Organic Review Test

Multiple Choice

Identify the choice that best completes the statement or answers the question.

- 1. An amine is characterized by what functional group?
 - a. -CO2CH3

d. -CHO

b. -NH2

e. -OH

- c. -CO2H
- 2. Which of the following is an alcohol?
 - a. NaOH

d. CH 3 CH 2 OH

b. Н₃С — NН₂

- 3. How many actual double bonds does the benzene ring possess?

d. 1

b. 3

c. 2

e. 0

The correct name for the compound given above is which of the following?

a. 2-methyl-1-butene

d. 3-methyl-2-butene

b. pentene

e. 2-ethyl-1-pentene

c. 2-ethyl-1-propene

What is the correct name for the above compound?

a. 2,3-dimethylbutane

d. 2,2-dimethylbutane

b. hexane

e. isohexane

- c. 2-methylpentane
- 6.



The compound above is classified as a(n)

a. alkane

d. ketone

b. carboxylic acid

e. alkene

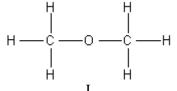
c. aldehyde

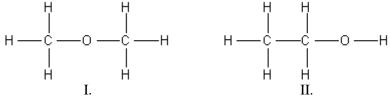
- 7. Which of the following is a secondary alcohol?

What is the correct name for the above compound?

- a. 2-methyl-3-butanol
- b. 2-pentanol
- c. isobutanol

- d. 3-methyl-2-butanol
- e. none of these
- Which statement is incorrect concerning these two molecules with the same formula, C_2H_6O ?





- a. compound (II) will more likely be soluble in water than compound (I)
- b. compound (I) will have a lower boiling point than compound (II)
- hydrogen bonding will be the most likely for compound (II)
- the vapour pressure of compound (II) will be lower than that of compound (I) at a given temperature
- e. compound (I) would be a better solvent
- 10. The general formula for a cycloalkane can be represented by which of the following?
 - a. CnHn

c. CnH2n

b. CnH2n+2

d. CnH2n-2

11.

The correct name for compound above is which of the following?

chloropropylbenzene

- c. 1-chloro-3-phenyl-3-propene
- b. 3-phenyl-1-choloropropyne
- d. 3-chloro-1-phenyl-1-propene

The correct name for the compound given above is which of the following?

a. 3-amino-3-hexanone

c. N-propylpropanamide

b. ethyl ethanamide

d. N-ethylethanamide

13.



The correct name for the compound given above is which of the following?

a. 1,3-cyclopentadiene

c. 1,4-cyclopentene

b. 1,4-cyclopentadiene

d. 1,3-cyclopentene

14. Of the five names listed below, four contain deliberate errors. Which is the only name is correct?

a. 2-pentanal

d. 1,2-dimethylpropanoate

b. 2,3-dichloropentane

e. n-methylpropanamide

c. 3-methylpropanoic acid

15. The reaction of CH₃CH=CH-CH=CH₂ with excess bromine gives chiefly

- a. 1,2-dibromo-3-pentene
- b. 3,4-dibromo-1-pentene
- c. 1,4-dibromo-2-pentene
- d. a mixture of the above three compounds
- none of the above three compounds

16. The number of isomers of chlorodibromobenzene is which of the following?

a. three

d. six

b. four

e. seven

c. five

17. The formula for methyl ethanoate is which of the following?

The condensed formula of 2,3,4-trimethylpentane is which of the following?

- a.

- b.

$$\begin{array}{c|c} & F & O \\ & & || \\ H_3C & --C & --CH_2 - C & --OH_2 \\ & & | \\ & NO_2 \end{array}$$

The correct IUPAC name for above compound is which of the following?

a. fluorobutanoic acid

- c. 2-fluoro-2-nitrobutanoic acid
- b. 3-fluoro-3-nitrobutanoic acid
- d. 3-fluoro-2-nitropropanoic acid

20.

