

# FIITJEE

## CBSE TERM - I ALL XII<sup>TH</sup> STUDYING BATCHES

### Full Test – II

#### CHEMISTRY (18<sup>th</sup> November 2021)

Time: 1:30 Hours

Maximum Marks: 45

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**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.

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**Name of the Candidate** : .....

**Enroll Number** : .....

**Date of Examination** : .....

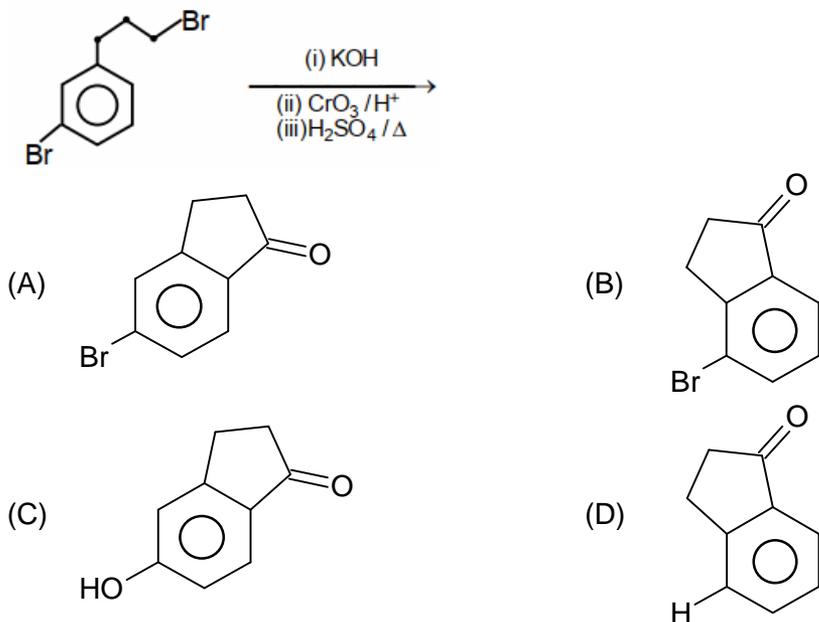
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## CHEMISTRY

## SECTION – A

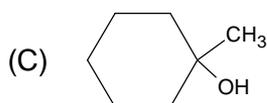
*This section contains 25 Multiple Choice Questions number 1 to 25. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.*

1. Write the product of given reaction



2. Which of the following is not correct about Henry's law?  
 (A) On increasing temperature value of  $K_H$  increases  
 (B) Value of  $K_H$  increases solubility of gas increases  
 (C) Value of  $K_H$  for two different gases at same temperature is not same  
 (D) None of these
3. A solid having HCP arrangement with formula  $\text{A}_2\text{B}_3$ . Which atom form lattice and which atom occupied void  
 (A) B atom occupy lattice and A atom occupy  $2/3$  octahedral voids  
 (B) B atom occupy lattice and A atom occupy  $1/3$  octahedral voids  
 (C) A atom occupy lattice and B atom occupy  $2/3$  octahedral voids  
 (D) A atom occupy lattice and B atom occupy  $1/3$  octahedral voids
4. In aqueous solution glucose remains as  
 (A) only in open chain form  
 (B) only in pyranose form  
 (C) only in furanose forms  
 (D) in all three forms in equilibrium

5. Which of the following can give white turbidity at the fastest rate with conc. HCl and anhy.  $ZnCl_2$

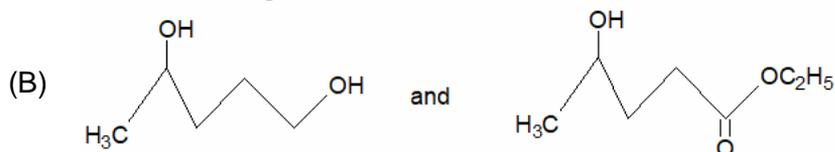
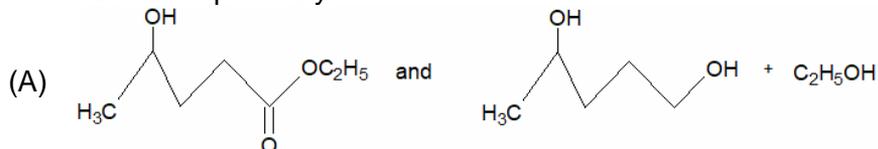


