CHEMISTRY

Organic Chemistry - Some Basic Principles and Techniques

No. of Questions	Maximum Marks	Time
45	180	1 Hour

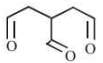
Speed TEST 40
Chapter-wise

GENERAL INSTRUCTIONS

- This test contains 45 MCQ's. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.
- You have to evaluate your Response Grids yourself with the help of solutions provided at the end of this book.
- Each correct answer will get you 4 marks and 1 mark shall be deduced for each incorrect answer. No mark will be given/ deducted if no bubble is filled. Keep a timer in front of you and stop immediately at the end of 60 min.
- The sheet follows a particular syllabus. Do not attempt the sheet before you have completed your preparation for that syllabus.
- After completing the sheet check your answers with the solution booklet and complete the Result Grid. Finally spend time to analyse your performance and revise the areas which emerge out as weak in your evaluation.

1. The correct decreasing order of priority for the functional groups of organic compounds in the IUPAC system of nomenclature is
(a) $-COOH, -SO_3H, -CONH_2, -CHO$
(b) $-SO_3H, -COOH, -CONH_2, -CHO$
(c) $-CHO, -COOH, -SO_3H, -CONH_2$
(d) $-CONH_2, -CHO, -SO_3H, -COOH$

2. The IUPAC name of the compound

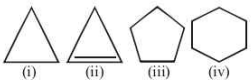


(a) 1, 2, 3 – triformyl propane
(b) Propane – 1, 2, 3 – tricarbaldehyde
(c) 3 – formyl – 1, 5 – pentane dial
(d) Propane – 1, 2, 3 – trial

3. Vinylcarbinol is
(a) $HO-CH_2-CH=CH_2$
(b) $CH_3C(OH)=CH_2$
(c) $CH_3-CH=CH-OH$
(d) $CH_3-C(CH_2OH)=CH_2$

4. The compound  is known by which of the following names ?
(a) Bicyclo [2.2.2] octane
(b) Bicyclo [2.2.1] octane
(c) Bicyclo [1.2.1] octane
(d) Bicyclo [1.1.1] octane

5. The stability of the compounds

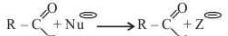


(i) (ii) (iii) (iv)

(a) (iv) > (iii) > (i) > (ii) (b) (i) > (iii) > (ii) > (iv)
(c) (ii) > (iii) > (i) > (iv) (d) (iv) > (i) > (iii) > (ii)

6. Fractional distillation is used when
(a) there is a large difference in the boiling point of liquids
(b) there is a small difference in the boiling points of liquids
(c) boiling points of liquids are same
(d) liquids form a constant boiling mixture

7. Rate of the reaction



is fastest when Z is
(a) OC_2H_5 (b) NH_2 (c) Cl^- (d) $OCOCH_3$

8. The order of activity of the various o- and p-director is
(a) $-O^- > -OH > -OCOCH_3 > -COCH_3$
(b) $-OH > -O^- > -OCOCH_3 > -COCH_3$
(c) $-OH > -O^- > -COCH_3 > -OCOCH_3$
(d) $-O^- > -COCH_3 > -OCOCH_3 > -OH$

RESPONSE GRID				
1. (a)(b)(c)(d)	2. (a)(b)(c)(d)	3. (a)(b)(c)(d)	4. (a)(b)(c)(d)	5. (a)(b)(c)(d)
6. (a)(b)(c)(d)	7. (a)(b)(c)(d)	8. (a)(b)(c)(d)		

Space for Rough Work

9. The general formula $C_nH_{2n}O_2$ could be for open chain
(a) carboxylic acids (b) diols
(c) dialdehydes (d) diketones

10. $C_6H_5CHO + HCN \longrightarrow C_6H_5 - \underset{\underset{OH}{|}}{\overset{\overset{H}{|}}{C}} - CN$

The product would be
(a) a racemate
(b) optically active
(c) a meso compound
(d) a mixture of diastereomers

11. The number of possible open chain (acyclic) isomeric compounds for molecular formula C_5H_{10} would be
(a) 8 (b) 7 (c) 6 (d) 5

