FIITJEE

CBSE TERM - I

ALL XIITH STUDYING BATCHES

Part Test – II

CHEMISTRY

(9th November 2021)

Time: 1:30 Hours **Maximum Marks: 45**

General Instructions:

1. The question paper contains three sections A, B and C
2. Section A consists of 25 questions MCQ Single Option Correct, out of which students will attempt any 20 questions only. Each question carries +1 Mark.
3. Section B consists of 24 questions MCQ Single Option Correct, out of which 5 questions are Assertion-Reasoning type. Students will attempt any 20 questions only. Each question carries +1 Mark.
4. Section C consists of 6 questions MCQ Single Option Correct out of which 4 questions are based on case studies. Students will attempt any 5 questions only. Each question carries +1 Mark.
5. There is no negative marking.

Name of the Candidate : .....

Enroll Number : .....

Date of Examination : .....

CHEMISTRY

SECTION – A

*This section contains **25 Multiple Choice Questions** number **1 to 25**. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.*

1. Which functional groups of glucose interact to form cyclic hemiacetal leading to pyranose structure?
   (A) aldehyde group and hydroxyl group at C-5
   (B) aldehyde group and hydroxyl group at C-4
   (C) aldehyde group and hydroxyl group at C-6
   (D) Ketone group at C-2 and hydroxyl group at C-5

2. Fructose reduces Fehling's solution due to the presence of
   (A) hydroxyl group
   (B) aldehyde group
   (C) ketone group
   (D) α-hydroxyketone group

3. The end product C for the following reaction is
   $(C_6H_5)_2CHCH_2OH \xrightarrow{Na} X \xrightarrow{CH_3I} Y$
   (A) $(C_6H_5)_2C=CH_2$
   (B) $(C_6H_5)_2COCH_3$
   (C) $(C_6H_5)_2CHCH_2O-\overset{\overset{O}{\|}}{C}-O^-Na^+$
   (D) $(C_6H_5)_2CHCH_2OCH_3$

4. Which of the following compounds is oxidised to prepare methyl-ethyl ketone?
   (A) 2-Propanol
   (B) 1-Butanol
   (C) 2-Butanol
   (D) ter-Butyl alcohol

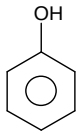
5. Blue liquid which is obtained on reacting equimolar amounts of two gases at -30^oC is?
   (A) N_2O
   (B) N_2O_3
   (C) N_2O_4
   (D) N_2O_5

6. When PbO_2 reacts with conc. HNO_3 the gas evolved is
   (A) NO_2
   (B) O_2
   (C) N_2
   (D) N_2O

7. Sulphur can exhibit paramagnetic behaviour in
   (A) solid state
   (B) molten state
   (C) vapour state
   (D) solution state

8. Which is the most polar alcohol?
   (A) CH_3OH
   (B) C_2H_5OH
   (C) C_3H_7OH
   (D) C_4H_9OH

9. HBr reacts fastest with
   (A) 2-methylpropan-2-ol
   (B) Propan-1-ol
   (C) Propan-2-ol
   (D) 2-methylpropan-1-ol

10.  behaves as the strongest acid in

(A) H_2O (B) HCl
(C) CCl_4 (D) C_6H_6

11. Total number of lone pair of electron on central atom in $XeOF_4$ is
(A) 0 (B) 1
(C) 2 (D) 3

12. $H_3PO_3 \xrightarrow{\Delta} H_3PO_4 + (X)$
X is
(A) PH_3 (B) $(HPO_3)_n$
(C) P_4 (white) (D) P_4(red)

13. Which reaction produces Cl_2 gas?
(A) $MnO_2 + HCl \longrightarrow$ (B) $NaCl + H_2SO_4 \longrightarrow$
(C) $HCl + NaNO_3 \longrightarrow$ (D) $KCl + NaH \longrightarrow$

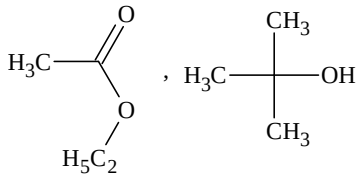
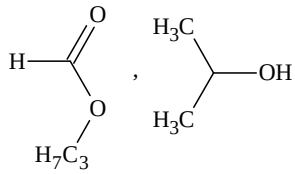
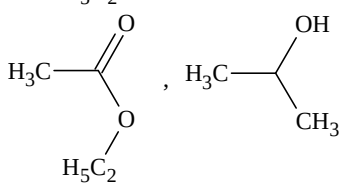
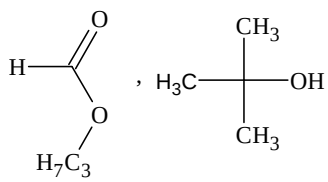
14. Proteins are the polymers of
(A) alpha keto acids (B) alpha amino acids
(C) alpha hydroxyl acids (D) alpha keto esters

