

2022

Time : 3 hours

Full Marks : 60

Candidates are required to give their answers in their own words as far as practicable.

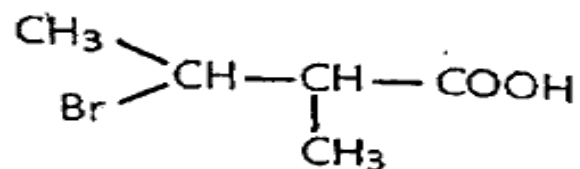
The figures in the margin indicate full marks.

Answer any five questions in

which questions no 1 is compulsory.

1. Choose the correct alternative for each of the following questions : 1×12=12

(a) The IUPAC name of the following compound is :



(i) 2-Bromo-3-methylbutanoic acid

(ii) 2-Methyl-3-bromobutanoic acid

(iii) 3-Bromo-2-methylbutanoic acid

(iv) None of these

(b) The increasing order of +ve Inductive effect shown by $-\text{H}$, $-\text{CH}_3$, $-\text{C}_2\text{H}_5$ and $-\text{C}_3\text{H}_7$ is :

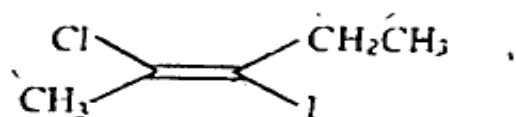
(i) $-\text{H} < -\text{CH}_3 < -\text{C}_2\text{H}_5 < -\text{C}_3\text{H}_7$

(ii) $-\text{H} > -\text{CH}_3 < -\text{C}_2\text{H}_5 > -\text{C}_3\text{H}_7$

(iii) $-\text{H} < -\text{C}_2\text{H}_5 < -\text{CH}_3 < -\text{C}_3\text{H}_7$

(iv) None of the above

(c) The IUPAC name of the following compound is :



(d) Which of the following is an alkane which can exhibit optical activity ?

- (i) 3-Methylhexane
- (ii) Isopentane
- ✓(iii) 3-Methylpentane
- (iv) None of these

(e) Which among the following does not exhibit geometric isomerism ?

- ✓(i) 1-hexene
 - (ii) 2-hexene
 - (iii) 3-hexene
 - (iv) None of these
- (f) Which among the following is not a class of organic compound ?
- (i) Carbonyl compound
 - ✓(ii) Nitro compound
 - (iii) Amides
 - (iv) Ionic compounds
- (g) An alkane with 6 carbon atoms will have how many hydrogen atoms ?

(i) 11

(ii) 12

(iii) 13

~~(iv)~~ 14

(h) Ethylene on reaction with bromine forms which among the following product ?

(i) $\text{BrH}_2\text{C}-\text{CH}_2\text{Br}$

(ii) $\text{BrH}_2\text{C}=\text{CH}_2\text{Br}$

(iii) $\text{Br}_2\text{HC}=\text{CHBr}_2$

(iv) None of these

(i) Which among the following product is formed when ethyne undergoes hydration ?

(i) Formaldehyde

(ii) Formic acid

(iii) Acetaldehyde

(iv) None of these

(j) Which reagent is a good nucleophile?

(i) NH_3

(ii) BH_3

(iii) Br_2

(iv) None of these

(k) Which of the following is not an electrophile ?

(i) $(\text{CH}_3)_4\text{N}^+$

(ii) Cl_2

(iii) HBr

(iv) None of these

(l) Identify the one which does not come under the organic addition reaction ?

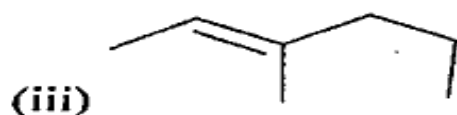
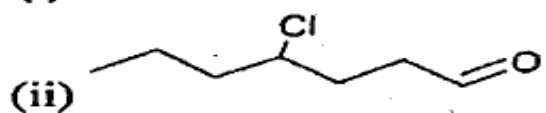
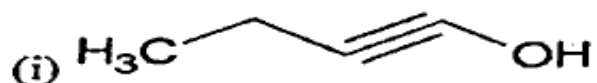
(i) Hydration

(ii) Dehydration

(iii) Halogenation

(iv) Hydrohalogenation

2. (a) Write IUPAC name of the following compounds : $1.5 \times 3 + 1.5 \times 3 + 3 = 12$



(b) Draw structure of the following compounds :

(i) 3-Ethyl-2-hexene

(ii) Ethyl but-2-enoate

(iii) Acetophenone

(c) What is Hyperconjugation? Explain using suitable example.

3. (a) Explain the term hybridization ? 3

(b) Explain the sp , sp^2 , sp^3 hybridization in Carbon taking suitable examples. 3×3

4. (a) What is Inductive effect ? 3

(b) Explain any three of the following : 3×3

(i) Chloroacetic acid is a stronger acid than acetic acid.

(ii) Ethylamine is more basic than ammonia

(iii) Acetic acid is weaker than formic acid.

(iv) Phenols are stronger acids than alcohols.

5. Write down short notes on any **three** of the following : 4×3=12

(a) Order of stability of carbonium ions

(b) Huckel's Rule

(c) Geometrical Isomerism

(d) Nucleophiles

(e) Order of stability of carbanions

6. (a) What is optical isomerism ? 4

(b) What is the most essential condition for a compound to be optically active ? 2

(c) What are enantiomers? Write their characteristics ? 6

7. (a) What is E1 reaction ? Discuss its mechanism taking suitable example. 6

(b) What happens when : 3×2

(i) Acetylene is treated with ammoniacal AgNO_3

(ii) Propyne is treated with chlorine

water. <https://www.jharkhandstudy.com>

8. How will you prepare any **four** of the following : 3×4=12

(a) Toluene from Benzene

(b) Acetic acid from 2-Butyne

- (c) Benzene sulfonic acid from Benzene
- (d) Acetaldehyde from Acetylene
- (e) Benzene from Ethyne
- (f) m-dinitrobenzene from nitrobenzene

9. Write down mechanism of any three of the following : 3×4=12

- (a) Alkylation of Benzene
- (b) Acylation of Benzene
- (c) Nitration of Benzene
- (d) Anti-Markownikoff Reaction
- (e) Chlorination of Benzene

10. Write down short notes on any three of the following : 3×4=12

- (a) Ozonolysis of alkenes and alkynes
- (b) Free radical substitution reaction
- (c) Structural isomerism
- (d) Wurtz Reaction
- (e) Markownikoff Reaction

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