12. Which one of the following is the stablest structure of cyclohexatriene ?
(a) Chair form (b) Boat form
(c) Halfchair form (d) Planar form

13. The compound formed in the positive test for nitrogen with the Lassaigne solution of an organic compound is
(a) $Fe_4[Fe(CN)_6]_3$ (b) $Na_4[Fe(CN)_6]$
(c) $Fe(CN)_3$ (d) $Na_4[Fe(CN)_5NOS]$

14. 2.79 g of an organic compound when heated in Carius tube with conc. HNO_3 and H_3PO_4 formed converted into $MgNH_4.PO_4$ ppt. The ppt. on heating gave 1.332 g of $Mg_2P_2O_7$. The percentage of P in the compound is
(a) 23.33% (b) 13.33% (c) 33.33% (d) 26.66%

15. Match the columns

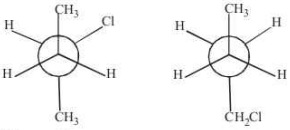
	Column-I		Column-II
A.	CH_3COOH & $HCOOCH_3$	I.	Functional isomers
B.	1-butene & 2-butene	II.	Metamers
C.	diethyl ether & methyl propyl ether	III.	Position isomers
D.	dimethyl ether and ethanol	IV.	Chain isomers

(a) A – I; B – III; C – II; D – IV
(b) A – II; B – III; C – IV; D – I
(c) A – II; B – IV; C – I; D – III
(d) A – II; B – I; C – IV; D – III

16. The accepted IUPAC name of the camphor is

(a) 1, 7, 7 – trimethyl bicyclo [2. 2. 1] heptan – 2 – one
(b) 1, 7, 7, – trimethyl bicyclo [2. 1. 2] heptan – 2 – one
(c) 1, 2, 2 – trimethyl bicyclo [2. 2. 1] heptan – 6 – one
(d) None of these

17. The pair of structures given below represent



(a) enantiomers
(b) diastereomers
(c) structural isomers
(d) two molecules of the same compound.

18. Which of the following compounds exhibits geometrical isomerism ?
(a) C_2H_3Br (b) $(CH)_2(COOH)_2$
(c) CH_3CHO (d) $(CH_2)_2(COOH)_2$

19. Chlorine in vinyl chloride is less reactive because
(a) sp^2 - hybridised carbon has more acidic character than sp^3 - hybridised carbon
(b) C - Cl bond develops partial double bond character
(c) of resonance
(d) All are correct

20. The best method for the separation of naphthalene and benzoic acid from their mixture is:
(a) distillation (b) sublimation
(c) chromatography (d) crystallisation

21. The percentage of sulphur in an organic compound whose 0.32 g produces 0.233 g of $BaSO_4$ [At. wt. Ba = 137, S = 32] is
(a) 1.0 (b) 10.0 (c) 23.5 (d) 32.1

22. Indicate the wrongly named compound

(a) $CH_3-\underset{\underset{CH_3}{|}}{CH}-CH_2-CH_2-CHO$
(4-methyl -1- pentanal)

(b) $CH_3-\underset{\underset{CH_3}{|}}{CH}-C\equiv C-COOH$
(4- methyl -2- pentyne -1- oic acid)

(c) $CH_3CH_2CH_2-\underset{\underset{CH_3}{|}}{CH}-COOH$
(2- methyl -1- pentanoic acid)

(d) $CH_3-CH_2-CH=CH-\overset{\overset{O}{\|}}{C}-CH_3$
(3- hexen -5- one)

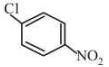
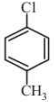
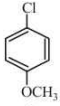
RESPONSE GRID					
	9. (a)(b)(c)(d)	10. (a)(b)(c)(d)	11. (a)(b)(c)(d)	12. (a)(b)(c)(d)	13. (a)(b)(c)(d)
	14. (a)(b)(c)(d)	15. (a)(b)(c)(d)	16. (a)(b)(c)(d)	17. (a)(b)(c)(d)	18. (a)(b)(c)(d)
	19. (a)(b)(c)(d)	20. (a)(b)(c)(d)	21. (a)(b)(c)(d)	22. (a)(b)(c)(d)	