15. Which can convert glucose into a black colour compound?
(A) Conc. HNO_3 (B) Conc. H_2SO_4
(C) Conc.H_3PO_4 (D) Conc. HCl

16. Which contains a lone pair on xenon?
(A) XeF_6 (B) XeO_2F_4
(C) XeO_4 (D) None of these

17. Order of reactivity of HX towards ROH is
(A) HI > HBr > HCl (B) HCl > HBr > HI
(C) HI > HBr < HCl (D) HI < HBr > HCl

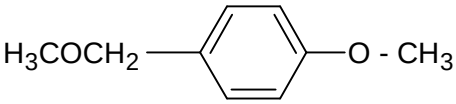
18. Ester A ($C_4H_8O_2$) + $\underset{(2\text{ parts})}{CH_3MgBr} \xrightarrow{H_3O^+}$ B $\underset{(\text{alcohol})}{(C_4H_{10}O)}$.
Alcohol B reacts fastest with Lucas reagent. Hence A and B are:

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

19. For H_3PO_3 and H_3PO_4 the correct choice is:
(A) H_3PO_3 is dibasic and reducing
(B) H_3PO_3 is dibasic non-reducing
(C) H_3PO_4 tribasic and reducing
(D) H_3PO_3 tribasic and non-reducing

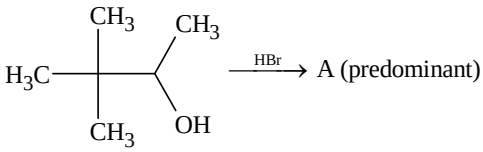
20. An orange solid(X) on heating, gives a colorless gas (Y) and a only green residue (Z). Gas (Y) on treatment with Mg, produces a white solid substance (P). Which is (P)?
(A) Mg_3N_2
(B) MgO
(C) MgO_2
(D) $MgCl_2$

21. How many moles of HI can be consumed by one mole of the following compound?

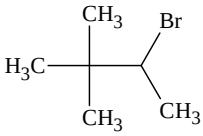


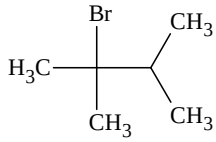
(A) 2
(B) 3
(C) 4
(D) 1

22. Which interhalogen compound does not exist?
(A) BrF_3
(B) FCl_3
(C) ClF_3
(D) ICl_3

23. 

A is:

(A) 

(B) 

(C) Both
(D) None is correct

24. Which isomer of $C_2H_5OC_2H_5$ possess the highest boiling point?
(A) Chain isomers
(B) Position isomers
(C) Functional isomers
(D) Metamers

25. An inorganic salt (A) is decomposed at about 523K to give product (B) and (C). (C) is a liquid at room temperature and is neutral to litmus paper while oxide (B) on burning with white phosphorus, give a dehydrating agent (D). Compounds (A), (B), (C) and (D) will be identified as
(A) NH_4NO_3, N_2O, H_2O, P_4O_{10}
(B) NH_4NO_2, K_2O, H_2O, P_4O_{10}
(C) $CaCO_3, CaO, H_2O, CaCl_2$
(D) $CaCO_3, CaO, H_2O, Ca(OH)_2$

SECTION – B

*This section contains **24 Multiple Choice Questions** number **26 to 49, out of which 5 questions are Assertion-Reasoning type.** Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.*

26. Reaction between C_2H_5OH and CH_3MgBr produces?
(A) C_3H_8 (B) C_2H_6
(C) CH_4 (D) C_4H_{10}

27. Nitrogen dioxide is dissolved in warm water to produce
(A) HNO_3 and HNO_2 (B) only HNO_3
(C) only HNO_2 (D) HNO_2 and N_2

28. Phenol is heated with chloroform and alcoholic KOH when salicylaldehyde is produced. This reaction is known as
(A) Fridel-Crafts reaction (B) Reimer-Tiemann reaction
(C)Rosenmund reaction (D) Sommelet reaction

29. Which of the two substances upon mixing produces S_8?
(A) H_2SO_4 and SO_2 (B) H_2S and SO_2
(C) SO_3 and SO_2 (D) H_2S and H_2SO_4

30. Consider two reactions
I. $Zn + Conc.HNO_3\,(hot) \rightarrow Zn(NO_3)_2 + X + H_2O$
II. $Zn + dil.HNO_3\,(cold) \rightarrow Zn(NO_3)_2 + Y + H_2O$
Compounds X and Y are respectively
(A) N_2O, NO (B) NO_2, N_2O
(C) N_2, N_2O (D) NO_2, NO