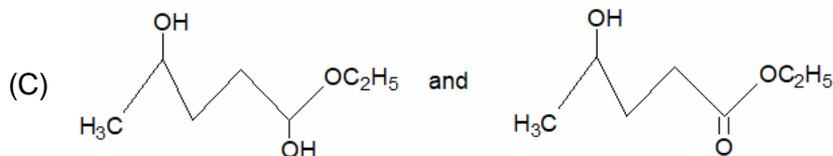
6. What is the correct order for bond dissociation enthalpy?  
 (A)  $HCl > HF > HBr > HI$  (B)  $HF > HCl > HBr > HI$   
 (C)  $HI > HBr > HCl > HF$  (D)  $HCl > HBr > HI > HF$
7. Which of the following will give iodoform reaction with  $I_2/NaOH$   
 (A)  $CH_3CH_2CH_2OH$  (B)  $CH_3 - CHOH - CH_3$   
 (C)  $Ph - CH_2OH$  (D) all of these
8. Which of the following 0.1 M aqueous solutions will have the lowest freezing point?  
 (A)  $K_2SO_4$  (B)  $NaCl$   
 (C) urea (D) glucose
9. Which of the following statement is true?  
 (A)  $CH_3CH_2S^-$  is both a stronger base and more nucleophilic than  $CH_3CH_2O^-$ .  
 (B)  $CH_3CH_2S^-$  is a stronger base but is less nucleophilic than  $CH_3CH_2O^-$ .  
 (C)  $CH_3CH_2S^-$  is a weaker base but is more nucleophilic than  $CH_3CH_2O^-$ .  
 (D)  $CH_3CH_2S^-$  is both a weaker base and less nucleophilic than  $CH_3CH_2O^-$ .
10. The intermediate formed in haloform reaction is  
 (A) primary carbocation (B) primary carbanion  
 (C) secondary carbocation (D) secondary carbanion

11.



A and B are respectively:

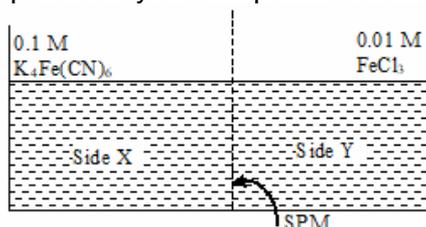




(D) None

12. The sweetest carbohydrate is  
 (A) sucrose (B) glucose  
 (C) fructose (D) lactose
13. The degree of dissociation ( $\alpha$ ) of a weak electrolyte  $A_xB_y$  is related to Vant's Hoff factor (i) by the expression.  
 (A)  $\alpha = \frac{i+1}{x+y-1}$  (B)  $\alpha = \frac{i-1}{(x+y-1)}$   
 (C)  $\alpha = \frac{x+y-1}{i-1}$  (D)  $\alpha = \frac{x+y+1}{i-1}$
14. The ratio of the value of any colligative property for  $K_4[Fe(CN)_6]$  solution to that of  $Fe_4[Fe(CN)_6]_3$  solution is nearly  
 (A) 1 (B) 0.71  
 (C) 1.4 (D) Less than 1
15. The two functional groups present in a typical carbohydrate are  
 (A)  $-OH$  and  $-COOH$  (B)  $-CHO$  and  $-COOH$   
 (C)  $C=O$  and  $-Br$  (D)  $-OH$  and  $-CHO$
16. The wt. of urea dissolved in 100 ml solution which produce an osmotic pressure of 20.4 atm at  $25^\circ C$ , will be  
 (A) 5 g (B) 4 g  
 (C) 3 g (D) 6 g
17. Sucrose molecule is made up of  
 (A) a gluco pyranose and a fructose pyranose  
 (B) a gluco pyranose and a fructo-furanose  
 (C) a gluco-furanose and a fructo-pyranose  
 (D) a gluco-furanose and a fructo-furanose
18. Which of the following aqueous solutions has osmotic pressure nearest to that of an equimolar solution of  $K_4[Fe(CN)_6]$ ?  
 (A)  $Na_2SO_4$  (B)  $BaCl_2$   
 (C)  $Al_2(SO_4)_3$  (D)  $C_{12}H_{22}O_{11}$
19. 1 molar solution of a non-volatile and non-electrolyte compound will produce an osmotic pressure ... at  $0^\circ C$ :  
 (A) 1 atm (B) 44.8 atm  
 (C) 10 atm (D) 22.4 atm

