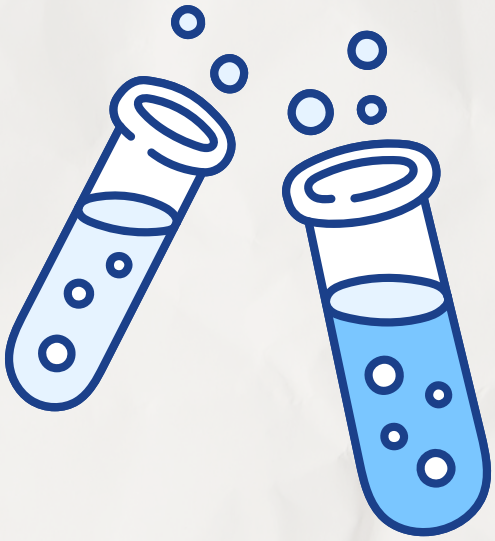
ORGANIC CHEMISTRY

FINAL EXAM



Done by:mohammed ramadan

1) Which of the following would you expect to have ionic bonds?
   a. MgF_2
   b. CO
   c. ICl
   d. Br_2
   e. NF_3

Ans : A

2) Which of the following elements is the most electronegative?
   a. O
   b. S
   c. Se
   d. Te
   e. Po

Ans : A

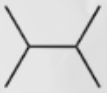
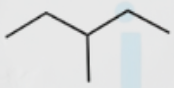
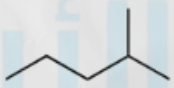
3) If the Cl–Cl bond length is 1.98Å and the C–C bond length is 1.54Å, what would you expect the bond length of Cl–C to be?
   a. 0.74Å
   b. 1.54Å
   c. 1.76Å
   d. 1.98Å
   e. 3.52Å

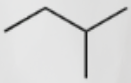
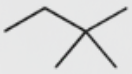
Ans : C

4) The most electronegative elements in the periodic table are generally found :
   a. toward the left in a horizontal row and toward the top in a column.
   b. toward the right in a horizontal row and toward the top in a column.
   c. toward the left in a horizontal row and toward the bottom in a column.
   d. toward the right in a horizontal row and toward the bottom in a column.
   e. distributed randomly throughout the table

Ans : B

5) Which of the following abbreviated structural formulas is NOT an isomer of the others?

a.  b.  c. 

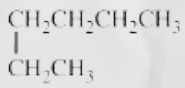
d.  e. 

Ans : D

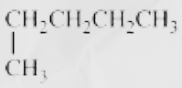
6) The number of possible acyclic hydrocarbons with the molecular formula C_4H_6 is :
   a. 2
   b. 3
   c. 4
   d. 5
   e. 6

Ans : C

7) Which of the following molecules are structural isomers?



1



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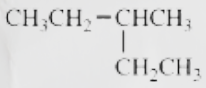

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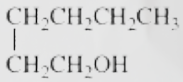

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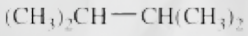
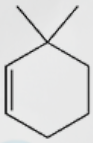


5

a. 1,2 and 3
b. 1,3 and 4
c. 2,3 and 5
d. 1,3 and 5
e. 2,3 and 5

Ans : D

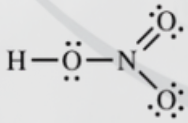
8) The structural formula



has the molecular formula
a. C6H10
b. C8H14
c. C8H16
d. C8H18
e. C8H20

Ans : B

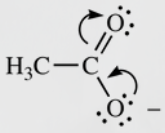
9) What is the formal charge of N in HNO3, as seen below?



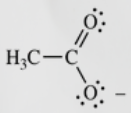
a. +1
b. +2
c. 0
d. –1
e. –2

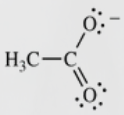
Ans : A

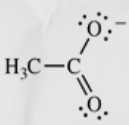
10) The curved arrows in the resonance structure for the acetate ion shown below :

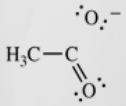


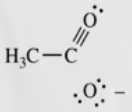
indicate the following alternative resonance structure for the acetate ion:

a. 

b. 

