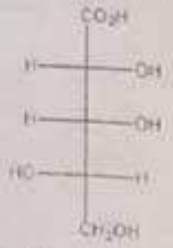
1 → A
2 → D
3 → D
4 → B
5 → C
6 → مش داخل
7 → B
8 → C
9 → مش داخل
10 → C
11 → B
12 → C
13 → C
14 → A
15 → E
16 → B
17 → D
18 → A
19 → A
20 → C
21 → B
22 → C
23 → C
24 → B
25 → A
26 → C
27 → C
28 → B
29 → B
30 → A
31 → D
32 → E
33 → مش داخل
34 → C
35 → E
36 → D
37 → A
38 → A
39 → C
40 → E
41 → C
42 → B
43 → مش داخل
44 → A
45 → C
46 → B
47 → B
48 → A
49 → C
50 → B

37) How many enantiomeric pairs exist for the compound below?



A) 4 B) 3 C) 9 D) 8 E) 16

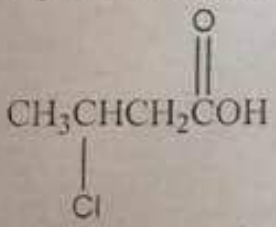
38) Upon ozonolysis which alkene will give only acetone $(CH_3)_2C{=}O$?

A) 2,3-dimethyl-2-butene
B) 2,2-dimethyl-2-butene
C) 3-hexene
D) 2-methyl-2-pentene
E) 2-methyl-3-hexene

39) Which of the following is the most acidic?
A) 2,4-dinitroaniline B) 4-nitrophenol C) Picric acid D) 2,4-dinitrophenol E) Phenol

40) Which of the following is the least basic?
A) 2-Chloroaniline
B) 2,4-Dichloroaniline
C) 2,4,6-Trichloroaniline
D) Aniline
E) 2,3,4,5,6-Pentachloroaniline

41) What is the common name for the following compound?



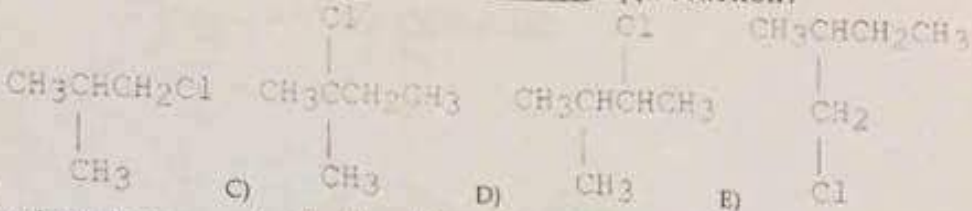
A) λ-Chlorobutanoic acid
B) β-Chlorobutanoic acid
C) β-Chlorobutyric acid
D) λ-Chlorobutyric acid
E) 3-Chlorobutyric acid

42) The Hinsberg test of a $C_5H_{14}N_2$ compound produces a solid that is insoluble in 10% aq. NaOH. This solid derivative dissolves in 10% aq. sulfuric acid. Which of the following would best fit these facts?
A) $NH_2CH_2CH_2CH_2N(CH_3)_2$.
B) $(CH_3)_2NCH_2CH_2NHCH_3$.
C) $NH_2CH_2C(CH_3)_2CH_2NH_2$.
D) $(CH_3)_2NCH_2N(CH_3)_2$.

43) Reaction of *para*-chloroaniline with acetic anhydride in pyridine gave a mixture of 94% of *para*-chloroacetanilide, contaminated with 6% unreacted amine. Which of the following work-ups would be best used to purify the amide?
A) React the unreacted amine with methyl iodide.
B) Wash an ether solution of the crude product with concentrated brine (aq. NaCl).
C) Wash an ether solution of the crude product with 5% aqueous sulfuric acid.
D) Wash an ether solution of the crude product with 5% aqueous sodium carbonate

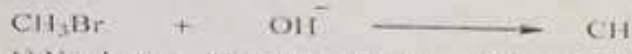
44) Which of the following reagents would be best for converting phenylacetamide $(C_6H_5CH_2CONH_2)$ to benzylamine $(C_6H_5CH_2NH_2)$?
A) $LiAlH_4$ in ether. B) H_2 & Pt catalyst. C) Aqueous NaOBr. D) None of the above

23) Which of the following alkyl halides gives the slowest S_N2 reaction?