20.  $\text{FeCl}_3$  on reaction with  $\text{K}_4[\text{Fe}(\text{CN})_6]$  in aqueous solution gives blue colour. These are separated by a semi permeable membrane AB as shown. Due to osmosis there is

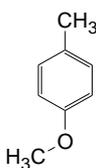


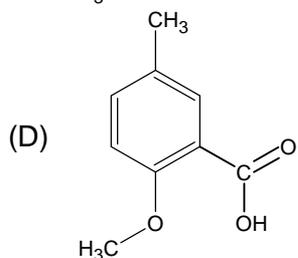
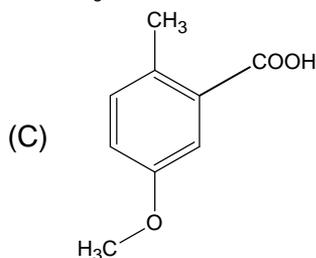
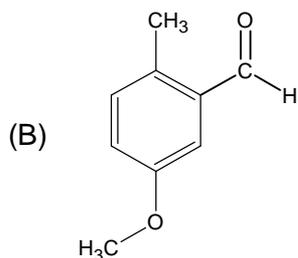
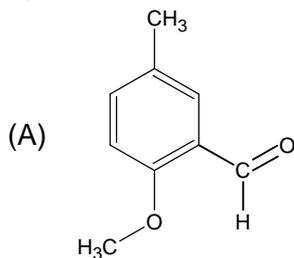
- (A) blue colour formation in side X  
 (B) blue colour formation in side Y  
 (C) blue colour formation in both of the sides X and Y  
 (D) no blue colour formation
21. The freezing point of 0.05 m solution of a non-electrolyte in water is ( $K_f \text{ H}_2\text{O}$ )= $1.86^\circ\text{C/m}$   
 (A)  $-1.86^\circ\text{C}$  (B)  $-0.93^\circ\text{C}$   
 (C)  $-0.093^\circ\text{C}$  (D)  $0.93^\circ\text{C}$
22. How glucose is related with fructose  
 (A) functional isomer (B) rotamers  
 (C) position isomer (D) geometrical isomer
23. Which of the following solution will have highest freezing point?  
 (A) 2 M NaCl solution (B) 1.5 M  $\text{AlCl}_3$  solution  
 (C) 1 M  $\text{Al}_2(\text{SO}_4)_3$  solution (D) 3 M Urea solution
24. Which of the following compound will give blue colour in Victor Mayer's test
- (A)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2 - \text{OH}$  (B)  $\text{CH}_3 - \text{CH}_2 - \overset{\text{OH}}{\underset{|}{\text{C}}} \text{H} - \text{CH}_3$   
 (C)  $\text{CH}_3 - \overset{\text{CH}_3}{\underset{\text{CH}_3}{| \text{C}}} - \text{OH}$  (D) all
25. In which of the following case, formation of butane nitrile is possible  
 (A)  $\text{C}_3\text{H}_7\text{Br} + \text{KCN}$  (B)  $\text{C}_4\text{H}_9\text{Br} + \text{KCN}$   
 (C)  $\text{C}_3\text{H}_7\text{OH} + \text{KCN}$  (D)  $\text{C}_4\text{H}_9\text{OH} + \text{KCN}$