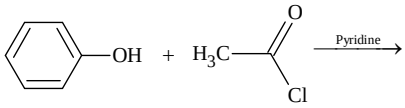
31. Which one of the following compounds on strong heating evolves ammonia gas?
(A) $(NH_4)_2SO_4$ (B) HNO_3
(C) $(NH_4)_2Cr_2O_7$ (D) NH_4NO_3

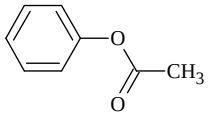
32. When glucose is reacted with bromine water, the major product is
(A) gluconic acid (B) glucaric acid
(C) glucuronic acid (D) oxalic acid

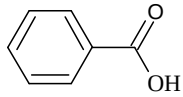
33. Alpha amino acids exists as dipolar ions in aqueous solutions. What is the pH of such solutions called
(A) neutralisation point (B) isoelectric point
(C) isotonic point (D) isopolar point

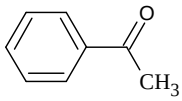
34. Phenol does not react with $NaHCO_3$ because
(A) phenol is a weaker acid than carbonic acid
(B) phenol is a stronger acid than carbonic acid
(C) phenol is as strong as carbonic acid
(D) phenol is insoluble in water.

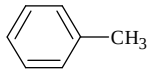
35. Predict the product of reaction below



(A) 

(B) 

(C) 

(D) 

36. The compound $(SiH_3)_3$ N is
(A) pyramidal and more basic than $(CH_3)_3N$ (B) planar and less basic than $(CH_3)_3N$
(C) pyramidal and less basic than $(CH_3)_3N$ (D) planar and more basic than $(CH_3)_3N$

37. The correct order of acidic strength of oxy-acids of chlorine is
(A) $HClO < HClO_2 < HClO_3 < HClO_4$ (B) $HClO_4 < HClO_3 < HClO_2 < HClO$
(C) $HClO < HClO_4 < HClO_3 < HClO_2$ (D) $HClO_4 < HClO_2 < HClO_3 < HClO$

38. Aqueous solution of which of the following substances is used as a disinfectant?
(A) HCl (B) Cl_2
(C) Cl_2O_5 (D) Cl_2O_3

39. Which of the following inert gas can be easily adsorbed as charcoal?
(A) He (B) Xe
(C) Ne (D) Ar

40. Which of the following reaction produces phenyl methyl ether?
(A) PhCl + CH_3OH (B) PhONa + CH_3Cl
(C) PhCl + CH_3ONa (D) PhONa + CH_3OCH_3

41. The acidic character of 1°, 2°, 3° alcohols, H_2O and RC ≡ CH is in the order
(A) $H_2O > 1° > 2° > 3° >$ RC ≡ CH (B) RC ≡ CH > 3° > 2° > 1° > H_2O
(C) 1° > 2° > 3° > H_2O > RC ≡ CH (D) 3° > 2° > 1° > H_2O > RC ≡ CH

42. Which of the following substance is most reactive towards BF_3?
(A) CH_4 (B) NH_3
(C) O_2 (D) N_2

43. The structure of O_3 and SO_2 are
(A) linear and bent, respectively (B) both linear
(C) both bent (D) bent and linear, respectively

44. C_2H_5OH loses only hydrogen, when it is treated with
(A) Ca or HCl (B) Na or Cu/300^oC
(C) H_2SO_4 or Na (D) NaOH or HCl

45. Assertion : White phosphorus is more reactive than red phosphorus.
Reason : Angle strain in white phosphorus is more than red phosphorus.
(A) Both Assertion and Reason are true and the Reason is the correct explanation of Assertion.
(B) Both Assertion and Reason are true but the Reason is not the correct explanation of assertion.
(C) Assertion is true but Reason is false.
(D) Assertion is false but Reason is true

46. Assertion : At pH less than 6.4, glycine exists as a positively charged species.
Reason : The isoelectric point or p^I of glycine is 6.4.
(A) Both Assertion and Reason are true and the Reason is the correct explanation of Assertion.
(B) Both Assertion and Reason are true but the Reason is not the correct explanation of Assertion.
(C) Assertion is true but Reason is false.
(D) Assertion is false but Reason is true

47. Assertion : C_2H_5OH is more soluble in water than CH_3OH.
Reason : Boiling point of C_2H_5OH is higher than that of CH_3OH.
(A) Both Assertion and Reason are true and the Reason is the correct explanation of Assertion.
(B) Both Assertion and Reason are true but the Reason is not the correct explanation of Assertion.
(C) Assertion is true but Reason is false.
(D) Assertion is false but Reason is true