A) CH_3CH_2Cl B) C) D) E)

24) Assuming no other changes, what is the effect of doubling only the concentration of the alkyl halide in the reaction below?

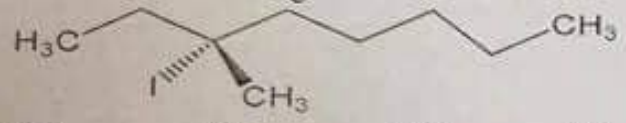


A) No change B) doubles the rate C) triples the rate D) quadruples the rate E) rate is halved

25) Assuming no other changes, what is the effect of doubling only the concentration of the iodide ion in the reaction below?

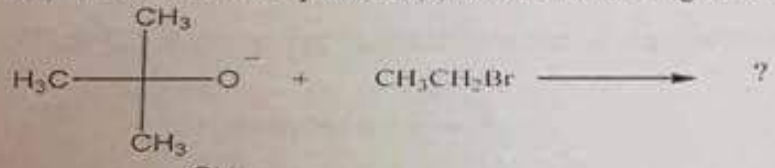
A) No change B) doubles the rate C) triples the rate D) quadruples the rate E) rate is halved

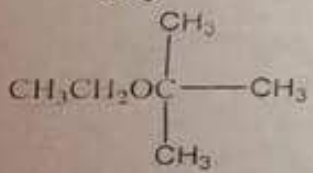
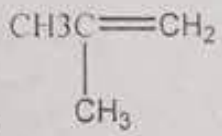
26) How many distinct alkene products, including stereoisomers, are possible when the alkyl iodide below undergoes E2 elimination?



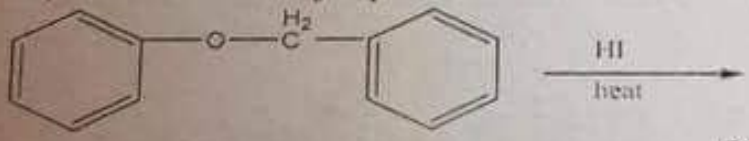
A) 2 B)4 C) 5 D)1 E)3

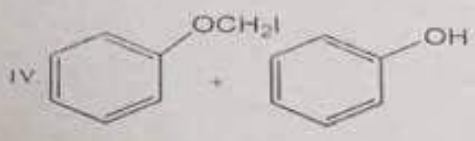
27) What is/are the product(s) of the following reaction?

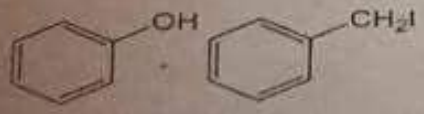


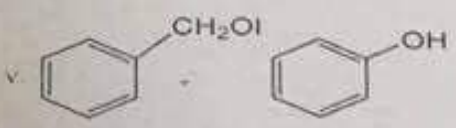
A)  B) n-Butanol C)  D)Diethyl ether E) None of the above.

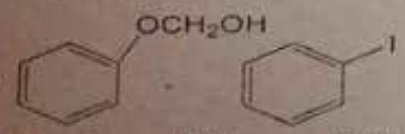
28) What are the major products from the following reaction?