## 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. The compound, added to destroy phosgene gas formed in the oxidation of chloroform, is  
(A)  $C_2H_5OH$  (B)  $CH_3COOH$   
(C)  $CH_3COCH_3$  (D)  $CH_3OH$
27. Chloropicrin is obtained by the reaction of  
(A) Chlorine on picric acid. (B) Nitric acid on chloroform.  
(C) Steam on carbon tetrachloride. (D) Nitric acid on chlorobenzene.
28. When NaCl is heated in presence of sodium vapour, it becomes yellow coloured due to  
(A) Schottky defect (B) Frenkel defect  
(C) Metal excess defect (D) Metal deficiency defect
29. Bottles containing  $C_6H_5I$  and  $C_6H_5CH_2I$  lost their original labels. They were labelled A and B for testing. A and B were separately taken in test tubes and boiled with NaOH solution. The end solution in each tube was made acidic with dilute  $HNO_3$  and then some  $AgNO_3$  solution was added. Substance B gives a yellow precipitate. Which one of the following statements is true for this experiment?  
(A) A was  $C_6H_5I$  (B) A was  $C_6H_5CH_2I$   
(C) B was  $C_6H_5I$  (D) Addition of  $HNO_3$  was unnecessary
30. The order of reactivities of the following alkyl halides for an  $S_N2$  reaction is  
(A)  $R-F > R-Cl > R-Br > R-I$  (B)  $R-F > R-Br > R-Cl > R-I$   
(C)  $R-Cl > R-Br > R-F > R-I$  (D)  $R-I > R-Br > R-Cl > R-F$
31. Which of the following compound shows highest reactivity towards  $S_N1$  reaction?  
(A)  $CH_3 - Cl$  (B)  $C_2H_5 - Cl$   
(C)  $CH_2 = CH - Cl$  (D)  $CH_2 = CHCH_2 - Cl$
32. 8: 8 co-ordination is noticed in  
(A) MgO (B)  $Al_2O_3$   
(C) CsCl (D) All of these

33.  on treatment with  $\text{CHCl}_3$  and  $\text{NaOH}$  produces



34. Which of the following phrases are not correctly associated with an  $\text{S}_{\text{N}}1$  reaction?

1. Rearrangement is possible.
2. Rate is affected by solvent polarity.
3. The strength of the nucleophile is important in determining the rate.
4. The reactivity series is tertiary > secondary > primary.
5. Proceeds with complete inversion of configuration.

(A) 3, 5

(B) 5 only

(C) 2, 3, 5

(D) 3 only

35. Glucose reacts with excess of  $\text{C}_6\text{H}_5\text{NHNH}_2$  and forms

(A) glucosazone

(B) glucose phenyl hydrazine

(C) glucose-oxime

(D) sorbitol

36. The stability of hydrides decreases in the order  $\text{NH}_3 > \text{PH}_3 > \text{AsH}_3 > \text{SbH}_3 > \text{BiH}_3$  (Decrease in bond dissociation enthalpy) out of the following which shows strongest reducing agent character and strongest basic character respectively.

(A)  $\text{BiH}_3$ ,  $\text{PH}_3$

(B)  $\text{NH}_3$ ,  $\text{BiH}_3$

(C)  $\text{SbH}_3$ ,  $\text{NH}_3$

(D)  $\text{BiH}_3$ ,  $\text{NH}_3$

37. Match the following

Column – I		Column – II	
(A)	$N_2O$	(P)	Blue solid, acidic
(B)	$NO$	(Q)	Colourless liquid, acidic
(C)	$N_2O_3$	(R)	Colourless gas, neutral
(D)	$NO_2$	(S)	Brown gas
(E)	$N_2O_4$	(T)	Colourless solid, acidic
(F)	$N_2O_5$		

(A) (A)→R, (B)→R, (C)→P, (D)→S, (E)→Q, (F)→T

(B) (A)→R, (B)→R, (C)→T, (D)→S, (E)→P, (F)→Q

(C) (A)→Q, (B)→S, (C)→P, (D)→S, (E)→P, (F)→R

(D) (A)→R, (B)→R, (C)→T, (D)→S, (E)→Q, (F)→P

38. Out of the following which statement is not correct for white phosphorous?

(A) White phosphorous is poisonous, soluble in water insoluble in carbon disulphide

(B) White phosphorous is poisonous, insoluble in water, soluble in carbon disulphide

 (C) It dissolves in boiling NaOH solution giving  $PH_3$  and sodium hypophosphite

 (D)  $P_4$  catches fire in air to give white fumes of  $P_4O_{10}$ 

 39. The radius of the  $Na^+$  is 95 pm and that of  $Cl^-$  ion is 181 pm. Predict the co-ordination number of  $Na^+$ .

