

**Term- 1 EXAMINATION**  
**SESSION 2021-22**  
**SET – A**

Class: 12<sup>th</sup>  
Name:

Subject: Chemistry (043)  
Roll No:

Max. Marks: 35  
Section:

Duration: 90 Minutes  
Invigilator's Sign:

**General instructions:**

1. Use black or blue ball point pens, and avoid gel pens and fountain pens for filling the sheets.
2. Darken the bubbles completely. Don't put a tick mark or a cross mark where it is specified that you fill the bubbles completely. Half-filled or over-filled bubbles will not be marked by the teacher.
3. Never use pencils to mark your answers unless specified, in which case just stick to HB or 2B pencils only.
4. Never use whiteners to rectify filling errors as they may disrupt the evaluation process.
5. Writing on the OMR Sheet is permitted on the specified area only and even small mark on other than specified area may create problem during the evaluation.
6. There are some areas on OMR sheets where candidates are instructed not to write anything.
7. Do not fold the OMR Sheet.
8. Multiple markings are invalid.
9. Ensure that the invigilator has signed your OMR Answer Sheet.
10. If student has not filled his Roll Number then Answer sheet will not be evaluated.
11. *The Question Paper contains three sections.*  
*Section A has 25 questions. Attempt any 20 questions.*  
*Section B has 24 questions. Attempt any 20 questions.*  
*Section C has 6 questions. Attempt any 5 questions.*  
*All questions carry equal marks.*  
*There is no negative marking.*

**SECTION A**

**This section consists of 25 multiple choice questions with overall choice to attempt any 20 questions. In case more than desirable number of questions are attempted, ONLY first 20 will be considered for evaluation.**

1. The formation of  $O^{2-}$   $[PtF_6]^-$  is the basis for the formation of xenon fluorides. This is because :  
(A)  $O_2$  and Xe have comparable sizes.  
(B) both  $O_2$  and Xe are gases.  
(C)  $O_2$  and Xe have comparable ionisation energies.  
(D)  $O_2$  and Xe have comparable electronegativities.
2. When  $F_2$  is passed into a solution of mineral acid X, a greenish yellow gas Y is formed. Which on treating with slaked lime forms "Z". When Red litmus is kept in contact with Z, it changes into  
(A) Blue colour  
(B) No change in colour  
(C) White in colour  
(D) None of these
3.  $NH_3(\text{excess}) + Cl_2 \rightarrow NH_4Cl + A(\text{gas})$   
 $NH_3 + Cl_2(\text{excess}) \rightarrow B + HCl$   
Incorrect statement regarding A and B.  
(A) A is highly reactive gas at room temperature.  
(B) Bond order of gas 'A' is same as  $C_2^{2-}$ .  
(C) Compound 'B' is explosive.  
(D) Bond angle of compound B is greater than bond angle of  $NF_3$
4. Which one has the lowest boiling point ?  
(A)  $NH_3$                       (B)  $PH_3$                       (C)  $AsH_3$                       (D)  $SbH_3$
5. Which of the following is obtained when gold is treated with aquaregia.?  
(A)  $AuCl_4$                       (B)  $AuCl_3$                       (C)  $[AuCl_4]^-$                       (D)  $[AuCl_4]^+$
6. Which of the following is most reactive?  
(A)  $I_2$                       (B)  $Cl_2$                       (C)  $Br_2$                       (D)  $ClF$

7. When ozone reacts with an excess of salt (X) solution buffered with a borate buffer (pH 9.2) Y (violet colour) is liberated which can be titrated against a standard solution of sodium thiosulphate, this is a quantitative method for estimating O<sub>3</sub> gas. The X, Y are:

- (A) potassium iodide (B) I<sub>2</sub>  
 (C) both (A) and (B) (D) sodium sulphate

8. Which of the following is not the method of preparation of Cl<sub>2</sub> gas?

- (A) Deacons process (B) MnO<sub>2</sub> + HCl (C) KMnO<sub>4</sub> + HCl (D) K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> + NaCl + H<sub>2</sub>SO<sub>4</sub>

