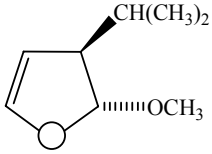
有機化學

D 1.What term describes the structural relationship between (E)- and (Z)- 2-pentene?
(A)not isomers (B)constitutional isomers (C)enantiomers (D)diastereomers (E) conformers

E 2.What term describes the structural relationship between (1S,3R)-1,3-di-chlorocyclopentane and (1R,3S)-1,3-dichlorocyclopentane?
(A)not isomers (B)constitutional isomers (C)enantiomers
(D)diastereomers (E)the same compound

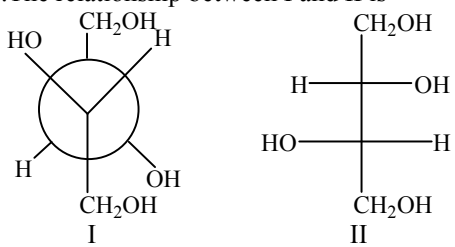
E 3.Which of the following incorrectly describes cis-1,2-dimethylcyclopentane?
(A) It is a meso compound. (B) It is achiral. (C) It contains two asymmetric carbons.
(D) It's diastereomer is trans-1,2-dimethylcyclopentane. (E) It has an enantiomer.

A 4.Which of the following configurations corresponds to the structure below?



(A)4R,5R (B)4R,5S (C)2R,3R (D)2S,3S (E)1R,2R

C 5.The relationship between I and II is：



(A)same compound (B)enantiomers (C)diastereomers
(D)constitutional isomers (E)conformers

D 6.A student measured the optical activity of an unknown sugar at two different concentrations. The results of his measurements are shown below. Given that the sample cell had a path length of 10.0 cm. Calculate the specific rotation for the unknown sugar. (Hint: consider each measurement of plane polarized light has a true reading and a "ghost" reading 180° from the true reading.)

concentration	observed rotation
2.00g sugar in 10.0mL water	$+159.1^\circ$
5.00g sugar in 10.0mL water	$+127.8^\circ$

(A) -10.5° (B) $+25.6^\circ$ (C) $+79.5^\circ$ (D) -105° (E) $+256^\circ$

E 7.Which of the compounds below undergoes solvolysis in aqueous ethanol most rapidly?
(A)cyclohexyl bromide (B)methyl iodide (C)isopropyl chloride
(D)3-choloropentane (E)3-iodo-3-methylpentane

E 8.What type of intermediate is present in the S_N2 reaction of cyanide with bromoethane?
(A)carbocation (B)free radical (C)carbine (D)carbanion (E)this reaction has no intermediate

A 9.A sample of 1-chloro-1-phenylethane with an $[\alpha]_0^{25}$ of -94.8° is reacted with NH_3 in methanol/ water solvent. The major substitution product of the reaction is 1-phenyl-1-ethanamine with an $[\alpha]_0^{25}$ of -8.6°. Given that optically pure (R)-1-chloro-1-phenylethane has a specific rotation of -109.0° and that optically pure (R)-1-phenyl-1-ethanamine has a specific rotation of $+39.3^\circ$. Which of the following statements best describes this reaction?
(A)Net inversion 25% with 75% racemization – S_N1 mechanism
(B)Net inversion 12% with 88% racemization – S_N1 mechanism

(C)Net inversion 75% with 25% racemization – S_N2 mechanism
(D)Net inversion 12% with 88% racemization – S_N2 mechanism
(E)None of the above

A 10.Which of the following is true for the initiation step of a free radical chlorination reaction?
(A)$\Delta H^\circ > 0$ and $\Delta S^\circ > 0$ (B)$\Delta H^\circ > 0$ and $\Delta S^\circ < 0$ (C)$\Delta H^\circ < 0$ and $\Delta S^\circ > 0$
(D)$\Delta H^\circ < 0$ and $\Delta S^\circ < 0$ (E)$\Delta H^\circ = 0$ and $\Delta S^\circ = 0$

A 11.Consider the reaction of A being converted into B at $25^\circ C$. If the ΔG° of this reaction is + 1.0 Kcal/mol, the % conversion is
(A)15% (B)30% (C)50% (D)70% (E)84%

B 12.Predict the major organic product that result when 2,2,4-trimethyl-pentane is subjected to free radical bromination?
(A)1-Bromo-2,4,4-trimethylpentane (B)2-Bromo-2,4,4,-trimethylpentane
(C)3-Bromo-2,2,4-trimethylpentane (D)4-Bromo-2,2,4-trimethylpentane
(E)3-Bromo-2-methylhexane

A 13.Which of the following reactive intermediate species maintains sp^3 hybridization?
(A)methyl carbanion (B)dibromocarbene (C)tertiary carbocation
(D)secondary alkyl radical (E)(B) and (C)

E 14.According to the Lewis definition of the following may act as acids?
(A)NH_3 (B)HCl (C)$AlCl_3$ (D)A and B (E)A, B, and C

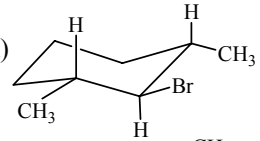
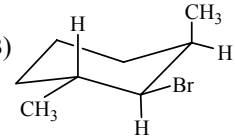
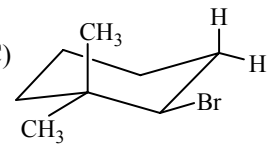
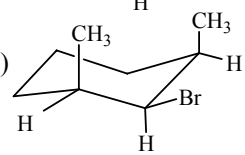
B 15.Which of the following is a bridged bicyclic alkane?
(A)cis-decaline (B)bicycle [2,2,1] heptane (C)bicyclo [3,2,0] heptane
(D)bicycle [4,1,0] heptane (E)none of the above