Space for Rough Work

23. The (R)- and (S)- enantiomers of an optically active compound differ in
(a) their reactivity with achiral reagents
(b) their optical rotation of plane polarized light
(c) their melting points
(d) None of these

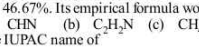
24. But-2-ene exhibits cis-trans-isomerism due to
(a) rotation around $C_3 - C_4$ sigma bond
(b) restricted rotation around C = C bond
(c) rotation around $C_1 - C_2$ bond
(d) rotation around $C_2 - C_3$ double bond

25. Which of the following compounds undergoes nucleophilic substitution reaction most easily ?

(a) 
(b) 
(c) 
(d) 

26. An organic compound contains C = 40%, H = 13.33% and N = 46.67%. Its empirical formula would be
(a) CHN (b) C_2H_2N (c) CH_4N (d) C_3H_7N

27. The IUPAC name of



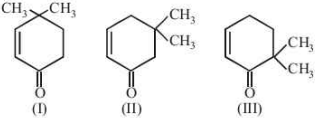
is
(a) 1- Hydroxy -4- methyl -3- pentanone
(b) 2- Methyl -5- hydroxy -3- pentanone
(c) 4- Methyl -3- oxo -1- pentanol
(d) Hexanol -1 - one -3

28. An important chemical method to resolve a racemic mixture makes use of the formation of
(a) a meso compound (b) enantiomers
(c) diastereomers (d) racemate

29. The Lassaigne's extract is boiled with dil. HNO_3 before testing for halogens because
(a) Silver halides are soluble in HNO_3
(b) Na_2S and NaCN are decomposed by HNO_3
(c) Ag_2S is soluble in HNO_3
(d) AgCN is soluble is HNO_3

30. What is the decreasing order of strength of the bases OH^-, NH_2^-, $HC \equiv C^-$ and $CH_3CH_2^-$?
(a) $CH_3CH_2^- > HC \equiv C^- > NH_2^- > OH^-$
(b) $HC \equiv C^- > CH_3CH_2^- > NH_2^- > OH^-$
(c) $OH^- > NH_2^- > HC \equiv C^- > CH_3CH_2^-$
(d) $NH_2^- > HC \equiv C^- > OH^- > CH_3CH_2^-$

31. Given



(I) (II) (III)

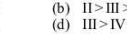
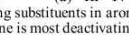
Which of the given compounds can exhibit tautomerism?
(a) I and III (b) II and III
(c) I, II and III (d) I and II

32. Cyclohexanol (I), acetic acid (II), 2, 4, 6-trinitrophenol (III) and phenol (IV) are given. In these the order of decreasing acidic character will be :
(a) III > II > IV > I (b) II > III > I > IV
(c) II > III > IV > I (d) III > IV > II > I

33. Some *meta*-directing substituents in aromatic substitution are given. Which one is most deactivating?
(a) $-SO_3H$ (b) –COOH (c) $-NO_2$ (d) $-C \equiv N$

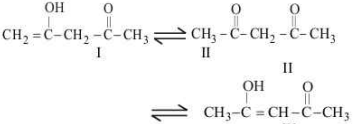
34. Consider thiol anion (RS^-) and alkoxy anion (RO^-). Which of the following statements is correct ?
(a) RS^- is less basic but more nucleophilic than RO^-
(b) RS^- is more basic and more nucleophilic than RO^-
(c) RS^- is more basic but less nucleophilic than RO^-
(d) RS^- is less basic and less nucleophilic than RO^-

35. Consider the following compounds.

(i) C_6H_5COCl (ii) 
(iii)  (iv) 

The correct decreasing order of their reactivity towards hydrolysis is
(a) (i) > (ii) > (iii) > (iv) (b) (iv) > (ii) > (i) > (iii)
(c) (ii) > (iv) > (i) > (iii) (d) (ii) > (iv) > (iii) > (i)