9. Correct order of acidic nature will be:

- (A) HClO, HClO<sub>2</sub>, HClO<sub>4</sub>, HClO<sub>3</sub>  
 (B) HOF, HClO, HBrO, HIO,  
 (C) HClO<sub>3</sub>, HIO<sub>3</sub>, HBrO<sub>3</sub>  
 (D) HF, HBr, HCl, HI

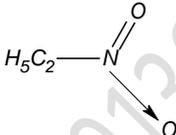
10. The order of reactivity of alkyl halides towards elimination reaction is :

- (A)  $\overset{\circ}{3} > \overset{\circ}{2} > \overset{\circ}{1}$  (B)  $\overset{\circ}{2} > \overset{\circ}{1} > \overset{\circ}{3}$   
 (C)  $\overset{\circ}{3} > \overset{\circ}{1} > \overset{\circ}{2}$  (D)  $\overset{\circ}{1} > \overset{\circ}{2} > \overset{\circ}{3}$

11. The end product "Y" in the following reaction, aniline  $\xrightarrow{HNO_2 (0 \text{ to } 5 \text{ deg cel})} X \xrightarrow{\text{water}} Y$  is

- (A) Methyl amine (B) Acetamide  
 (C) Phenol (D) Propylamine

12. C<sub>2</sub>H<sub>5</sub>I  $\xrightarrow{AgNO_2}$  X (major product) there X is

- (A) C<sub>2</sub>H<sub>5</sub>—O—N=O (B)   
 (C) C<sub>2</sub>H<sub>5</sub>—N=O (D) C<sub>2</sub>H<sub>5</sub>—N=N—C<sub>2</sub>H<sub>5</sub>

13. The order of reactivities of the following alkyl halides for SN<sup>2</sup> reaction is:

- (A) RF > RCl > RBr > RI (B) RF > RBr > RCl > RI  
 (C) RCl > RBr > RF > RI (D) RI > RBr > RCl > RF

14. SN<sup>1</sup> reaction of alkyl halides leads to

- (A) retention of configuration (B) inversion of configuration  
 (C) racemisation (D) none of the above

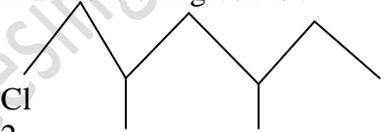
15. Which of the following have highest dipole moment?

- (A) Cyclo hexane (B) chlorobenzene  
 (C) vinyl chloride (D) CCl<sub>4</sub>

16. CH<sub>3</sub>CH=CH<sub>2</sub> + HBr in the presence of peroxide gives:-

- (A) CH<sub>3</sub>CHBrCH<sub>2</sub> (B) CH<sub>3</sub>CHBrCH<sub>3</sub>  
 (C) CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>Br (D) CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>Br

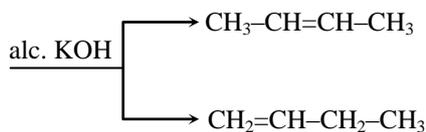
17. The no. of chiral centre in given is :

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

18. Which of the following statement is correct -

- (A) Decreasing order of density of alkyl halides is RI > RBr > RCl > RF  
 (B) The stability order of alkyl halides is RF > RCl > RBr > RI  
 (C) Among isomeric alkyl halides the decrease in boiling point and SN<sup>2</sup> 1° > 2° > 3°  
 (D) All are correct

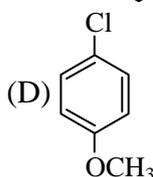
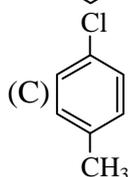
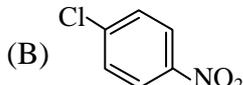
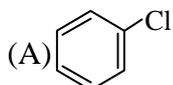
19. For the reaction CH<sub>3</sub>CH(X)CH<sub>2</sub>CH<sub>3</sub>



- (A)  $\text{CH}_3\text{-CH=CH-CH}_3$  predominates  
(C) Both are formed in equal amounts

- (B)  $\text{CH}_2\text{=CH-CH}_2\text{-CH}_3$  predominates  
(D) The product ratio is dependent on the halogen X

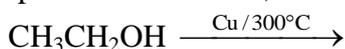
20. Which of the following compounds undergoes nucleophilic substitution reaction most easily ?