(A) 4

(B) 6

(C) 8

(D) Unpredictable

40. Match the following.

Column – I		Column – II	
(A)	$F_2$	(i)	Red
(B)	$Cl_2$	(ii)	Violet
(C)	$Br_2$	(iii)	Yellow
(D)	$I_2$	(iv)	Greenish yellow

(A) a → i, b → iii, c → iv, d → ii

(B) a → ii, b → i, c → iii, d → iv

(C) a → iii, b → iv, c → i, d → ii

(D) a → i, b → ii, c → iii, d → iv

41. Out of the following what is the correct order for bond dissociation enthalpy of halogens (in kJ/mol)?

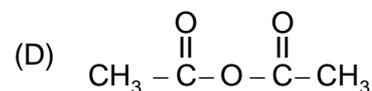
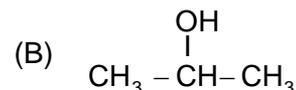
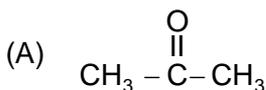
 (A)  $F_2 > Cl_2 > Br_2 > I_2$ 

 (B)  $Cl_2 > F_2 > Br_2 > I_2$ 

 (C)  $F_2 > Br_2 > Cl_2 > I_2$ 

 (D)  $Cl_2 > Br_2 > F_2 > I_2$ 

42. Iodoform test is not given by



43. Dissaccharide sugars are  
(A) fructose (B) glucose  
(C) sucrose (D) raffinose
44. Glucose is/an  
(A) polyhydroxy ketone (B) alcohol  
(C) hydrate of carbon (D) pentahydroxy aldehyde
45. Assertion : In lead chamber process of oxidation of  $\text{SO}_2$  to  $\text{SO}_3$  by  $\text{O}_2$ , NO is the catalyst.  
Reason: NO reduces the activation energy of the reaction by forming an intermediate compound.  
(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: Tollen's reagent, Benedict's solution and fehiling's solution are reducing agents.  
Reason: Mild oxidizing agents like chlorine or bromine water convert glucose into gluconic acid  
(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: The ease of dehydration of alcohols follows the order: Primary > Secondary > Tertiarty  
Reason: Dehydration of  $3^\circ$  alcohol in acidic medium usually proceeds through the formation of cabocations  
(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: The presence of nitro group facilitates nucleophilic substitution reactions in aryl halides  
Reason: The intermediate carbanion is stabilized due to the presence of nitro group  
(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: Although  $\text{PF}_5$ ,  $\text{PCl}_5$  and  $\text{PBr}_5$  are known, but the pentahalides of nitrogen have not been observed  
Reason: Phosphorus has lower electronegativity than nitrogen
- (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)**

The concentration of a solute is very important in studying chemical reaction because it determines how often molecules collide in solution and thus indirectly determine the rate of reactions and the conditions at equilibrium.

There are several ways to express the amount of solute present in a solution. The concentration of a solution is a measure of the amount of solute that has been dissolved in a given amount of solvent or solution. Concentration can be expressed in terms of molarity, molality, parts per million, mass percentage, volume percentage, etc.

Choose the most appropriate answer of the following questions.

50. A solution is prepared using aq. KI which is turned out to be 20% w/w. Density of KI is 1.202 g/mL. The molality of the given solution and mole fraction of solute are respectively  
 (A) 1.95 m, 0.120 (B) 1.5 m, 0.0263  
 (C) 2.5 m, 0.0569 (D) 3.0m, 0.0352
51. If a solute undergoes dimerization and trimerization, the minimum values of the van't Hoff factors are  
 (A) 0.50 and 1.50 (B) 1.50 and 1.33  
 (C) 0.50 and 0.33 (D) 0.25 and 0.67
52. Which of the following is temperature dependent?  
 (A) Molarity (B) Molality  
 (C) Mole fraction (D) Mass percentage
53. The relationship between Osmotic pressure at 273 K when 10gm of glucose ( $P_1$ ), 10gm urea ( $P_2$ ) and 10 gm sucrose ( $P_3$ ) are dissolved in 250 ml of water is  
 (A)  $P_1 > P_2 > P_3$  (B)  $P_3 > P_1 > P_2$   
 (C)  $P_2 > P_1 > P_3$  (D)  $P_2 > P_3 > P_1$
54. If  $a \neq b \neq c, \alpha = \gamma = 90^\circ, \beta \neq 90^\circ$ , the crystal system is  
 (A) Cubic (B) Orthorhombic  
 (C) Monoclinic (D) Hexagonal
55. Water insoluble compound of starch is  
 (A) amylopectine (B) amyulose  
 (C) cellulose (D) none of these