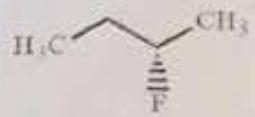






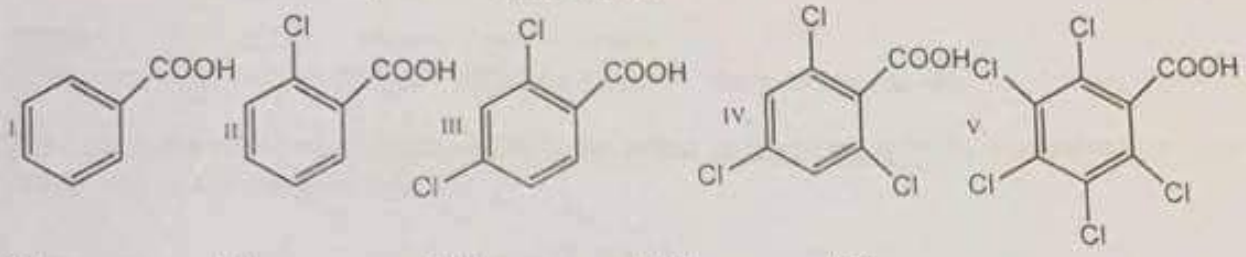
A) I B)II C) III D) IV E) V

17) Which of the following statements correctly describes the molecule shown below?



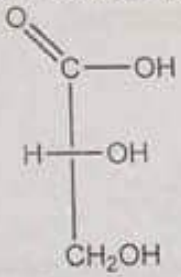
A) It is achiral. B) It is meso C) Its chiral carbon possesses the R configuration
D) Its chiral carbon possesses the S configuration E) The molecule possesses two chiral carbons

18) Which of the following is the weakest acid?



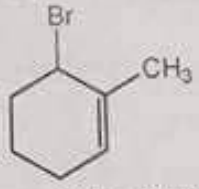
A) I B) II C) III D) IV E) V

19) What is the absolute configuration of (-)-lactic acid?



A) R configuration B) L configuration C) S configuration D) R and S configuration E) D and L configuration

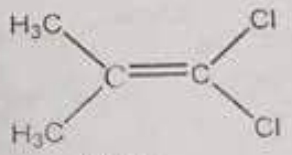
20) The proper IUPAC name for the alkene shown below.



A) 2-methyl- 3-bromocyclohexene
B) 1-methyl- 6-bromocyclohexane
C) 6-bromo-1-methylcyclohexene
D) 6-bromo-1-methylcyclohexane
E) None of the above.

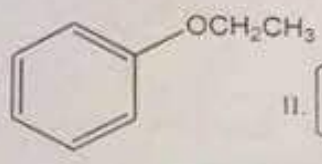
21) Which of the following is capable of exhibiting *cis-trans* isomerism?
A) 1-butene B) 2-pentene C) cyclohexene D) 1-pentene E) methylcyclohexane.

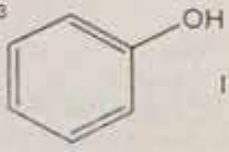
22) Which of the following best describes the geometry about the carbon-carbon double bond in the alkene below?



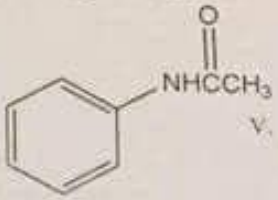
A) Z B) E C) neither E nor Z D)Cis E)Trans

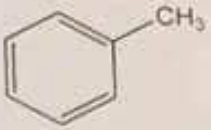
12) Which of the following compounds reacts most slowly during nitration?

I. 

II. 

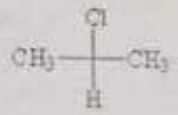
III. 

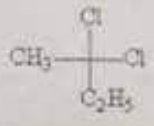
IV 

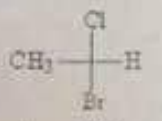
V. 

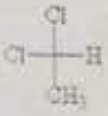
A) I B) II C) III D) IV E) V

13) Which of the following compounds has a chiral carbon atom?

I. 

II. 

III. 

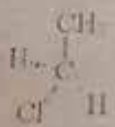
IV. 

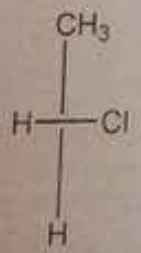
V. 

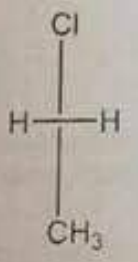
A) I B) II C) III D) IV E) V

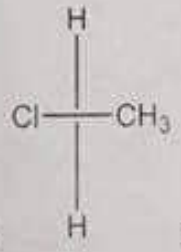
14) How many chiral carbons are present in a molecule of 2,4,6-trimethylheptane?
A) 0 B) 1 C) 2 D) 3 E) 4

15) Which of the following compounds is an enantiomer of the structure below?