21. Alkyl chloride is formed when alcohol is treated with HCl in presence of anhydrous  $\text{ZnCl}_2$ . The order of reactivity with respect to alcohol is :

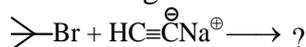
- (A)  $3^\circ > 2^\circ > 1^\circ$  (B)  $1^\circ > 2^\circ > 3^\circ$   
(C)  $2^\circ > 1^\circ > 3^\circ$  (D)  $1^\circ > 3^\circ > 2^\circ$

22. The product of reaction,



- (A)  $\text{C}_2\text{H}_6$  (B)  $\text{CH}_3\text{COCH}_3$  (C)  $\text{CH}_3\text{CHO}$  (D)  $\text{CH}_3\text{COOH}$

23. In the following reaction



Product will be

- (A)  $\text{>C}\equiv\text{CH}$  (B)  $\text{>=CH}_2$  (C) (D)  $\text{>C}\equiv\text{C-CH}_3$

24.  $\text{RX} + \text{Na}$  (DRY ETHER)  $(\text{CH}_3)_3\text{C-C}(\text{CH}_3)_3$  the RX will be:

- (A)  $(\text{CH}_3)_3\text{C-X}$  (B)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{-X}$  (C)  $(\text{CH}_3\text{CH}_2\text{CH}_2)_2\text{CH-X}$  (D)  $(\text{CH}_3\text{CH}_2\text{CH}_2)_3\text{C-X}$

25. A tertiary alcohol is obtained when  $\text{CH}_3\text{MgI}$  reacts with-

- (A)  $\text{CH}_3\text{CHO}$  (B)  $\text{CH}_3\text{CH}_2\text{CHO}$  (C)  $\text{CH}_3\text{-CH(CH}_3\text{)-CHO}$  (D)  $\text{CH}_3\text{COCH}_3$

### SECTION B

This section consists of 24 multiple choice questions with overall choice to attempt any 20 questions. In case more than desirable number of questions are attempted, ONLY first 20 will be considered for evaluation

26.  $\text{RX} + \text{RONa} \rightarrow (\text{CH}_3)_3\text{C-O C}_2\text{H}_5$

In above reaction RX & RONa can be:

- (A)  $(\text{CH}_3)_3\text{C-X}$ ,  $\text{CH}_3\text{CH}_2\text{ONa}$  (B)  $\text{CH}_3\text{CH}_2\text{-X}$ ,  $(\text{CH}_3)_3\text{C ONa}$   
(C)  $(\text{CH}_3\text{CH}_2\text{CH}_2)_2\text{CH-X}$ ,  $(\text{CH}_3)_3\text{C ONa}$  (D)  $(\text{CH}_3\text{CH}_2\text{CH}_2)_3\text{C-X}$ ,  $(\text{CH}_3)_3\text{C ONa}$

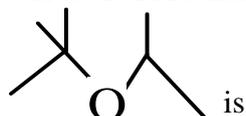
27.  $(\text{CH}_3)_2\text{CH-OCH}_3 + \text{HI}$  It will give:-

- (A)  $(\text{CH}_3)_2\text{CH-I}$ ,  $\text{CH}_3\text{OH}$  (B)  $(\text{CH}_3)_2\text{CH-OH}$ ,  $\text{CH}_3\text{I}$   
(C)  $(\text{CH}_3\text{CH}_2\text{CH}_2)_2\text{CH-I}$ ,  $(\text{CH}_3)_3\text{C ONa}$  (D)  $(\text{CH}_3)_2\text{CH-OH}$ ,  $(\text{CH}_3)_2\text{CH-I}$

28. Which of the following is correct increasing order of their acid strength:

- (A) Phenol, 3-nitrophenol, 3,5-dinitrophenol, 2,4,6-trinitrophenol  
(B) Phenol, 3,5-dinitrophenol, 2,4,6-trinitrophenol, 3-nitrophenol  
(C) Phenol, 2,4,6-trinitrophenol, 3,5-dinitrophenol, 3-nitrophenol  
(D) Phenol, 4,6-trinitrophenol, 3-nitrophenol, 3,5-dinitrophenol

