General Organic Chemistry

SET Self Evaluation Test - 23

1. The most stable conformation of *n*-butane is **[CBSE PMT 1997]**

(a) Skew boat (b) Eclipsed

(c) Gauche (d) Staggered

2. Which of the following undergoes nucleophilic substitution by SN^1 mechanism **[CBSE PMT 2005]**

(a) Benzyl chloride (b) Ethyl chloride

(c) Chlorobenzene (d) Isopropyl chloride

3. Which type of isomerism is shown by propanal and propanone **[CPMT 2004]**

(a) Functional group (b) Metamerism

(c) Tautomerism (d) Chain isomerism

4. Which of the following exhibits optical isomerism **[BHU 1980; NCERT 1983; AIIMS 1992; MNR 1993; MP PMT 1990, 94]**

(a) Butanol-1 (b) Butanol-2

(c) Butene-1 (d) Butene-2

5. In carbonium ion the carbon bearing the positive charge in the **[Pb. PMT 1999; MH CET 2002]**

(a) sp^2 -hybridized state (b) sp^3d -hybridized state

(c) sp -hybridized state (d) sp^3 -hybridized state

6. Which of the following is not an electrophile **[CBSE PMT 2001]**

(a) Cl^+ (b) Na^+

(c) H^+ (d) BF_3

7. Heterolytic bond dissociation energy of alkyl halides follows the sequence **[AMU 2000]**

(a) $R-F > R-Cl > R-Br > R-I$

(b) $R-I > R-Br > R-Cl > R-F$

(c) $R-I > R-F > R-Br > R-Cl$

(d) $R-Cl > R-Br > R-I > R-F$

8. The shape of carbonium is **[AMU (Engg.) 1999]**

(a) Planar (b) Pyramidal

(c) Linear (d) None of these

9. Which of the following compounds shows tautomerism **[MP PET 2001]**

(a) $HCHO$ (b) CH_3CHO

(c) CH_3COCH_3 (d) $HCOOH$

10. In which bond angle is the highest **[CBSE PMT 1991]**

(a) sp^3 (b) sp^2

(c) sp (d) sp^3d

11. How many primary amines are possible for the formula $C_4H_{11}N$ **[MNR 1995]**

(a) 1 (b) 2

(c) 3 (d) 4

12. On monochlorination of 2-methyl butane, the total number of chiral compounds is **[IIT-JEE Screening 2004]**

(a) 2 (b) 4

(c) 6 (d) 8

13. An isomer of ethanol is **[DPMT 1982, 88; CPMT 1973, 75, 78, 84; IIT-JEE 1986; BHU 1984, 85; EAMCET 1993; MP PET 1995; RPET 1999; BHU 2000; AFMC 2002]**

(a) Methanol (b) Dimethyl ether

(c) Diethyl ether (d) Ethylene glycol

14. Due to the presence of an unpaired electron, free radicals are

(a) Chemically reactive (b) Chemically inactive

(c) Anions (d) Cations

15. Tertiary alkyl halides are practically inert to substitution by S_{N^2} mechanism because of **[AIEEE 2005]**

(a) Insolubility (b) Instability

(c) Inductive effect (d) Steric hindrance

16. The decreasing order of nucleophilicity among the nucleophiles

(i) $CH_3\overset{\overset{O}{\|}}{C}-O^-$ (ii) CH_3O^-

(iii) $H_3C-\overset{\overset{O}{\|}}{\underset{\underset{O}{\|}}{S}}-O^-$ (iv) CN^- (v) 

is **[AIEEE 2005]**

(a) (i), (ii), (iii), (iv) (b) (iv), (iii), (ii), (i)

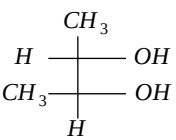
(c) (ii), (iii), (i), (iv) (d) (iii), (ii), (i), (iv)

17. Which of the following is optically active **[BHU 2005]**

(a) Butane (b) 4-methylheptane

(c) 3-methylheptane (d) 2-methylheptane

18. Correct configuration of the following is



[AIIMS 2005]

(a) 1S, 2S (b) 1S, 2R

(c) 1R, 2S (d) 1R, 2R

19. Which types of isomerism is shown by 2, 3-dichlorobutane

[AIEEE 2005]

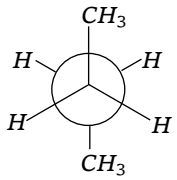
(a) Distereo (b) Optical
(c) Geometric (d) Structural

20. Who synthesised the first organic compound urea in the laboratory **[RPMT 2000]**

(a) Kolbe (b) Wohler
(c) Fraizer (d) Berzilius

Answers and Solutions

(SET -23)

1. (d)  Anti or completely staggard

Staggard form is most stable because of minimum repulsion between bulky methyl groups.