36. The order of stability of the following tautomeric compounds is :



(a) III > II > I (b) II > I > III
(c) II > III > I (d) I > II > III

RESPONSE GRID					
	23. (a)(b)(c)(d)	**24.** (a)(b)(c)(d)	**25.** (a)(b)(c)(d)	**26.** (a)(b)(c)(d)	**27.** (a)(b)(c)(d)
	28. (a)(b)(c)(d)	**29.** (a)(b)(c)(d)	**30.** (a)(b)(c)(d)	**31.** (a)(b)(c)(d)	**32.** (a)(b)(c)(d)
	33. (a)(b)(c)(d)	**34.** (a)(b)(c)(d)	**35.** (a)(b)(c)(d)	**36.** (a)(b)(c)(d)	

Space for Rough Work

37. Match the columns

Column - I		Column - II
A. Duma's method	I.	$\frac{80\times m_1\times 100}{188\times m}$
B. Kjeldahl's method	II.	$\frac{31\times m_1\times 100}{1877\times m}\%$
C. Carius method for bromine	III.	$\frac{1.4\times M\times 2\left(v-\frac{v_1}{2}\right)}{m}\%$
D. Percentage of phosphorus	IV.	$\frac{28\times V\times 100}{22400\times m}\%$

(a) A – IV; B – III; C – I; D – II
(b) A – III; B – IV; C – II; D – I
(c) A – IV; B – I; C – II; D – III
(d) A – I; B – III; C – II; D – IV

38. Which of the following represents the correct order of stability of the given carbocations ?

(a) $\overset{+}{F_3C} > F_2C(\overset{+}{C}H)CH_3$ (b) $\overset{+}{H_3C} > F_2C(\overset{+}{C}H)\overset{+}{C}F_3$

(c) $F_3C(\overset{+}{C}H)\overset{+}{C}F_2 > \overset{+}{C}F_3$ (d) $F_3C(\overset{+}{C}H)\overset{+}{C}H_2 > \overset{+}{C}F_3$

39. $(CH_3)_4N^+$ is neither an electrophile, nor a nucleophile because it
(a) does not have electron pair for donation as well as can not attract electron pair
(b) neither has electron pair available for donation nor can accommodate electron since all shells of N are fully occupied
(c) can act as Lewis acid and base
(d) None of these

40. In Kjeldahl's method for the estimation of N_2, potassium sulphate and copper sulphate are used. On the basis of their functions which of the following statement(s) is/are correct?
(i) Potassium sulphate raises the b.pt. and ensures complete reaction.
(ii) Copper sulphate acts as catalyst.
(iii) Potassium sulphate acts as catalyst and copper sulphate raises the b.pt.
(a) Only (iii) is correct (b) (i) and (ii) are correct
(c) Only (ii) is correct (d) None is correct

41. What is the relationship between open chain forms of D-glucose and D-altrose ?
(a) enantiomers
(b) constitutional isomers
(c) diastereomers
(d) different conformations of the same compound

42. The production of an optically active compound from a symmetric molecule without resolution is termed
(a) Walden inversion (b) Partial racemisation
(c) Asymmetric synthesis (d) Partial resolution

43. The number of asymmetric C-atom created and number of possible stereoisomers when benzil (Ph CO CO Ph) is reduced with $LiAlH_4$.
(a) 2, 3 (b) 2, 2 (c) 2, 4 (d) 3, 2

44. Among the following, the true property about

$CH_3-\overset{+}{C}(CH_3)-CH_3$ is

(a) it is non-planar
(b) its C^+ is sp^2-hybridized
(c) an electrophile can attack on its C^+
(d) it does not undergo hydrolysis

45. The compound which contains all the four 1°, 2°, 3° and 4° carbon atoms is
(a) 2, 3-dimethylpentane
(b) 3-chloro-2, 3-dimethylpentane
(c) 2, 3, 4-trimethylpentane
(d) 3, 3- dimethylpentane

RESPONSE GRID				
37. (a)(b)(c)(d)	38. (a)(b)(c)(d)	39. (a)(b)(c)(d)	40. (a)(b)(c)(d)	41. (a)(b)(c)(d)
42. (a)(b)(c)(d)	43. (a)(b)(c)(d)	44. (a)(b)(c)(d)	45. (a)(b)(c)(d)	

CHEMISTRY CHAPTERWISE SPEED TEST-40			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	35	Qualifying Score	60
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

Space for Rough Work