C 16.Which of the following correctly lists the conformations of cyclohexane in order of increasing energy?
(A)chair < boat < twist boat < half-chair (B)half-chair < boat < twist boat < chair
(C)chair < twist boat < boat < half-chair (D)chair < twist boat < half-chair < boat
(E)half-chair < twist boat < boat < chair

B 17.Which has the greatest molar heat of combustion?
(A)trans-1,2-dimethylcyclopentane (B)cis-1,2-dimethylcyclopentane
(C)trans-1,3-dimethylcyclopentane (D)methylcyclohexane (E)cycloheptane

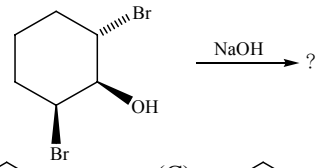
C 18.Which of the following difluorocyclohexane isomers has the greatest molecular dipole in its least stable chair conformation?
(A)trans-1,2-difluorocyclohexane (B) cis-1,2-difluorocyclohexane
(C)cis-1,3-difluorocyclohexane (D)trans-1,3-difluorocyclohexane
(E)trans-1,4-difluorocyclohexane

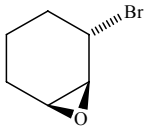
A 19.Which of the following compounds does not proceed E_2 reaction smoothly under the condition of CH_3ONa/CH_3OH?

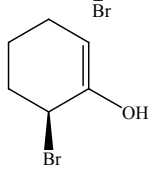
(A) 
(B) 
(C) 
(D) 
(E)None of the above

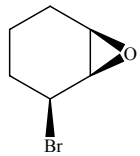
B 20.How many stereoisomers for 3,4,5-trimethylcyclopentene could be found?
(A)3 (B)4 (C)6 (D)8 (E)10

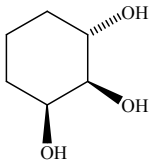
C 21.The product of the following reaction will be?

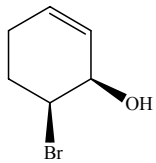


(A) 

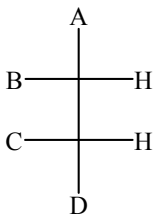
(B) 

(C) 

(D) 

(E) 

B 22.If the Fischer projection below is to represent (2R,3R)-2,3-dibromo-pentane, the identities of A-D must be as follows:



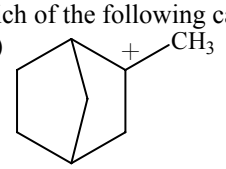
(A)A=Br, B=Et, C=Br, D=CH_3
(B)A=Et, B=Br, C=CH_3 D=Br
(C)A=CH_3 B=Et, C=Br, D=Br
(D)A=Br, B=CH_3 C=Br, D=Et
(E)A=CH_3, B=Br, C=Br, D=Et

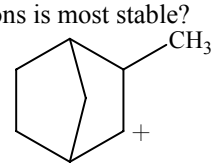
C 23.Which compound has the highest solubility in water?
(A)1-chlorohexane (B)1-hexene (C)1-hexanol (D)dipropyl ether (E)2-hexanone

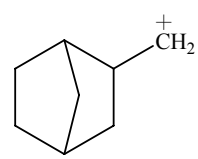
A 24.Which compound is the most stable?
(A)cis-1,3-dimethylcyclohexane (B)trans-1,3-dimethylcyclohexane
(C)cis-1,4-dimethylcyclohexane (D)trans-1,2-dimethylcyclohexane
(E)1,1-dimethylchyclohexane

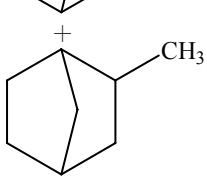
D 25.What is the major product of the light-initiated reaction of 2-pentene with N-bromosuccinimide?
(A)1-bromo-2-pentene (B)2-bromo-2-pentene (C)3-bromo-2-penene
(D)4-bromo-2-pentene (E)3-bromo-1-pentene

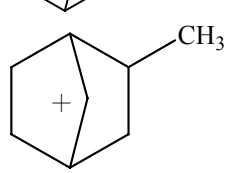
A 26.Which of the following carbocations is most stable?

(A) 

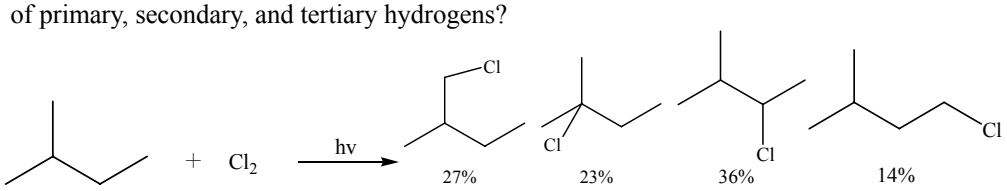
(B) 

(C) 

(D) 

(E) 

A 27.Monochlorination of 2-methylbutane leads to four different isomers. What is the relative reactivity of primary, secondary, and tertiary hydrogens?



(A)1:4:5 (B)9:12:8 (C)7:6:4 (D)7:18:12 (E)None of the above

D 28.Among the following statements about the family of cyclohexane, which one is incorrect?

(A)substitutent tends to occupy the equatorial position in order to avoid the 1,3-diaxal interactions.

(B)Conformational flipping of cyclohexane at room temperature is fast and interconverts axial and equatorial hydrogens.

(C)The chair form is energecally more stable than the twist-boat form.

(D)cis-1,2-dimethylcyclohexane is optically inactive because it has a plane of symmetry (σ)

(E)None of the above

D 29.Which reaction would you expect to have he smallest energy of activation?

(A) $CH_4 + \cdot F \rightarrow \cdot CH_3 + HF$ (B) $CH_4 + \cdot Br \rightarrow \cdot CH_3 + HBr$ (C) $CH_4 + \cdot Cl \rightarrow \cdot CH_3 + HCl$

(D) $\cdot CH_3 + \cdot Cl \rightarrow CH_3Cl$ (E) $Cl_2 \rightarrow \cdot Cl + Cl\cdot$

B 30.Arrange the following compounds in order of reactivity toward S_N2 displacement

I. 1-bromo-2, 2-dimethylpropane

II. 1-bromobutane

III. 1-bromo-2-methylbutane

IV. 1-bromo-3-methylbutane

(A)I > II > III > IV (B)II > IV > III > I (C)III > II > IV > I

(D)II > III > IV > I (E)III > IV > I > II

C 31.The c-c bond length in butane is approximately

(A)1.09 A° (B)1.33A° (C)1.54A° (D)1.20A° (E)1.40A°

E 32.In the chlorination of methane, the propagation steps involve forming:

(A)hydrogen radicals (B)methyl radicals (C)chlorine radicals

(D)A, B, and C (E)B and C

C 33.What statement does not apply to the boiling points of alkanes?

(A)The boiling point increases as the length of the carbon chain increases.

(B)Straight chain alkanes have a higher boiling point than their branched isomers.

(C)The boiling point are influenced by hydrogen bonding.

(D)The boiling point are influenced by London dispersion forces.

(E)Because they are nonpolar, alkanes have lower boiling points than othe organic compounds of similar molar mass.

D 34.Which statement is true for S_N2 reactions?

(A)The rate of the reaction is dependent on the stability of a carbocation.

(B)The rate of the reaction is dependent on just the substrate.

(C)Displacement occurs with inversion of configuration.

(D)The fastest reaction will occur with tertiary halide.

(E)The mechanism is a two step process.

D 35.Enantiomers may differ in the following property:

(A)boiling point (B)melting point (C)solubility in water

(D)the rate at which they react with a chiral reagent

(E)number of degree they rotate plane polarized light

E 36.Which of the following reaction does not proceed via a carbocation intermediate?

(A)Solvolysis of tert-butyl bromide in CH_3OH

(B)Electrophilic addition of isobutylene with HBr

(C)Dehydration of cyclohexanol with H_2SO_4

(D)Electrophilic substitution of benzene with Br_2 in the presence of $FeBr_3$

(E)All of the above

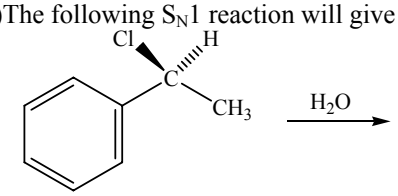
B 37.About S_N2 reaction, Which of the following description is less appropriate?
(A)the reaction pursues faster in aprotic solvent than the protic ones.
(B)the reaction pursues faster in nonpolar solvent than the polar ones.
(C)the reaction pursues faster in acetonitrile than in methanol
(D)the reaction involves a bimolecular rate-determining step.
(E)None of these

C 38.About crown ether, which of the following description is less appropriate?
(A)was first discovered by Pedersen
(B)can complex to alkali metal ions
(C)generally are acyclic compounds
(D)is quite useful in organic synthesis
(E)All of the above

A 39.Which compound is the major component in natural gas?
(A)methane (B)ethane (C)ethyne (D)nitrogen (E)2,2,-4-trimethylpentane

A 40.Which reaction is good to prepare tert-butyl methyl ether?
(A) $(CH_3)_3COK + CH_3I$ (B) $(CH_3)_3CK + CH_3OH$ (B) $(CH_3)_3CI + CH_3ONa$
(D) $(CH_3)_3COH + CH_3ONa$ (E) $(CH_3)_3COH + CH_3OH$ and H^+

B 41.For S_N1/E1 reactions, which of the following statements is incorrect?
(A)The S_N1/E1 reactions proceed through the same carbocation intermediate.
(B)For a given secondary alkyl bromide in water, lower the temperature favors the S_N1 product.
(C)The following S_N1 reaction will give a racemic product.

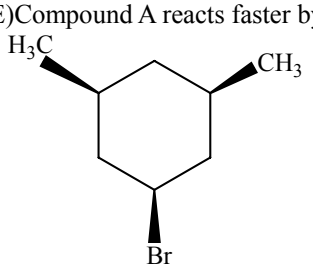


(D)For E_1 product, the most substituted alkene normally is the major one.
(E)None of these

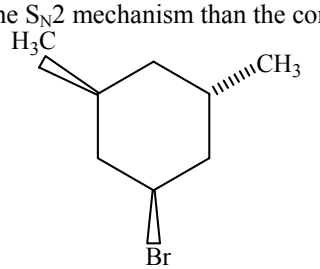
D 42.Which of the following statements is correct?
(A)Among the tripeptides formed by the combinations of glycine, and valine, there are 4 meso compounds.
(B)The α- and β-anomers of glucose are a pair enantiomer.
(C) α-Anomer of glucose is more stable than β-anomers in water.
(D) α-Anomer of glucose is more stable than β-anomers in nonpolar solvent

D 43.Which of the following amino acid contains a mercaptan group?
(A)Valine (B)Aspartic acid (C)Tyrosine (D)Cystenine (D)Arginine

C 44.Which of the following statements on nucleophilic substitution reaction is false?
(A)primary alkyl halides reacts slower than the corresponding secondary substrates in the S_N1 reaction.
(B)The rate of reaction depends on the nature of the leaving group in both S_N1 and S_N2 reactions.
(C)In the S_N1 reaction, a carbocation transition state is formed.
(D)In the reaction of CH_3I with $(CH_3)_2NH$, the rate in ethanol solvent is slower than that in hexane.
(E)Compound A reacts faster by the S_N2 mechanism than the compound B.



A



B

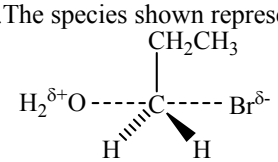
B 45.For 1,3-dichloro-1,2-propadiene
(A)it is achiral molecule (B)it has stereocenters (C)it has chiral centers
(D)it has (E)- and (Z)- isomers (E)it has diastereomers

C 46.The number of units of unsaturation (degree of unsaturation)in a molecule $C_3H_4ClNO_2$ is
(A)0 (B)1 (C)2 (D)3 (E)4

E 47.In Which of the solvents below would the reaction shown take place at the fastest rate?
$CH_3CH_2CH_2CH_2Br + NaCN \longrightarrow CH_3CH_2CH_2CH_2CN + NaBr$
(A)ethanol (B)benzene (C) water (D)dimethyl sulfoxide (E)acetonitrile

C 48.Consider the reaction of each of the following with 1-bromopentane. Which one would have the highest elimination/substitution ratio?
(A) CH_3CH_2ONa, CH_3CH_2OH, $55^\circ C$ (B) NaSH, ethanol, H_2O, $25^\circ C$
(C) $(CH_3)_3COK$, $(CH_3)_3COH$, $55^\circ C$ (D)KCN, DMSO, $40^\circ C$ (E) $(CH_3)_3N$, DMSO, $0^\circ C$

E 49.The species shown represents the transition state for the:



(A)reaction of 1-propanol with HBr (B)reaction of 1-bromopropane with OH^-
(C)addition of HOBr to 1-propene (D)addition of H_2SO_4 / NaBr to 1-propanol
(E)A and D

B 50.Which of the following species forms the strongest ion-dipole attraction with 18-crown-6?
(A) F^- (B) K^+ (C) $Cr_2O_7^{2-}$ (D) Li^+ (E)Br_2

B 51.Which one of the following is a diastereomer of (R)-4-bromo-cis-2-hexene?
(A)(S)-4-bromo-cis-2-hexene (B)(R)-4-bropmo-trans-2-hexene (C)(S)-1-bromo-cis-2-hexene
(D)(R)-5-bromo-cis-2-hexene (E)(S)-5-bromo-cis-2-hexene

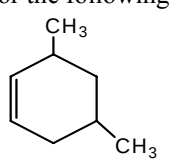
D 52.How many stereoisomers are there of D-fructose (including D-fructose)?
(A)2 (B)4 (C)6 (D)8 (E)16

B 53.Which statements about acid-base equilibra are true?
Ⅰ.The pKa is the negative log of the acid equilibra constant.
Ⅱ.A stronger acid has a pKa with a smaller value than a weaker acid.
Ⅲ.A stronger base has a conjugate acid which has a pKa with a smaller value than a weaker base.
Ⅳ.The Ka=K[HA]
(A) Ⅰ, Ⅲ (B) Ⅰ, Ⅱ (C) Ⅰ, Ⅱ, Ⅲ (D) Ⅱ, Ⅲ, Ⅳ (E) Ⅰ, Ⅱ, Ⅲ, Ⅳ

D 54.Which of the following properties are not identical for constitutional isomers?
Ⅰ.molecular formula
Ⅱ.molecular weight
Ⅲ.order of attachment of atoms
Ⅳ.physical properties
(A) Ⅰ, Ⅳ (B) Ⅱ, Ⅲ (C) Ⅰ, Ⅱ (D) Ⅲ, Ⅳ (E) Ⅰ, Ⅲ, Ⅳ

C 55.In the most stable conformation of trans –1, 4-dimethylcyclohexane, what positions do the methyl groups occupy?
(A)axial, axial (B)equatorial, axial (C)equatorial, equatorial (D)axial, equatorial

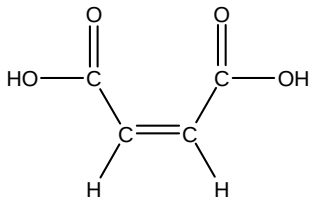
C 56.Which is the correct name for the following compound ?

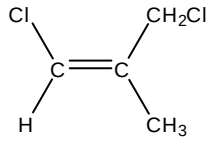


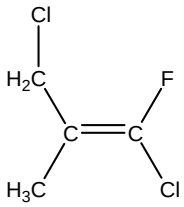
(A)1, 3 – dimethylcyclohexene (B)2, 4 - dimethylcyclohexene
(C)3, 5 – dimethylcyclohexene (D)2, 4 –dimethyl – 1 – cyclohexene

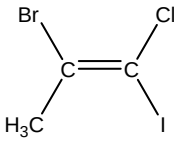
B 57.How many trans isomers are there for an alkene with the formula,C_4H_7Cl?
(A)2 (B)3 (C)4 (D)6 (E)8

C 58.Which alkenes have E configurations?

Ⅰ. 

Ⅱ. 

Ⅲ. 

Ⅳ. 

(A) Ⅰ,Ⅱ (B) Ⅱ,Ⅲ (C) Ⅲ,Ⅳ (D) Ⅱ,Ⅳ

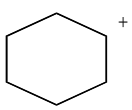
C 59.How many distinct terpene structure types can be made from the assembly of 2-isoprene units?
(A)1 (B)2 (C)3 (D)4 (E)16

D 60.The reaction of propene with which of the following reagents are oxidation reactions?

HBr/CH_2Cl_2	OsO_4	H_2/Pt	Br_2	H^+/H_2O
Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅴ

(A) Ⅱ (B) Ⅲ (C) Ⅰ,Ⅳ (D) Ⅱ,Ⅳ (E) Ⅱ,Ⅴ

E 61.Arrange these carbocations in order of decreasing stability (most to least).

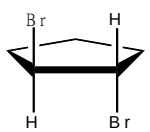


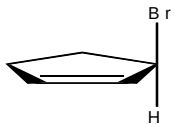
$CH_3C^+H_2$ Ⅰ　　Ⅱ　　C^+H_3 Ⅲ　　$(CH_3)_3C^+$ Ⅳ

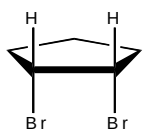
(A) Ⅰ,Ⅱ,Ⅲ,Ⅳ (B) Ⅲ,Ⅰ,Ⅱ,Ⅳ (C) Ⅱ,Ⅳ,Ⅰ,Ⅲ (D) Ⅰ,Ⅲ,Ⅳ,Ⅱ (E) Ⅳ,Ⅱ,Ⅰ,Ⅲ

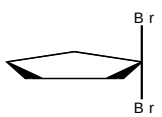
E 62.Which reagents react with an alkene by an electrophilic mechanism?
Ⅰ. H_2O/H_2SO_4 Ⅱ. Br_2/CCl_4 Ⅲ.HBr
Ⅳ.H_2/Pt Ⅴ.CH_3CO_2OH
(A) Ⅰ,Ⅱ,Ⅲ (B) Ⅰ,Ⅲ (C) Ⅱ,Ⅳ (D) Ⅱ,Ⅲ (E) Ⅰ,Ⅱ,Ⅲ,Ⅴ

B 63.Which is major product from the reaction of cyclopentene with NBS/CCl_4?

(A) 

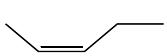
(B) 

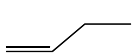
(C) 

(D) 

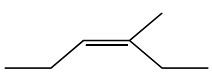
(E) no reaction

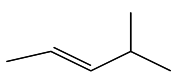
D 64.Which alkene has the highest rate of reaction with HBr?

(A) 

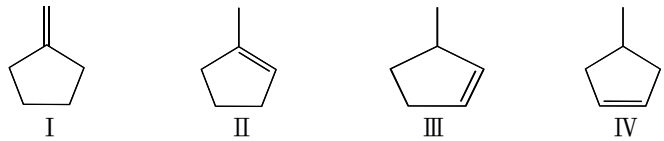
(B) 

(C)

(D) 

(E) 

A 65.Which compound does not give two isomers when reacted with Cl_2/CCl_4?



Ⅰ Ⅱ Ⅲ Ⅳ

(A) Ⅰ (B) Ⅱ (C)Ⅳ (D) Ⅱ, Ⅲ (E) Ⅰ, Ⅳ

E 66.What is relationship these two structures?

(A)Constitutional isomers (B)Enantiomers (C)Diastereomers

(D)Optical isomers (E)Identical structures

C 67.The specific rotation of dextrorotatory tartaric acid is +12.7. A mixture of dextrorotatory and levorotatory tartaric acid has a specific rotation of +6.35° .Whatis the optical purity of the mixture?

(A)25% (B)33.3% (C)50% (D)75% (E)60%

C 68.Which statements about stereoisomers are ture?

Ⅰ. enantiomers and diastereomers have the same physical properties.

Ⅱ. 50/50 mixtures of R and S enantiomers are called racemic mixtures.

Ⅲ. meso isomers rotate the plane of plane polarized light.

Ⅳ. dextrorotatory compounds rotate plane polarized light to the right.

Ⅴ. enantiomers have the same chemical properties.

(A) Ⅰ, Ⅱ, Ⅳ (B) Ⅱ, Ⅲ, Ⅴ (C) Ⅱ, Ⅳ, Ⅴ (D) Ⅰ, Ⅲ, Ⅳ (E) Ⅰ, Ⅱ, Ⅴ

C 69.Arrange the nucleophiles in order of increasing reactivity (least first).

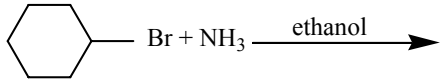
NH_3 H_2O OH^- CH_3O^-

Ⅰ Ⅱ Ⅲ Ⅳ

(A) Ⅰ, Ⅳ, Ⅱ, Ⅲ (B)Ⅳ, Ⅱ, Ⅰ, Ⅲ (C) Ⅱ, Ⅰ, Ⅲ, Ⅳ (D)Ⅳ, Ⅲ, Ⅰ, Ⅱ (E) Ⅱ, Ⅳ, Ⅰ, Ⅲ

B 70.Which nucleophilic substitution reactions will proceed?

Ⅰ $CH_3CH_2OH + NaCl \xrightarrow{\text{acetone}}$

Ⅱ  $\xrightarrow{\text{ethanol}}$

Ⅲ $CH_3CH_2CH_2Cl + CH_3CH_2O^- \xrightarrow{\text{ethanol}}$

Ⅳ $CH_4 + LiCl \xrightarrow{\text{acetone}}$

(A) Ⅰ, Ⅱ (B) Ⅱ, Ⅲ (C) Ⅲ, Ⅳ (D) Ⅰ, Ⅳ (E) Ⅰ, Ⅱ, Ⅲ

A 71.Which statements apply to an S_N2 reaction?

Ⅰ The rate limiting step of the reaction involves the alkyl halide and the nucleophile.

Ⅱ The order of reactivity is methyl $> 1^0 > 2^0 > 3^0$

Ⅲ The rate limiting step of the reaction involves only the alkyl halide

Ⅳ Their on an intermediate carbocation

(A)Ⅰ, Ⅱ (B)Ⅲ, Ⅳ (C)Ⅰ, Ⅳ (D)Ⅱ, Ⅳ

C 72.Which conditions are best for preparing isopropyl methyl ether?

Ⅰ. $(CH_3)_2CHBr + CH_3ONa \longrightarrow$ Ⅱ. $CH_3Br + (CH_3)_2CHONa \longrightarrow$

Ⅲ. $(CH_3)_2CHBr + CH_3OH \xrightarrow{\text{heat}}$ Ⅳ. $(CH_3)_2CHOH + CH_3OH \xrightarrow{H_2SO_4}$

Ⅴ. $CH_3CH{=}CH_2 + CH_3OH \xrightarrow{H_2SO_4}$

(A)Ⅰ, Ⅱ (B)Ⅰ, Ⅲ (C)Ⅱ, Ⅴ (D)Ⅳ, Ⅴ (E)Ⅱ, Ⅲ, Ⅳ

C 73.Arrange the compounds in order of increasing solubility in water (least first)

I. $CH_3CH_2CH_2CH_2OCH_3$ II. CH_3OCH_3

III. $CH_3OCH_2CH_2OCH_3$ IV. $CH_3CH_2CH_2CH_2CH_2OH$

(A)I , III, II, IV (B)III, I, IV, II (C)I, IV, II, III (D)IV, I, III, II (E)I, IV, III, II

A 74.Arrange the compounds in the order of increasing acidity (least first)

I. CH_3CH_2OH II. CH_3CH_2SH III. H_2S IV. H_2O

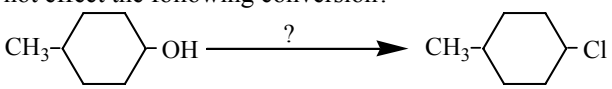
(A)I, IV, II, III (B)II, I, III, IV (C)III, II, I, IV (D)II, I , IV, III (E)II, III, I , IV

E 75.Arrange the compounds in the order of increasing boiling point (lowest first)

I.CH_3OCH_3 II. H_2O III. CH_3CH_2OH IV CH_3CH_2SH

(A)II, I , III, IV (B)I, IV, II, III (C)IV, I, III, II (D)I, III, IV, II (E)I, IV, III, II

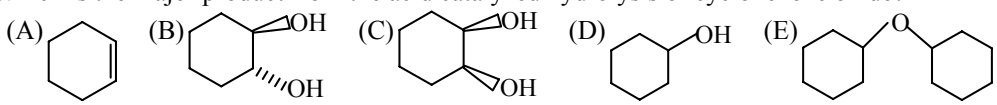
B 76.Which reagents do not effect the following conversion?



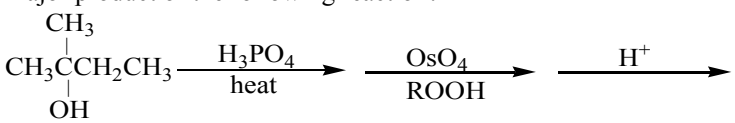
I. $HCl / ZnCl_2$ II. Cl_2 III. $SOCl_2$ / Pyridine IV. NaCl V. $POCl_3$ / Pyridine

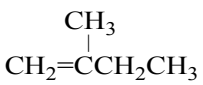
(A)I, II, IV (B)II, IV, V (C)I, III, V (D)I, III (E)III, V

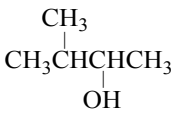
B 77.Which is the major product from the acid catalyzed hydrolysis of cyclohexene oxide?

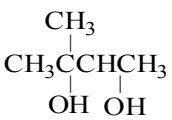


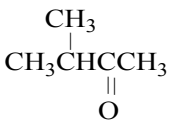
D 78.Which is the major product of the following reaction?

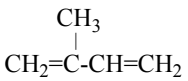


(A) 

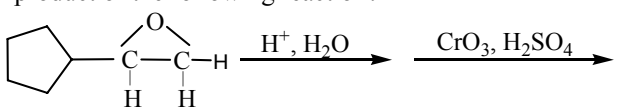
(B) 

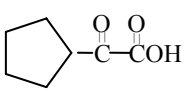
(C) 

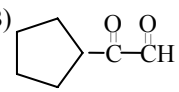
(D) 

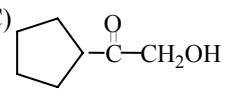
(E) 

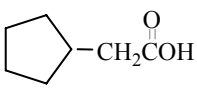
A 79.Which is the major product of the following reaction?

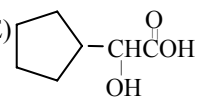


(A) 

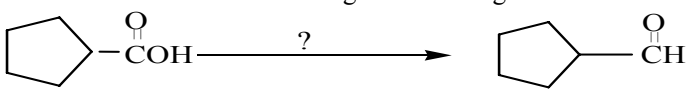
(B) 

(C) 

(D) 

(E) 

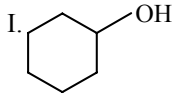
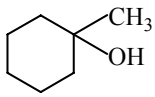
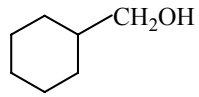
E 80.Which is the best method for making the following conversion?



I. $LiAlH_4$ II. $NaBH_4$ III. $SOCl_2$; $iAlH(OBu^t)_3$ IV $LiAlH_4$; PCC V. H_2; Pd-C

(A)I, III (B)II, III (C)II, III, V (D)II, V (E)III, IV

C 81. Arrange the following in order of increasing rate of reactivity with HBr (least first)

I.  II.  III.  IV. CH_3OH

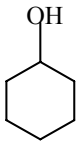
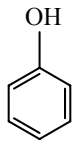
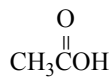
(A)I, II, IV, III (B)II, I, III, IV (C)IV, III, I , II (B)III, II, IV, I (E)III, IV, I ,II

A 82.Which is the best method for making the following conversion ?

$CH_3CH_2S\text{-}SCH_2CH_3 \longrightarrow 2\ CH_3CH_2SH$

(A)Zn, HOAc (B)I_2 (C)CrO_3, H_2SO_4 (D)H_2O_2 (E)H_2O, H^+

A 83.Arrange the compounds in order of increasing acidity (least first).

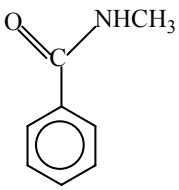
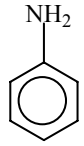
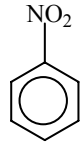
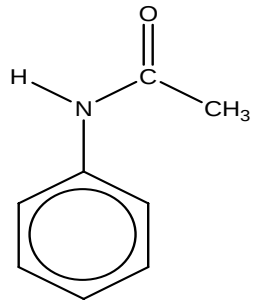
I.  II.  III. H_2CO_3 IV. 

(A) Ⅰ Ⅱ Ⅲ Ⅳ (B)Ⅲ Ⅰ Ⅱ Ⅳ (C)Ⅲ Ⅳ Ⅰ Ⅱ (D) Ⅰ Ⅱ Ⅳ Ⅲ (E)Ⅱ Ⅰ Ⅲ Ⅳ

C 84.How can phenol be distinguish from cyclohexanol ?

(A)HCl(aq) (B)$NaHCO_3$(aq) (C)NaOH(aq) (D)Na(s) (E)CrO_3, H_2SO_4

B 85.Arrange the compounds in order of increasing reactivity toward electrophilic aromatic substitution (lowest first).

I.  II.  III.  IV. 

(A)Ⅱ Ⅰ Ⅳ Ⅲ (B)Ⅲ Ⅰ Ⅳ Ⅱ (C) Ⅰ Ⅲ Ⅳ Ⅱ (D)Ⅳ Ⅲ Ⅱ Ⅰ (E)Ⅱ Ⅳ Ⅰ Ⅲ

B 86.Which compound is the strongest base ?

(A)CH_3NH_2 (B)$(CH_3)_2NH$ (C) $(CH_3)_3N$ (D) $CH_3\overset{+}{N}H_3OH^-$ (E)NH_2OH

B 87.Arrange the following in order of increasing strength of the hydrogen bonds (weakest first)

Ⅰ.$H_2NH\cdots OH_2$ Ⅱ. $H_3N\cdots HNH_2$ Ⅲ. $H_2O\cdots HOH$ Ⅳ. $H_3N\cdots HOH$

(A) Ⅰ , Ⅱ , Ⅲ , Ⅳ (B)Ⅱ , Ⅰ , Ⅳ , Ⅲ (C)Ⅱ , Ⅳ , Ⅰ , Ⅲ (D) Ⅰ , Ⅳ , Ⅱ , Ⅲ (E)Ⅲ , Ⅱ , Ⅳ , Ⅰ

D 88.Which is the order of increasing bond stretching frequency (lowest first)

Ⅰ. C = N Ⅱ. C = O Ⅲ. C = C Ⅳ. C = S

(A)Ⅱ , Ⅰ , Ⅳ , Ⅲ (B) Ⅰ , Ⅱ , Ⅳ , Ⅲ (C)Ⅲ , Ⅰ , Ⅱ , Ⅳ (D)Ⅳ , Ⅲ , Ⅰ , Ⅱ (E)Ⅲ , Ⅳ , Ⅰ , Ⅱ

A 89.Very prominate peaks in the IR spectrum are sufficient to distinguish between which compounds ?

Ⅰ. Diethyl ether and diethyl amine

Ⅱ. Cyclohexanone and cyclopentanone

Ⅲ. Pentanal and pentanol

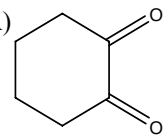
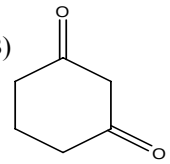
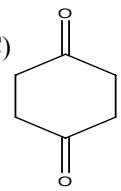
Ⅳ. 2-hexene and 3-hexene

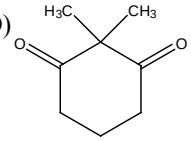
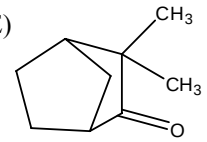
(A) Ⅰ , Ⅲ (B)Ⅱ , Ⅲ (C)Ⅱ , Ⅳ (D) Ⅲ , Ⅳ (E) Ⅲ

C 90.Which is the index of hydrogen deficiency for a compound having molecular formula $C_7H_5Cl_2NO$?

(A)3 (B)4 (C)5 (D)6 (E)7

B 91.Which compound undergoes the fastest exchange of hydrogen for deuterium when treated with D_2O and a trace of OD^- ?

(A)  (B)  (C) 

(D)  (E) 

C 92.Which of the following compounds cannot be used in an aldol self reaction ?

(A)ethanal (B)acetone (C)benzaldehyde (D)acetophenone (E)phenylacetaldehyde

C 93.Which phrase correctly completes the statement ?

Except for glycine, which is achiral, all the amino acids present in proteins…

(A)are chiral, but racemic (B)are meso forms (C)have the L configuration at their α carbon

(D)have the R configuration at their α carbon (E)have the S configuration at their α carbon

C 94.What are the products obtained following treatment of Ser-Tyr-Val-Ala with chymotrypsin?

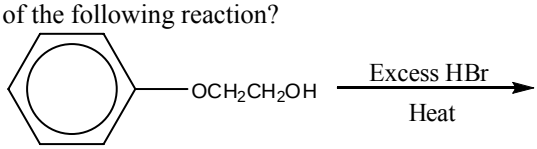
(A)Serine + Tyr-Val-Ala (B)Ser-Tyr + Valine + Alanine (C)Ser-Tyr + Val- Ala

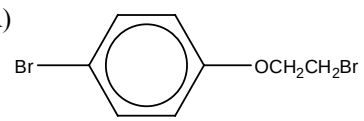
(D)Ser-Tyr-Val + Alanine (E)Serine + Thyrosine + Val-Ala

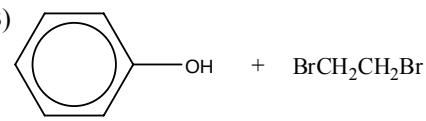
A 95.The first cycle of the Edman degradation of the tetrapeptide Gly-Ala-Ile-Leu would give a PTH derivation of

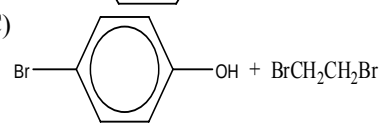
(A)Glysine (B)Isoleucine (C)Alanine (D)Leucine

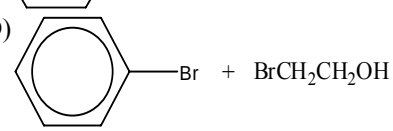
B 96.What are the products of the following reaction?

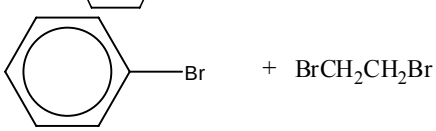


(A) 

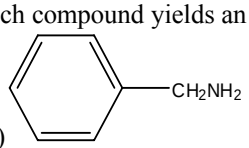
(B) 

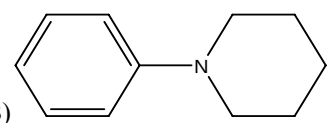
(C) 

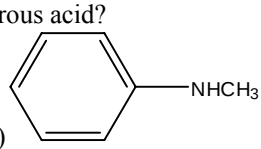
(D) 

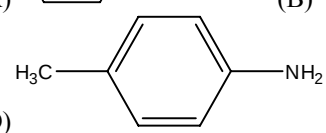
(E) 

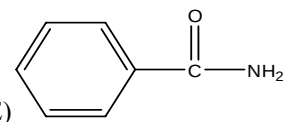
C 97.Which compound yields an N-nitrosammine after treatment with nitrous acid?

(A) 

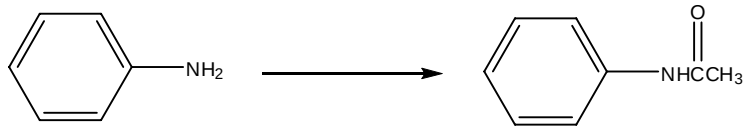
(B) 

(C) 

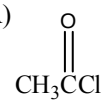
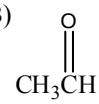
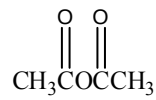
(D) 

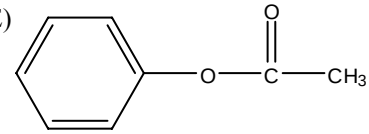
(E) 

B 98.All but one of the following compounds react with anline to give acetanilide. Which one does not?

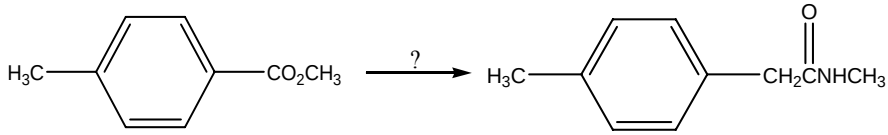


aniline acetanilide

(A)  (B)  (C) 

(D)  (E) 

C 99.Choose the best sequence of reactions for the transformation given.



(A)1.H_3O^+ 2.$SOCl_2$ 3.CH_3NH_2

(B)1.OH^-, H_2O 2.PBr_3 3.Mg 4.CO_2 5.H_3O^+ 6.$SOCl_2$ 7.CH_3NH_2

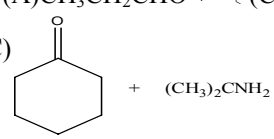
(C)1.$LiAlH_4$ 2.H_2O 3.HBr 4. Mg 5. CO_2 6. H_3O^+ 7.$SOCl_2$ 8.CH_3NH_2

(D) 1.$LiAlH_4$ 2. H_2O 3.TsCl,pyridine 4.NaCN 5.CH_3OH, Heat

(E) C and D

A 100.Which of the following pairs reactions is most effective in forming an enamine?

(A)CH_3CH_2CHO + 〔$(CH_3)_2CH$〕$_2NH$ (B)$(CH_3)_3CCHO$ + $(CH_3)_2NH$

(C) 

(D)$(CH_3)_2CHCHO$ + CH_3NH_2 (E) None of there forms an enamine