2. (a) Due to more stable carbocation.

3. (a) When two compounds have similar molecular formula but differ in the functional group then the isomerism is called functional group isomerism *i.e.* CH_3CH_2CHO and $CH_3.\overset{O}{\overset{\|}{C}}CH_3$.

4. (b) $CH_3-\overset{H}{\overset{|}{\underset{OH}{\underset{|}{C^*}}}}-CH_2-CH_3$

Because it has chiral carbon atom.

5. (a) The central carbon atom in carbonium ion is sp^2 hybridised and it has three sp^2 hybrid orbitals for single bonding to three substituents.

6. (b) Na^+ is not an electrophile.

7. (b) $R-I > R-Br > R-Cl > R-F$

8. (a) Carbonium ion is planar species

9. (c) Ketones show tautomerism. They form keto and enol form

$$CH_3-\overset{O}{\overset{\|}{C}}-CH_3 \underset{}{\overset{\text{Tautomerism}}{\rightleftharpoons}} CH_3-\overset{OH}{\overset{|}{C}}=CH_2$$

10. (c)

Type	Bond angle
sp^3	109.5^o
sp^2	120^o
sp^3d	90^o and 120^o
sp	180^o

11. (d) $CH_3-CH_2-CH_2-CH_2-NH_2$
(1-aminobutan e)

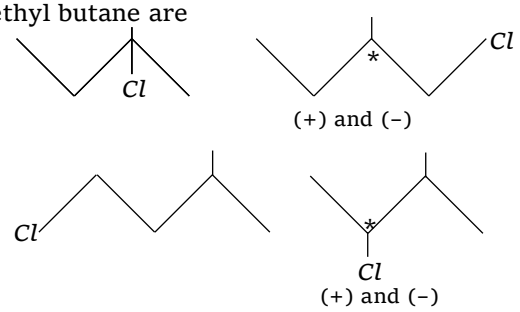
$CH_3-CH_2-\underset{NH_2}{\underset{|}{CH}}-CH_3$
(2-aminobutan e)

$CH_3-\underset{NH_2}{\underset{|}{\underset{CH_3}{\underset{|}{C}}}}-CH_3$
(2-Methyl-2-aminopropa ne)

$\overset{3}{CH_3}-\underset{CH_3}{\underset{|}{\overset{2}{CH}}}-\overset{1}{CH_2}-NH_2$
(2-Methyl-1-aminopropa ne)

***

12. (b) The possible monochlorinated products of 2-methyl butane are



Therefore, a total of four chiral compounds are obtained.

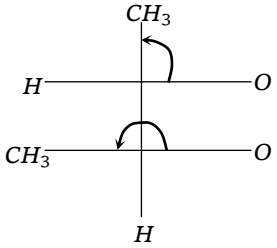
13. (b) Dimethyl ether is an isomer of ethanol.

14. (a) Free radicals are very reactive due to the presence of free e^-.

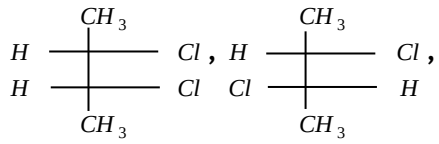
15. (d) Due to steric hinderance

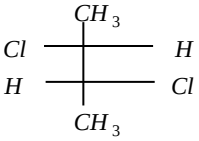
16. (c) (ii) > (iii) > (i) > (iv)

17. (c) $CH_3CH_2^*\overset{CH_3}{\overset{|}{C}}HCH_2CH_2CH_3$ has a chiral carbon atom and hence is optically active.

18. (a) 

Following the procedure outlined under 'Golden Rule' the absolute configuration is 1*s*, 2*s*.

19. (b)  , ,



20. (b) Wohler synthesised the first organic compound urea in the laboratory.