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Provincial Department of Education - NWP

02 E 1

Final Examination - Grade 13 - 2016

Index No. