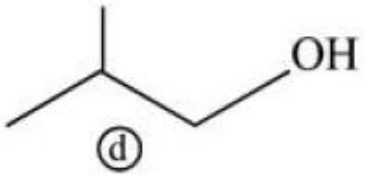
Question:

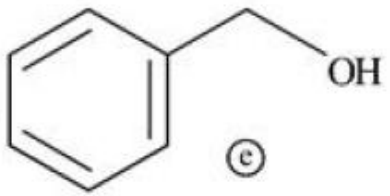
The number of alcohols which can be produced from Grignard reagent and formaldehyde from the following is

A. 

B. 

C. 

D. 

E. 

Choose the correct answer from the options given below:

A	5
B	2
C	4
D	3

Read the passage given below to answer question

A potential difference developed between the electrode and electrolyte is called electrode potential. When the concentrations of all the species involved in a half cell is unity, then the electrode potential is known as standard electrode potential. In a galvanic cell, the half- cell in which oxidation takes place is called anode and it has a negative potential with respect to solution. The other half cell in which reduction takes place, is called cathode and it has a positive potential with respect to solution. Thus, there exists a potential difference between the two electrodes, cathode and anode. This difference is called cell potential and is measured in volts. It is called the cell electromotive force when no current is drawn through the cell. A galvanic cell is represented by putting a vertical line between metal and electrolyte solution and putting a double vertical line between the two electrolytes connected by salt bridge. Under this convention, emf of cell is positive and is given as

$E_{cell} = E_{right} - E_{left}$

The standard electrode potential, are very important. The value at standard electrode potential of an electrode is greater than zero, then its reduced form is more stable compared to hydrogen gas. The value at some standard electrode potentials at 298 K are given below (ions are present as aqueous species and H_2O as liquid).

	ε^0/V
$Ag^+/Ag\,(s)$	0.80
$Cu^{2+}/Cu\,(s)$	0.34
$Pb^{2+}/Pb\,(s)$	−0.13
$Fe^{2+}/Fe\,(s)$	−0.44
$Mg^{2+}/Mg\,(s)$	−2.36

Section Name:CHEMISTRY

Question:

The strongest oxidising agent amongst the following Ag^{+}, Cu^{2+}, Fe^{2+}, Pb^{2+} , is

A	Ag^{+}
B	Cu^{2+}
C	Fe^{2+}
D	Pb^{2+}

Section Name:CHEMISTRY

Question:

Amongst the following, the weakest reducing agent is

A	Mg
B	Pb
C	Fe
D	Cu

Section Name:CHEMISTRY

Question:

The emf of the cell Ag (s) | Ag^{+} (1m) || Pb^{2+} (1m) | Pb (s), is

A	0.67 V
B	1.06 V
C	– 0.93 V
D	0.93 V

Section Name:CHEMISTRY

Question:

When Pb is added to an aqueous solution of a mixture of Cu^{2+} and Mg^{2+} ions, it is observed

A	Cu^{2+} is reduced.
B	Mg^{2+} is reduced.
C	Cu is reduced.
D	Pb^{2+} is reduced.

Section Name:CHEMISTRY

Question:

The combination of electrodes which will give maximum value of E° cell at 298 K is

A	**Anode**	**Cathode**
	Ag	Mg
B	**Anode**	**Cathode**
	Cu	Fe
C	**Anode**	**Cathode**
	Mg	Ag
D	**Anode**	**Cathode**
	Pb	Mg