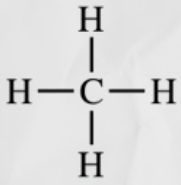
c. 

d. 

e. 

Ans : c

11) The Lewis structure of methane is



approximate H–C–H bond angle in methane is :

a. 60°
b. 90°
c. 109.5°
d. 120°
e. 180°

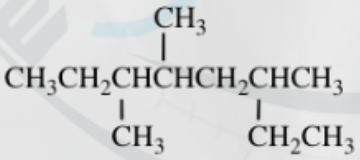
Ans : C

12) What is the molecular formula of a cycloalkane that has five carbon atoms?

a. C5H10
b. C5H12
c. C5H14
d. C5H8
e. C5H5

Ans : A

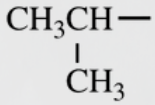
13) The correct IUPAC name for the following molecule is:



a. 6-ethyl-3,4,-dimethylheptane
b. 2-ethyl-4,5-dimethylheptane
c. 3,4,6-trimethyloctane
d. 3,5,6-trimethyloctane
e. none of these

Ans : C

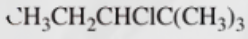
14) The name of the alkyl group below is:



a. ethyl
b. propyl
c. isopropyl
d. butyl
e. isobutyl

Ans : c

15) The IUPAC name for the following molecule is:



a. 3–chloroheptane
b. 2–chloro–1,1,1–trimethylbutane
c. t–butylpropyl chloride
d. 3–chloro–1–dimethylpentane
e. 3–chloro–2,2–dimethylpentane

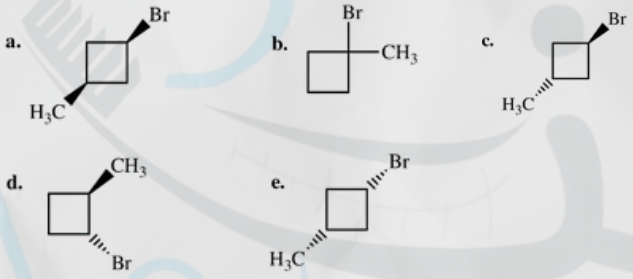
Ans : e

16) What is a correct name for the following molecule?

a. 2,2–dichlorocyclopropane
b. 1,1–dichlorocyclopentane
c. 1,1–dichloropropane
d. trans–1,1–dichlorocyclopropane
e. 1,1–dichlorocyclopropane

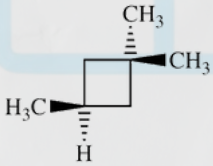
Ans : e

17) Trans–1–bromo–3–methylcyclobutane is represented by which structure below?



Ans : C

18) The correct IUPAC name for :



a. 1,3,3–trimethylcyclobutane.
b. cis–1,3,3–trimethylcyclobutane.
c. trans–1,3,3–trimethylcyclobutane.
d. 1,1,3–trimethylcyclobutane.
e. 2,2,4–trimethylcyclobutane.

Ans : d

19) Which of the following alkanes would have the highest boiling point?
a. pentane
b. isopentane
c. neopentane
d. hexane
e. isohexane

Ans : d

20) The bond angle of a normal, tetrahedral, sp3 hybridized carbon is 109.5° .What is the C–C–C bond angle of cyclopropane?
a. 60°
b. 90°
c. 109.5°
d. 120°
e. 180°

Ans : a

21) Cycloalkanes with _____ or more carbons in the ring are nonplanar.
a. 2
b. 3
c. 4
d. 5
e. 6

Ans : c

22) How many isomeric dichloro products can be obtained from the chlorination of cyclopropane?
a. 1
b. 2
c. 3
d. 4
e. 5