The correct IUPAC name of the above structure is which of the following?

a. 1-bromo-2-butene

c. 4-bromo-2-butyne

b. 1-bromo-2-butyne

d. 4-bromo-1-methyl-1-propyne

21. Which of the following compounds contains 10 carbon atoms?

a. 2,2,3-trimethylheptane

c. 2-methyldecane

b. octane

d. 2,3-dimethylheptane

22.

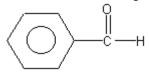
The correct IUPAC name for the compound above is which of the following?

- a. 5-ol-2-ethylpentane ether
- c. 3-propoxypentanal

b. 2-ethoxy-5-pentanone

d. 4-ethoxypentanal

Which of the following is the correct name for the compound below?



benzene-ethanol

c. methylbenzenal

phenylmethanoate`

d. phenylmethanol

Which of the following is the correct name for the structure below?



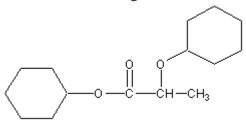
a. trans-4-nonyne

c. trans-4-nonene

b. cis-5-nonene

d. cis-4-nonene

25. Which of the following is the correct name for the diagram below?



- a. propylcyclohexylcyclohexanoate
- c. dicyclohexanylpropanoate
- b. 2-cyclohexoxycyclohexylpropanoate
- d. methylcycloxypropanoate

26. Which of the following classes of organic compounds does **not** contain oxygen?

a. aldehydes

d. ethers

b. amines

amino acids

e. amides

 27.	Which group of these compounds tends to be t	the n	nost reactive?					
	a. alkanes	c.						
	b. alkenes	a.	aromatics					
 28.	When excess hydrogen bromide is added to pentyne, the possible product is which of the following?							
	a. 1,1-dibromopentane		1,1,2,2-tetrabromopentane					
	b. 1,2-dibromopentane	d.	2,2-dibromopentane					
 29.	The primary product of the reaction below wh	ich u	ises excess HBr is which of the following?					
	/\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \							
	/ / / / /							
	a.	c.						
			Br Br					
	Br Br							
	b.	d.	* * * * * * * * * * * * * * * * * * * *					
	₽r		Br Br					
	Br		Br Br					
 30.	Butane and fluorine gas would react by which							
	a. additionb. combustion	c. d.	substitution single displacement					
 31.	The compound with the highest boiling point v							
	a. CH₃Clb. CH₃Br	c.	CH ₄ CH ₃ F					
	U. CH3DI	u.	CH3i					
 32.	Name the following compound:							
	CI							
	н _: С—ан ₂ -ан—ан ₃ -ан ₂ -ан—ан;							
	нс—ан du							
	a. 2-chloro-6-ethyl-3-methyloctane	d.	2-chloro-6-propyl-3-methyloctane					
	b. 2-chloro-6-ethyl-3-methyldecane	e.	2-chloro-6-ethyl-3-methylheptane					
	c. 2-chloro-6-methyl-3-ethyloctane							
 33.	The alcohol below is classified as which of the	e foll	owing?					
	< () }—сӊон							
	\							
	a. primary alcohol	c.	tertiary alcohol					
	b. secondary alcohol	d.	aromatic alcohol					
34.	Which one of the following compounds is not	eyne	ected to be completely soluble in water at room temperature?					
 <i>J</i> ⊣r.	a. CH ₃ CH ₂ CH ₂ OH	_	CH ₃ (CH ₂) ₁₆ CO ₂ H					
	b. CH ₃ CO ₂ H		CH₃OH					
35.	Esters are							
 55.	a. found in some medicines	d.	found in some types of flavorings					
	b. often fragrant	e.	all of the above					
	c. essential oils in fruits and flower							

36. What is the proper name for the structure given below?

a. 3-methyl-2-butanone

b. 3-pentanone

c. 1-ethyl-1-propanone

d. 1,1-dimethyl-1-propanone

37. Select the compound with the highest boiling point at standard pressure.

CH₄

38. As a chemist in an automotive research company, you are asked to make a substitute for ethylene glycol, the major component of antifreeze used in cars. Which of these reactions would you use to provide a product that has similar properties?