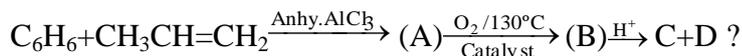
29. The correct IUPAC name of compound



- (A) 2-methyl 2-(1 methylethoxy) propane

- (B) t-butyl isopropyl ether  
 (C) 1-isopropoxy-1,1-dimethylethane  
 (D) 2-(1,1-dimethylethoxy)propane

30. What are the final products of the following sequence of reactions?



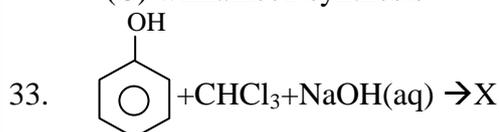
- (A) Cumene and phenol  
 (B) Phenol and acetone  
 (C) Cumene and acetone  
 (D) Benzoic acid and ethane

31. During the formation of ethanol from ethane the first step of reaction mechanism is:-

- (A) Protonation of alkene to form carbocation by electrophilic attack of  $\text{H}_3\text{O}^+$   
 (B) Nucleophilic attack of water on carbocation  
 (C) Nucleophilic attack of water on alkene  
 (D) Deprotonation to form an alcohol.

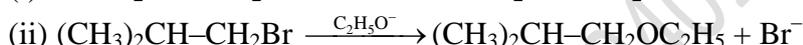
32.  $\text{CH}_3\text{CH}=\text{CH}_2$  can be converted to 1-propanol by using the reagents:

- (A) Hydroboration oxidation  
 (B) dil sulphuric acid  
 (C) williamson synthesis  
 (D) kolbe's reaction



- (A) Benzaldehyde (B) Salicylaldehyde (C) ether (D) ester

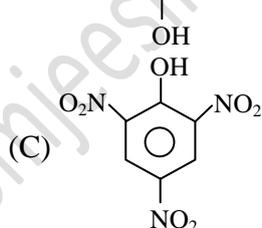
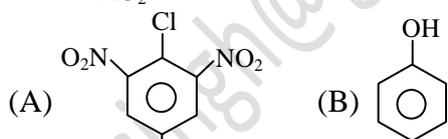
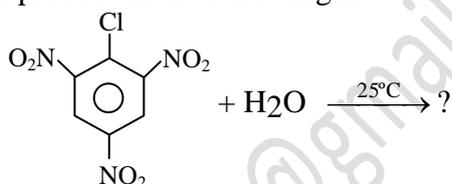
34. Consider the reactions :



The mechanisms of reactions (i) and (ii) are respectively :

- (A)  $\text{S}_{\text{N}}2$  and  $\text{S}_{\text{N}}1$  (B)  $\text{S}_{\text{N}}1$  and  $\text{S}_{\text{N}}2$   
 (C)  $\text{S}_{\text{N}}1$  and  $\text{S}_{\text{N}}1$  (D)  $\text{S}_{\text{N}}2$  and  $\text{S}_{\text{N}}2$

35. The product of the following reaction is -



(D) None of above

36. The correct order of boiling point is:

- (A)  $\text{CH}_3\text{Cl}, \text{CH}_2\text{Cl}_2, \text{CHCl}_3, \text{CCl}_4$  (B)  $\text{CHCl}_3, \text{CCl}_4, \text{CH}_3\text{Cl}, \text{CH}_2\text{Cl}_2$   
 (C)  $\text{CCl}_4, \text{CH}_3\text{Cl}, \text{CH}_2\text{Cl}_2, \text{CHCl}_3$  (D)  $\text{CH}_2\text{Cl}_2, \text{CHCl}_3, \text{CCl}_4, \text{CH}_3\text{Cl}$

37. Which of the following statements is true:

- (A)  $\text{AlCl}_3$  anhydrous is used in friedel craft alkylation since  $\text{AlCl}_3$  anhydrous is lewis acid  
 (B)  $\text{AlCl}_3$  anhydrous is used in friedel craft alkylation since  $\text{AlCl}_3$  anhydrous is lewis base  
 (C)  $\text{HNO}_3$  is used in sulphonation of chlorobenzene