Ans : c

23) The number of possible monobromination products, of methylcyclopentane is :
a. 2
b. 3
c. 4
d. 5
e. 6

Ans : e

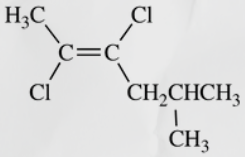
24) The number of possible dichlorination products of propane is :
a. 2
b. 3
c. 4
d. 5
e. 6

Ans : c

25) Which of the following compounds can exhibit cis/trans isomerism?
a. 1-pentene
b. 2-pentene
c. 2-methyl-2-pentene
d. 3-methyl-1-pentene
e. 1-hexene

Ans : b

26) The correct IUPAC name for the following molecule is:



a. trans-2,3-dichloro-5-methyl-2-hexene
b. trans-2,3-dichloro-5-methyl-3-hexene
c. cis-2,3-dichloro-5-methyl-3-hexene
d. trans-4,5-dichloro-2-methyl-4-hexene
e. cis-4,5-dichloro-2-methyl-4-hexene

Ans : a

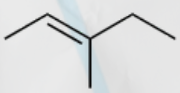
27) The correct structure for allyl bromide is:

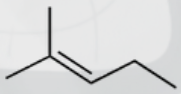
a. $CH_2=CHCH_2Br$ b. $CH_2=CHBr$ c. $BrCH=CHBr$

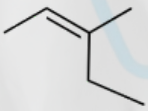
d. $BrCH=CHCH_3$ e. $CH_2=CHCHBr_2$

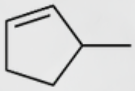
Ans : a

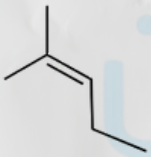
28) The structure of (Z)-3-methyl-2-pentene is :

a. 

b. 

c. 

d. 

e. 

Ans : c

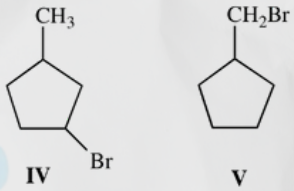
29) Which of the following hydrocarbons will be the most acidic?
a. pentane
b. ethene
c. acetylene
d. isobutane
e. propylene

Ans : c

30) What is the percent s character in an sp^2 hybrid orbital?
a. 25%
b. 33%
c. 50%
d. 67%
e. 75%

Ans : b

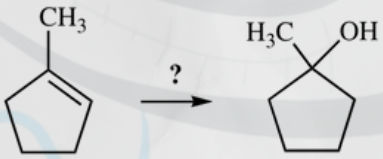
31) What would be the major product of the following reaction?



a. I
b. II
c. III
d. IV
e. V

Ans : b

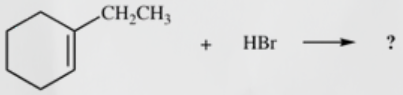
32) Select the necessary reagents to convert methylcyclopentene to 1–methylcyclopentanol :

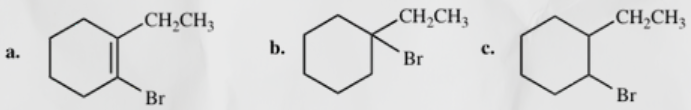


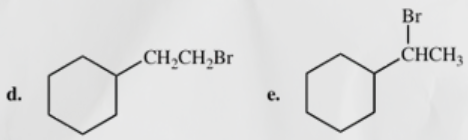
a. H_2O and H_2SO_4
b. Zn, H_2O
c. BH_3, then H_2O_2 and OH^-
d. O_3, then Zn, H^+
e. KOH in alcohol and heat

Ans : a

33) What is the product for the reaction below?







Ans : b

34) The products obtained by the acid-catalyzed hydration of methylcyclopentene and methylenecyclopentane are :

a. identical.
b. regioisomers.
c. cis-trans isomers.
d. constitutional isomers.
e. conformers.

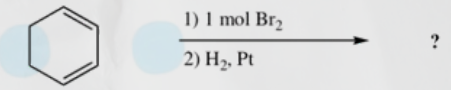
Ans : a

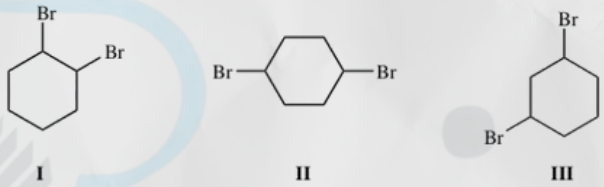
35) The products obtained by adding 1 mole of HBr to 2,4-hexadiene are :

a. 4-bromo-2-hexene and 5-bromo-2-hexene.
b. 3-bromo-2-hexene and 4-bromo-2-hexene.
c. 4-bromo-2-hexene and 2-bromo-4-hexene.
d. 2-bromo-3-hexene and 3-bromo-2-hexene.
e. 2-bromo-3-hexene and 4-bromo-2-hexene.

Ans : e

36) What is/are the final product(s) in the following multistep synthesis?





I II III

a. I
b. II
c. III
d. I and II
e. all are produced

Ans : d

37) Which of the following structures accurately represents toluene?

a. 

b. 

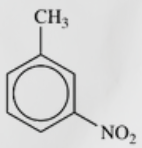
c. 

d. 

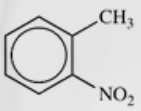
e. 

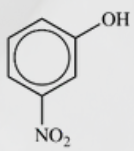
Ans : a

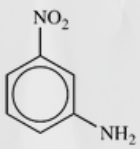
38) Which of the following molecules is m-nitrophenol?

a. 

b. 

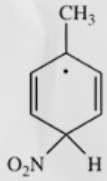
c. 

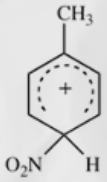
d. 

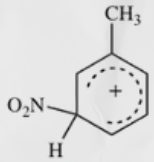
e. 

Ans : d

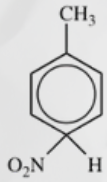
39) The predominant intermediate in electrophilic nitration of toluene is :

a. 

b. 

c. 

d. 

e. 

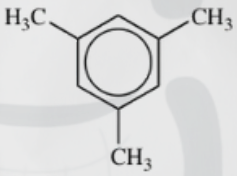
Ans : b

40) Which of the following groups are ortho, para-directing?

a. —CO2CH3
b. —CONH2
c. —SO3H
d. —NH^+(CH3)2
e. —SCH3

Ans : e

41) The relative rates of nitration of

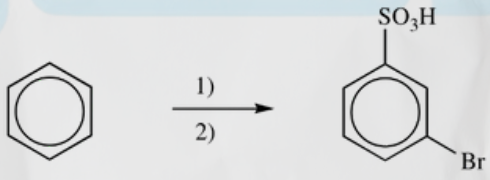
1. 
2. 
3. 
4. 

are

a. 1 > 2 > 3 > 4
b. 4 > 2 > 1 > 3
c. 2 > 1 > 4 > 3
d. 3 > 4 > 2 > 1
e. 3 > 2 > 1 > 4

Ans : e

42) Which is the best reaction sequence to synthesize m-bromobenzenesulfonic acid from benzene?



a. 1) Br2, AlBr3, 2) H2SO4, SO3
b. 1) H2SO4, SO3 2) Br2, AlBr3
c. 1) ethene, HF, 2) Br2, AlBr3
d. 1) CH3Cl, AlCl3, 2) Br2, AlBr3
e. 1) Br2, AlBr3, 2) CH3COCl, AlCl3

Ans : b

43) Which is the best sequence of reagents to use in synthesizing 2-bromo-4-nitrotoluene from benzene:

a. Br_2, $FeBr_3$; then CH_3Cl, $AlCl_3$; then HNO_3, H_2SO_4
b. CH_3Cl, $AlCl_3$; then Br_2, $FeBr_3$; then HNO_3, H_2SO_4
c. CH_3Cl, $AlCl_3$; then HNO_3, H_2SO_4; then Br_2, $FeBr_3$
d. SO_3, H_2SO_4; then HNO_3, H_2SO_4; then Br_2, $FeBr_3$
e. HNO_3, H_2SO_4; then Br_2, $FeBr_3$; then CH_3Cl, $AlCl_3$

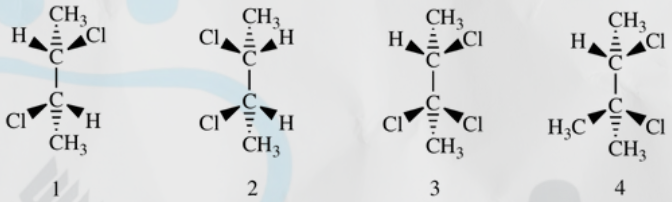
Ans : c

44) Chiral molecules that have nonsuperimposable mirror images are called:

a. enantiomers
b. diastereomers
c. meso compounds
d. stereogenic
e. symmetrical

Ans : a

45) Which of the following molecules has a mirror plane of symmetry?



a. 1
b. 2
c. 3
d. 4
e. all of them

Ans : b

46) A 50:50 mixture of enantiomers :

a. is a meso form.
b. is a pair of diastereomers
c. is a racemic mixture.
d. rotates plane polarized light.
e. is a pair of conformers

Ans : c

47) How many chiral stereoisomers can be drawn for $CH_3CHClCHBrCH_3$?

a. 1
b. 2
c. 3
d. 4
e. 8

Ans : d

48) How many stereoisomers with the formula $CH_3CHICHICH_3$ are possible?

a. 1
b. 2
c. 3
d. 4
e. 5

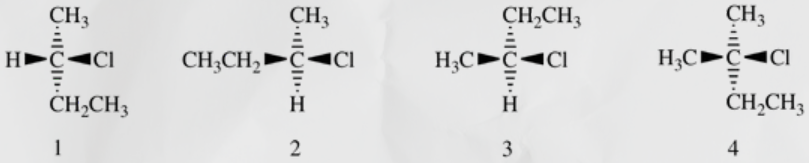
Ans : c

49) The observed rotation for 100 mL of an aqueous solution containing 1 g of sucrose, placed in a 2-decimeter sample tube, is +1.33° at 25°C. What is the specific rotation of sucrose?

a. +66.5°
b. +266°
c. +41.5
d. +133°
e. 108°

Ans : a

50) Which of the following molecules are the same?



a. 1 and 2
b. 3 and 4
c. 1 and 3
d. 2 and 3
e. 2 and 4

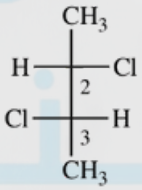
Ans : c

51) The terms that best describe the relationship between (2R,3R)-2,3-butanediol and (2S,3S)-2,3-butanediol are :

a. configurational, achiral, diastereomers.
b. conformational, chiral, enantiomers.
c. conformational, achiral, diastereomers
d. configurational, chiral, enantiomers.
e. configurational, achiral, enantiomers.

Ans : d

52) What is correct name for the following structure?



a. (R,S)-2,3-dichlorobutane
b. (2R,3S)-2,3-dichlorobutane
c. (2S,3S)-2,3-dichlorobutane
d. (2R,3R)-2,3-dichlorobutane
e. none of these

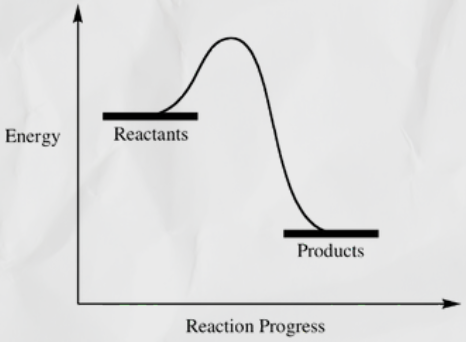
Ans : c

53) The reactivity order of
1. CH3CH2S—
2. CH3CH2O—
3. CH3CH2OH
as nucleophiles is :

a. 1 > 2 > 3
b. 2 > 3 > 1
c. 2 > 1 > 3
d. 3 > 2 > 1
e. 1 > 3 > 2

Ans : a

54) The energy–reaction diagram



is for

a. an SN2 reaction only.
b. an SN1 reaction only.
c. an E2 reaction only
d. an E1 reaction only
e. an SN1 or E1 reaction.
f. an SN2 or E2 reaction

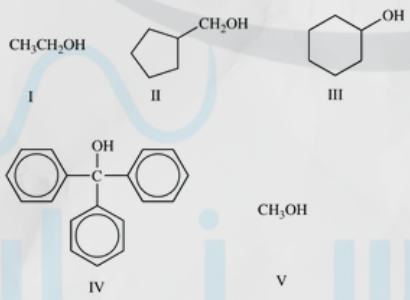
Ans : f

55) What is the IUPAC name for isobutyl alcohol?

a. 1–butanol
b. 2–butanol
c. 2–methyl–2–butanol
d. 2–methyl–1–propanol
e. 2,2–dimethylpropanol

Ans : d

56) Which of the following molecules is classified as a tertiary (3°) alcohol?



a. I
b. II
c. III
d. IV
e. V

Ans : d

57) The expected order of boiling points of

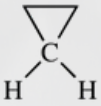
1. $CH_3CH_2OCH_3$ 2. $CH_3CH_2CH_2OH$ 3. CH_3CHCH_3 (OH)

is:

a. 3 > 2 > 1
b. 1 > 2 > 3
c. 1 > 3 > 2
d. 2 > 3 > 1
e. 2 > 1 > 3

Ans : d

58) Which of the following molecules is named oxirane?

a. 
b. 
c. 
d. 
e. $CH_3CH_2OCH_3$

Ans : a

59) What is the correct name for the following crown ether?

a. [8]crown-4
b. [12]crown-4
c. [4]crown-4
d. [15]crown-5
e. [18]crown-6

Ans : b

60) A crown ether named [18]crown-6 has a total of _____ carbons and _____ oxygens :

a. 18, 6
b. 6, 18
c. 24, 6
d. 6, 24
e. 12, 6

Ans : e

61) The mechanism by which ethers are cleaved in concentrated HI is:

a. SN1
b. SN2
c. E1
d. E2
e. none of these

Ans : b

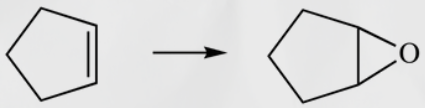
62) Which of following ethers will cleave by an SN1 mechanism?

a. CH_3OCH_3
b. CH_3CHOCH_3 (CH_3 branch)
c. $CH_3CH_2CH_2OCH_2CH_2CH_3$
d. CH_3COCH_3 (both CH_3 branches)
e. $CH_3CHCH_2OCH_3$ (CH_3 branch)

Ans : d

63) Which reagent will accomplish the following reaction?

a. NaOH
b. CH3CO3H
c. H2O, H2SO4
d. (a) BH3 (b) NaOH, H2O2
e. CH3CO2H



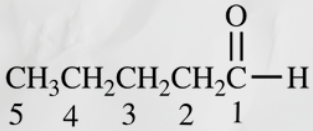
Ans : b

64) Which of the following molecules has the highest boiling point?

a. o–xylene
b. m–xylene
c. p–xylene
d. benzaldehyde
e. benzyl alcohol

Ans : e

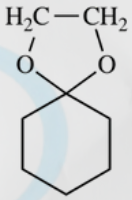
65) Which of the hydrogens in the following molecule are most acidic? The hydrogens on carbon

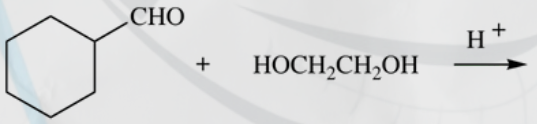


a. 1
b 2
c. 3
d. 4
e. 5

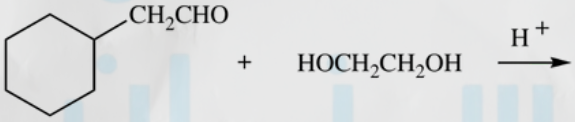
Ans : b

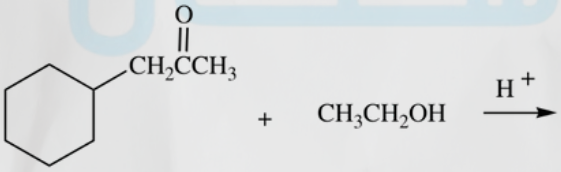
66) What reaction will produce the following product?

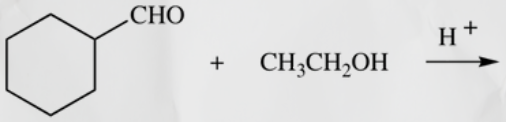


a. 

b. 

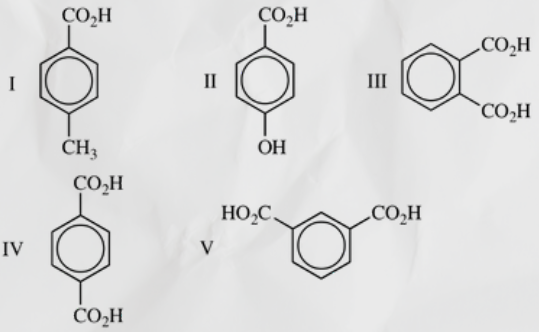
c. 

d. 

e. 

Ans : b

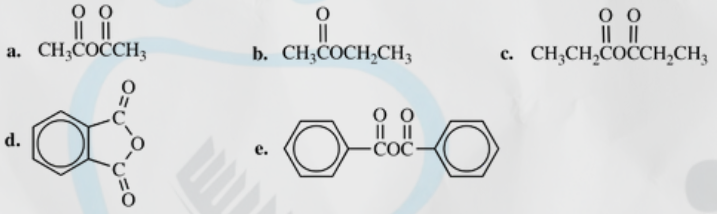
67) Which of the following carboxylic acids is terephthalic acid?



a. I
b. II
c. III
d. IV
e. V

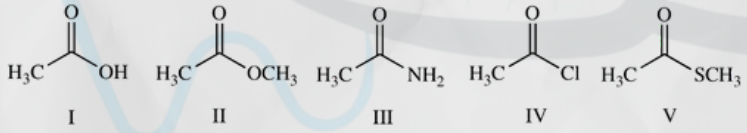
Ans : d

68) Which of the following molecules is not an anhydride?



Ans : b

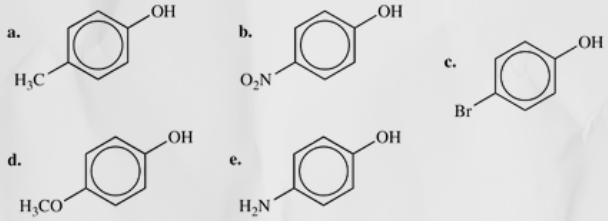
69) Which of the following compounds undergoes hydrolysis at the fastest rate upon reaction with sodium hydroxide in water?



a. I
b. II
c. III
d. IV
e. V

Ans : d

70) Which of the following phenols is the strongest acid?



Ans : b

هذه جميع الأسئلة التي وردت في امتحان دفعة "إيفورك"، وقد كان الامتحان مكوّنًا من (٧٠) سؤال.
لا تنسونا من صالح دعائكم 🌿
محمد رمضان