a.

b.

$$H_3C$$
— $CH=CH-CH_3$ + H_2O — >

c.

d.

$$CH_3CH_2CH_2CH_3 \xrightarrow{CI_2}$$
 followed by \xrightarrow{OH}

Unknown	B.P	Red Litmus Paper	Blue Litmus Paper	Odour	Solubility in H2O	Reaction with an oxidizer
I	48°C	Turns blue	No reaction	Fishy smell	Yes	Weak reaction
II	161°C	No reaction	Slightly red	None	Yes	Vigorous reaction
III	38°C	No reaction	No reaction	None	No	Weak reaction
IV	164°C	No reaction	Turns red	Unpleasant, rancid odour	Yes	No reaction

A forensic scientist is trying to identify the functional groups in some unknowns. After several tests, she produces the above chart. Unknown I is most likely which of the following?

a.

d.

b.

c.

40. A forensic scientist is trying to identify the functional groups in some unknowns. After several tests, she produces the above chart. Unknown II is most likely which of the following?

a.

d.

b.

e.

c.

41. A forensic scientist is trying to identify the functional groups in some unknowns. After several tests, she produces the above chart:

Unknown III is most likely which of the following?

a.

d

b.

e

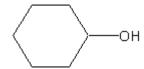
c.

42. A forensic scientist is trying to identify the functional groups in some unknowns. After several tests, she produces the above chart. Unknown IV is most likely which of the following?

a.

d

b.



c.

43. What is the correct IUPAC name for compound below?

- a. 2-ethyl-5-hexanone
- b. 5-ethyl-2-hexanone
- c. 3-methyl-6-heptanone

- d. 5-methyl-2-heptanone
- e. 2-heptanone

44. In order to prepare the molecule shown below, which organic compounds must a chemist react under the appropriate catalyst/conditions?

a.

$$CH_3CH_2CO_2H$$
 + C_6H_5OH

b.

c.

$$\bigcirc$$
 O—CH₂-CH₂-CH₃ + an oxidize

d.

$$\bigcirc$$
 CH=CH-CH₂-CH₃ + H₂O

- 45. Which statement below is incorrect?
 - a. the smallest aldehyde has the formula HCOH
 - b. a carbonyl carbon consists of a carbon-oxygen double bond
 - c. in an aldehyde, the carbonyl carbon is always bonded to a hydrogen atom
 - d. Ketones are more soluble in water than alcohols with the equivalent number of carbons

46. The correct name for the compound given below is which of the following?

$$\left\langle \bigcirc \right\rangle \stackrel{0}{\longrightarrow}$$
 CCH₂CH₂CH₃

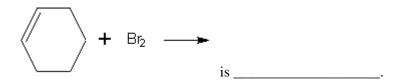
- a. 1-phenyl-1-butanone
- b. phenylbutanal

- c. 4-phenyl-4-butanone
- d. butanonebenzene

47.	The functional group of a molecule does	not affect	a compound's
	a. solubility		reaction with other molecules
	b. melting point	d.	carbon chain length
48.	Which compound is most likely to be a	gas at roon	n temperature?
	a. propane	-	propanal
	b. 2-chloropropane	d.	propanone
 49.	From the following list, select the two m	olecules tl	nat are isomers:
	1. CH ₃ CH ₂ CH ₂ CH ₃	2. CH ₃ CH	I ₂ CH ₂ CH(CH ₃) ₂
	3. CH ₃ CH ₂ CH ₂ CH ₃		I ₂ CH ₂ -C(CH ₃) ₂
	3. 611361126113	1. 011501	120112 0(0113)/2
	a. (1) and (2) only	d.	(2) and (3) only
	b. (1) and (3) only	e.	(2) and (4) only
	c. (1) and (4) only		
50.	Which of the following compounds is a	secondary	alcohol?
	a. 1-pentanol	c.	2-pentanone
	b. 2-pentanol	d.	2-methyl-2-butanol
51.	Which of the following compounds is ar	n isomer of	the other three identical molecules?
	a. $ \begin{array}{c} CH_3 \\ H_3C \longrightarrow CH_2 - CH_2 - CH \longrightarrow CH_3 \\ b. \\ CH_3 & CH_3 \\ HC \longrightarrow CH_2 - CH_2 \\ CH_3 & CH_3 \\ \end{array} $		H ₃ C
	 H₃CC H₂ -C H₂ -C H C H₃		I CH₃
	b.	d.	
	ÇH₃ ÇH₃		H ₃ C — CH ₂ - CH — CH ₂ - CH ₃
	HC		СПЗ
	CH _o		
	5.13		
 52.	The symbol shown below is which of the	e following	2 ?
	7 7 1		
	н —		
	н		
	a. an empirical formula	c.	a structural formula
	b. a molecular formula	d.	a stick formula
 53.	<u> </u>	organic co	ompounds because carbon can
	a. form 4 bonds		
	b. form single, double and triple bonds		
	c. form chains, rings, spheres and shee		
	d. the carbon-carbon bond is very stable. all of the above	le	
	e. all of the above		

Completion
Complete each statement.

54. The structure of the compound produced by this reaction:



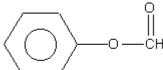
55. The primary reaction product of the reaction given below is ______.

$$CH_2$$
-CH=CH₂ + H_2 O \longrightarrow

- 56. When exposed to light and Cl₂(g), cyclopentane will react to form ______.
- 57. The correct IUPAC name for the compound formed by the reaction below is ______

Short Answer

58. Write the reaction showing how the ester.



, can be prepared from a carboxylic acid and an alcohol. Provide the names of all reactants below your equation.

Essay

- 59. Large factories with immense storage tanks, noxious fumes, and pipes draining dangerous fluids into clean streams is the perception many people in the general public have when asked about the chemical industry. They frequently associate these factories with the pollution and hazards surrounding modern chemical usage. In the past two decades, tough legislation has made many chemical factories much safer. In fact, 'household chemical uses' poses a greater potential for personal risk and environmental pollution in many cases. The average consumer handles a plethora of organic chemicals. Describe some of the **organic** chemicals commonly used around a household, general precautions that should be observed by citizens to reduce their risks, and alternative methods to reduce their overall consumption.
- 60. Our modern Western society relies heavily on organic compounds. Many improvements have been made in these products to assist in solving new health, environmental and safety concerns. Describe several of these innovations.