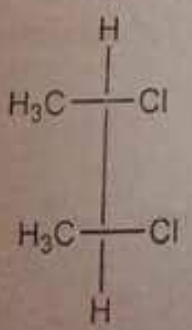
A) 

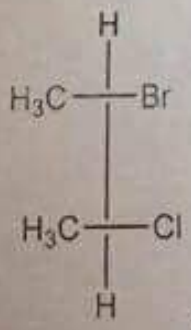
B) 

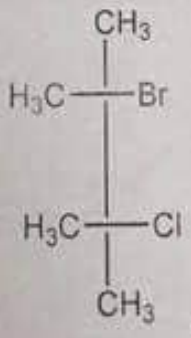
C) 

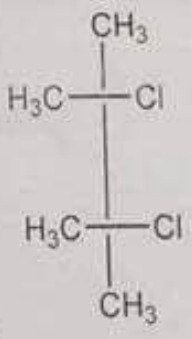
D) A and B E) It does not have an enantiomer.

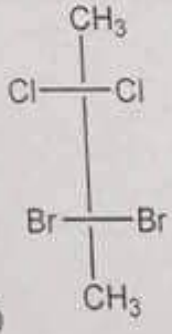
16) Which of the following compounds is chiral?

A) 

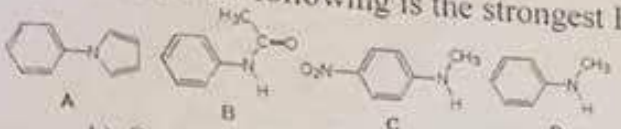
B) 

C) 

D) 

E) 

45) Which of the following is the strongest Brønsted base?

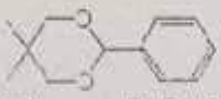


A) B B) C C) D D) A

46) Which of the following is a 3° amine?

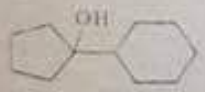
A) 1-methylcyclohexylamine B) triethylamine C) *tert*-butylamine D) N-methylaniline

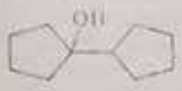
47) What product or products are expected from acid-catalyzed hydrolysis of the following compound?

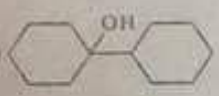


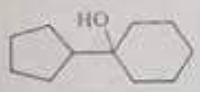
A) Only the starting material itself (no reaction) B) Benzaldehyde and 2,2-dimethyl-1,3-propanediol
C) Benzoic acid and 2,2-dimethyl-1,3-propanediol D) 2-phenyl-1,3-propanediol and acetone

48) Which is the major product of the following reaction?

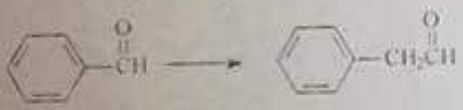
a) 

b) 

c) 

d) 

49) Which is the best procedure for the following preparation?



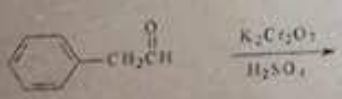
a) CH_3MgBr, H_2SO_4 → $K_2Cr_2O_7$, H_2SO_4

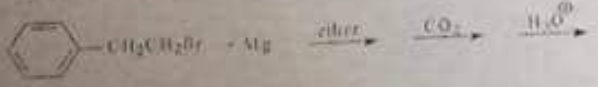
b) $Ag(NH_3)_2$, NH_3/H_2O → CH_3MgBr, H_2SO_4 → $NaBH_4$, H_2O

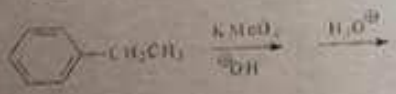
c) $NaBH_4$, H_2O → HCl → Mg, ether → H_2CO → PCC

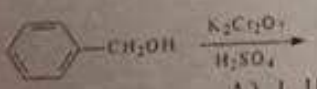
d) $LiAlH_4$, H_2O → HBr → Mg, ether → CO_2, H_3O^+

50) Which reactions yield the same carboxylic acid?

I 

II 

III 

IV 

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