48. Assertion : p-nitrophenol is more acidic than p-chlorophenol.
Reason : p-nitrophenol contains intramolecular hydrogen bond whereas p-chlorophenol contains intermolecular hydrogen bond.
(A) Both Assertion and Reason are true and the Reason is the correct explanation of Assertion.
(B) Both Assertion and Reason are true but the Reason is not the correct explanation of Assertion.
(C) Assertion is true but Reason is false.
(D) Assertion is false but Reason is true

49. Assertion : Cyclic ethers are unstable than open chain ethers in acidic medium.
Reason : Cyclic ethers contain angle strain, whereas open-chain ethers are free from such strains.
(A) Both Assertion and Reason are true and the Reason is the correct explanation of Assertion.
(B) Both Assertion and Reason are true but the Reason is not the correct explanation of Assertion.
(C) Assertion is true but Reason is false.
(D) Assertion is false but Reason is true

SECTION – C

*This section contains **6 Multiple Choice Questions** number **50 to 55, out of which 4 questions are based on case studies.** Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.*

(Case study (50 - 53)

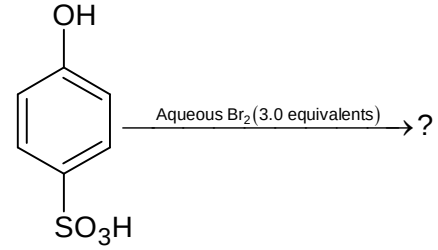
Although chlorobenzene is inert to nucleophilic substitution reactions, however it gives quantitative yield of phenol when heated with aq. NaOH at high temperature and under high pressure. As far as electrophilic substitution in phenol is concerned the –OH group is an activating group, hence, its presence enhances the electrophilic substitution at o– and p-positions.
Choose the most appropriate answer:

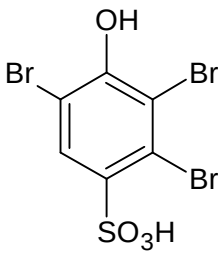
50. Conversion of chlorobenzene into phenol involves
(A) S_N1 reaction
(B) formation of sodium phenoxide as an intermediate product
(C) S_Ni reaction
(D) formation of benzene as an intermediate product

51. Phenol undergoes electrophilic substitution more readily than benzene because
(A) OH group exhibits +R effect, which favours electrophilic attack whereas benzene does not have any substitutent.
(B) the intermediate is more stable as it has negative charge on oxygen, which can be better accommodated than on carbon
(C) in one of the canonical structures, every atom has complete octet
(D) the –OH group is o, p-directing which like all other o, p-directing group, is activating

52. Phenol on treatment with excess of conc. HNO_3 gives
(A) o-nitrophenol
(B) p-nitrophenol
(C) o-and p-nitrophenol
(D) 2, 4, 6-trinitrophenol

53. The major product of the following reaction is:



(A)


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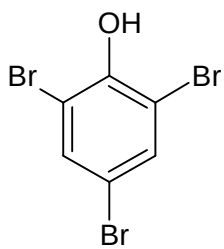
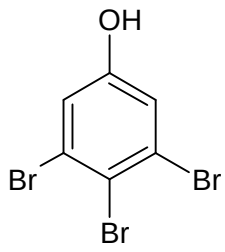
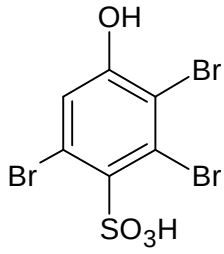
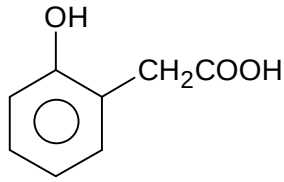
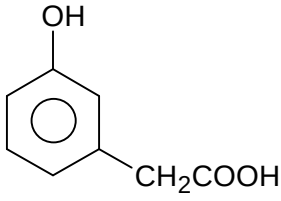


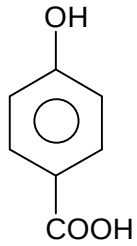
(C) 

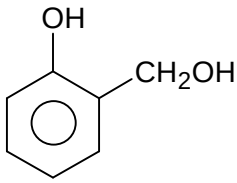
(D) 

54. Which of the following upon decarboxylation produces phenol

(A) 

(B) 

(C) 

(D) 

55. Which compound of phenol has the lowest boiling point?

(A) o-nitrophenol (B) m-nitrophenol
(C) p-nitrophenol (D) 2, 4, 6-trinitrophenol