- (D) Chlorobenzene on nitration with conc. Nitric acid and conc.  $\text{H}_2\text{SO}_4$  gives meta nitro chlorobenzene.
38. Which of the following reactions is used to prepare salicylic acid?  
 (A) Kolbe's reaction (B) Etard reaction  
 (C) Reimer-Tiemann reaction (D) Stephen's reduction.
39. Which of the following has the highest boiling point:  
 (A)  $\text{H}_2\text{O}$  (B)  $\text{H}_2\text{S}$  (C)  $\text{H}_2\text{Se}$  (D)  $\text{H}_2\text{Te}$
40. Covalency of nitrogen in  $\text{N}_2\text{O}_5$  restricted to:  
 (A) 2 (B) 3 (C) 4 (D) 5
41. Ozone is a/an \_\_\_\_\_ molecule and the two O-O bond lengths in ozone are (i) \_\_\_\_\_ and (ii) \_\_\_\_\_  
 (A) linear, 110pm ; 148pm (B) angular, 110pm ; 148pm  
 (C) linear, 128pm ; 128pm (D) angular, 128pm ; 128pm
42. Which one of the following are correctly arranged on the basis of the property indicated:  
 (A)  $\text{I}_2 < \text{Br}_2 < \text{F}_2 < \text{Cl}_2$  [ increasing bond dissociation enthalpy]  
 (B)  $\text{H}_2\text{O} > \text{H}_2\text{S} < \text{H}_2\text{Te} < \text{H}_2\text{Se}$  [ increasing acidic strength]  
 (C)  $\text{NH}_3 < \text{N}_2\text{O} < \text{NH}_2\text{OH} < \text{N}_2\text{O}_5$  [ increasing oxidation state]  
 (D)  $\text{BiH}_3 < \text{SbH}_3 < \text{AsH}_3 < \text{PH}_3 < \text{NH}_3$  [ increasing bond angle]
43. Which one of the following are not correctly arranged on the basis of the property indicated:  
 (A)  $\text{H}_2\text{O} < \text{H}_2\text{S} < \text{H}_2\text{Te} < \text{H}_2\text{Se}$  [ reducing power]  
 (B)  $\text{BiH}_3 < \text{SbH}_3 < \text{AsH}_3 < \text{PH}_3 < \text{NH}_3$  [ increasing order of Lewis basicity]  
 (C)  $\text{I}_2 < \text{Br}_2 < \text{F}_2 < \text{Cl}_2$  [ electron affinity]  
 (D)  $\text{HI} < \text{HBr} < \text{HF} < \text{HCl}$  [ thermal stability]
44. Which of the following does not give  $\text{N}_2$  gas on heating ?  
 (A)  $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$  (B)  $\text{Ba}(\text{N}_3)_2$   
 (C)  $\text{NH}_4\text{NO}_3$  (D)  $\text{NaN}_3$
45. Which of the following oxides of Nitrogen is Neutral  
 (A)  $\text{N}_2\text{O}_5$  (B)  $\text{N}_2\text{O}_3$  (C)  $\text{N}_2\text{O}_4$  (D)  $\text{N}_2\text{O}$

**These questions consist of two statements each, printed as "Assertion" and "Reason". While answering these Questions you are required to choose any one of the following responses.**

- (A) If both Assertion and Reason are True and the Reason is a correct explanation of the Assertion.  
 (B) If both Assertion and Reason are True but Reason is not correct explanation of the Assertion  
 (C) If Assertion is True but the Reason is False.  
 (D) If both Assertion and Reason are false.
46. **Assertion :** All the halogens are coloured.  
**Reason :** Halogen molecules absorb some wavelengths of visible light and the electrons are promoted to higher energy molecular orbitals.  
 (A) A (B) B (C) C (D) D
47. **Assertion :** Between  $\text{SF}_4$  and  $\text{SF}_6$ , only  $\text{SF}_4$  reacts with water.  
**Reason :**  $\text{SF}_4$  is  $\text{sp}^3\text{d}$  and  $\text{SF}_6$  is  $\text{sp}^3\text{d}^2$  hybridised.  
 (A) A (B) B (C) C (D) D
48. Assertion (A) : Phenol is stronger acid than ethanol.  
 Reason (R) : Phenoxide ion is less stable than ethoxide ion.  
 (A) A (B) B (C) C (D) D
49. Assertion (A): Tertiary butyl chloride shows  $\text{SN}^1$  reaction with alcoholic KOH.  
 Reason (R) : Tertiary butyl chloride is less reactive than n-butyl chloride towards  $\text{SN}^1$  reaction.  
 (A) A (B) B (C) C (D) D
50. Assertion: Phenol react with aq  $\text{Br}_2$  to give 2,4,6 tribromophenol a white precipitate.  
 Reason: -OH group in phenol is highly activating group.  
 (A) A (B) B (C) C (D) D