Organic Review Test Answer Section

MULTIPLE CHOICE

1.		B OC1.01	PTS:	1	REF:	K/U	OBJ:	1.8
2.	ANS:	D	PTS:	1	REF:	K/U	OBJ:	1.5
2		OC1.01	DTC.	1	DEE.	TZ /T T	ODL	1.0
3.	ANS: STA:	OC1.01	PTS:	1	REF:	K/U	OBJ:	1.2
4.	ANS:	A	PTS:	1	REF:	C	OBJ:	1.2
_		OC2.02	DTC.	1	DEE.	C	ODL	1.0
5.	ANS:	OC2.02	PTS:	I	REF:	C	OBJ:	1.2
6.	ANS:		PTS:	1	REF:	K/U	OBJ:	1.6
	STA:	OC1.01						
7.	ANS:		PTS:	1	REF:	K/U	OBJ:	1.5
		OC1.01				_		
8.	ANS:		PTS:	1	REF:	C	OBJ:	1.5
0	STA: ANS:	OC2.02	DTC.	1	DEE.	12/11	ODI.	1.5
9.		OC1.02	PTS:	1	REF:	K/U	OBJ:	1.5
10	ANS:		PTS:	1	REF:	K/II	OBJ:	1 2
10.		OC1.01	110.	1	KLI.	IV C	ODJ.	1,2
11.	ANS:		PTS:	1	REF:	С	OBJ:	1.2
	STA:	OC2.02						
12.	ANS:	C	PTS:	1	REF:	C	OBJ:	1.8
	STA:	OC2.02						
13.	ANS:		PTS:	1	REF:	C	OBJ:	1.2
		OC2.02	DE0.0				0.0.4	4.0
14.	ANS:		PTS:	1	REF:	C	OBJ:	1.8
15	ANS:	OC2.02	PTS:	1	REF:	C	OBJ:	1.3
13.		OC2.05	P13:	1	KEF:	C	ODJ:	1.5
16.	ANS:		PTS:	1	REF:	C	OBJ:	1.2
10.		OC2.01	110.	-	1121		020.	
17.	ANS:	D	PTS:	1	REF:	C	OBJ:	1.7
	STA:	OC2.02						
18.	ANS:		PTS:	1	REF:	C	OBJ:	1.2
		OC2.02						
19.	ANS:		PTS:	1	REF:	C	OBJ:	1.7
20		OC2.02	DTC	1	DEE	C	ODI	1.0
20.	ANS:	A OC2.02	PTS:	1	REF:	C	OBJ:	1.2
21	ANS:		PTS:	1	REF:	C	OBJ:	1 2
41.		OC2.02	115.	1	IXLI'.	C	ODJ.	1.4
22.	ANS:		PTS:	1	REF:	С	OBJ:	1.6
		OC2.02						
23.	ANS:	D	PTS:	1	REF:	C	OBJ:	1.6

	STA:	OC2.02						
24.			PTS:	1	REF:	С	OBJ:	1.2
		OC2.02						
25.			PTS:	1	REF:	C	OBJ:	1.7
2.5		OC2.02	D			***	0.77	
26.	ANS:	B OC1.01	PTS:	1	REF:	K/U	OBJ:	1.1
27			PTS:	1	DEE:	K/U	OBJ:	1 3
21.		OC1.03	115.	1	KLI.	K/U	ODJ.	1.3
28.		D	PTS:	1	REF:	С	OBJ:	1.3
	STA:	OC2.05						
29.			PTS:	1	REF:	C	OBJ:	1.3
20		OC2.05 C	DTC.	1	DEE.	K/U	OBJ:	1 /
30.		OC1.03	F13.	1	KEF.	K/U	ODJ.	1.4
31.	ANS:		PTS:	1	REF:	K/U	OBJ:	1.4
	STA:	OC1.02						
32.			PTS:	1	REF:	C	OBJ:	1.4
22		OC2.02	DTC	1	DEE	17/11	ODI	1.7
33.		A OC1.01	PTS:	1	KEF:	K/U	OBJ:	1.5
34.			PTS:	1	REF:	K/U	OBJ:	1.7
5		OC1.02	110.	•	TCLI.		ODU.	1.,
35.	ANS:		PTS:	1	REF:	K/U	OBJ:	1.7
		OC1.02				_		
36.	ANS:	A OC2.02	PTS:	1	REF:	C	OBJ:	1.7
37		D D	PTS:	1	REE.	K/U	OBJ:	1.5
37.		OC1.02	110.	1	ILLI.	11/ 0	ODJ.	1.5
38.	ANS:	В	PTS:	1	REF:	I	OBJ:	1.5
		OC2.05						
39.			PTS:	1	REF:	I	OBJ:	1.8
40		OC1.02 A	PTS:	1	REF:	T	OBJ:	1 4
40.		OC1.02	115.	1	KLI.	1	ODJ.	1.7
41.	ANS:	D	PTS:	1	REF:	I	OBJ:	1.6
		OC1.02						
42.			PTS:	1	REF:	I	OBJ:	1.7
13	ANS:	OC1.02	ртс.	1	REF:	C	OBJ:	1.6
4 3.		OC2.02	115.	1	KLI.	C	ODJ.	1.0
44.	ANS:		PTS:	1	REF:	C	OBJ:	1.7
		OC2.05						
45.		D	PTS:	1	REF:	K/U	OBJ:	1.6
16		OC1.01 A	DTC.	1	DEE.	C	OBJ:	1.6
40.		OC2.02	Г15.	1	KEI.	C	ODJ.	1.0
47.		D	PTS:	1	REF:	С	OBJ:	1.1
		OC2.01						
48.	ANS:		PTS:	1	REF:	K/U	OBJ:	1.1
40		OC1.02	DTC.	1	DEE.	V /II	ODI.	1.2
49.	ANS:	E	PTS:	1	KEF:	K/U	OBJ:	1.2