### SECTION C

**This section consists of 6 multiple choice questions with an overall choice to attempt any 5. In case more than desirable number of questions are attempted, ONLY first 5 will be considered for evaluation.**

51. Match the types of defects given in column I with the statement given in column II.

Select the correct matching -

**Column I**

A : XeF<sub>4</sub>

B : XeF<sub>6</sub>

C : XeO<sub>3</sub>

D : XeOF<sub>2</sub>

**Column II**

i. Pyramidal

ii. T-shape

iii. Distorted octahedral

iv. Square planar

	A	B	C	D
(A)	iv	iii	i	ii
(B)	i	ii	iii	iv
(C)	ii	i	iii	iv
(D)	iv	i	iii	ii

52. Complete the following analogy:

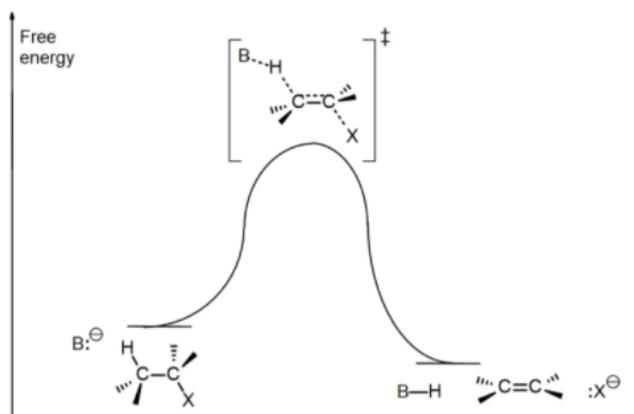
In BrF<sub>3</sub>: 1(lone pair) + 3 (bond pair), Bent T shape :: In XeF<sub>2</sub> :?

- (A) 2(lone pair) + 4 (bond pair), tetrahedral shape  
 (B) 2(lone pair) + 4 (bond pair), square planar shape  
 (C) 3(lone pair) + 2 (bond pair), linear shape  
 (D) 3(lone pair) + 2 (bond pair), angular shape

**CASE 1:- Read the passage given below and answer the following questions 53 - 55:**

- A strong base is necessary especially necessary for primary alkyl halides. Secondary and tertiary primary halides will proceed with E2 in the presence of a base (OH<sup>-</sup>, RO<sup>-</sup>, R<sub>2</sub>N<sup>-</sup>)
- Both leaving groups (the H and the X) should be on the same plane, this allows the double bond to form in the reaction. In the reaction above you can see both leaving groups are in the plane of the carbons.
- Follows **Zaitsev's rule**, the most substituted alkene is usually the major product.
- **Hoffman Rule**, if a sterically hindered base will result in the least substituted product.

The reaction coordinate free energy diagram for an E2 reaction shows a concerted reaction:



53. 2-Bromobutane on heating with alcoholic alkali forms -

- (A) 1 - Butylene only  
 (B) 2 - Butylene only  
 (C) 20% of 1-Butylene+ 80% of 2-Butylene  
 (D) 80% 1-Butylene + 20% 2-Butylene

54. Among the following the most reactive towards alcoholic KOH is

- (A) CH<sub>2</sub>=CHBr (B) CH<sub>3</sub>COCH<sub>2</sub>CH<sub>2</sub>Br  
 (C) CH<sub>3</sub>CH<sub>2</sub>Br (D) CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>Br

55. Tertiary alkyl halides are practically inert to substitution by S<sub>N</sub>2 mechanism because of -

- (A) instability (B) insolubility  
 (C) steric hindrance (D) inductive effect