STA: OC1.01 50. ANS: B PTS: 1 REF: K/U OBJ: 1.5 STA: OC1.01 51. ANS: D PTS: 1 REF: K/U OBJ: 1.2 STA: OC1.01 52. ANS: C PTS: 1 REF: K/U OBJ: 1.1 STA: OC1.01 53. ANS: E PTS: 1 REF: K/U OBJ: 1.1 STA: OC1.01

COMPLETION

54. ANS:

PTS: 1 REF: C OBJ: 1.3 STA: OC2.05

OH

CH2-CH-CH3

55. ANS:

PTS: 1 REF: C OBJ: 1.3 STA: OC2.05

56. ANS:

chlorocyclopentane

PTS: 1 REF: C OBJ: 1.4 STA: OC2.05

57. ANS: cyclobutylmethanoate

PTS: 1 REF: C OBJ: 1.7 STA: OC2.05

SHORT ANSWER

58. ANS:

PTS: 1 REF: C OBJ: 1.7 STA: OC2.05

59. ANS:

answers will vary

- dangers to individuals include organic chemicals which are toxic, flammable and irritating
- exposure can cause allergic responses, poisoning, sickness, cancer
- precautions for storage: keep in the original container; keep for only the prescribed length of time; store in a cool, dry place; check for leaks
- precautions for use: do not mix different products, use the recommended strength, avoid splashing, read instructions, retain labels, close containers, use in ventilated areas, secure lids, finish product before purchasing more, keep locked away from children
- some household organic products and possible alternative include:
- oil based paints: use water (latex) products
- paint and varnish removers: use a scrapper/sandpaper
- herbicides: pull weeds by hand, live with weeds, use dish detergent solution- insecticides: use insecticidal soap, eliminate excessive moisture, only use small quantities (give rise to resistance), use repellents such as boric acid
- pool chemicals: use ozone or UV light system, adjust to proper pH
- auto products: bring waste to a proper recycling facility for disposal
- mothballs: use cedar ball
- drain cleaners: use a mechanical snake
- house cleaners: vinegar, baking soda

PTS: 1 REF: MC OBJ: 1.1 STA: OC3.02

60. ANS:

answers will vary

- farmers use the potency of pheromones to attract and kill insects as an alternative to pesticides
- HFCs are replacing CFCs as propellants, since they do not contain chlorine and will damage the ozone layer
- synthesis of polymers for high density optical storage
- use of unleaded gasoline in place of leaded gasoline
- alterations in transparent polymers to prevent damage form lasers in pilots eyes, improve optical networks
- use of recyclable organic products in packaging and automotive products
- preservatives in foods to prevent spoilage
- biodegradable pesticides in place of long lasting alkyl organics such as DDT
- improved analytical testing for organic compounds in our bodies (e.g., hormone levels, proteins)
- newly synthesized antibiotics to fight disease
- alternative medicines: use of aldehydes in aromatherapy
- production of new artificial sweeteners such as saccharin to help diabetics, people on diets in place dangerous products such as aspartame

PTS: 1 REF: MC OBJ: 1.9 STA: OC3.04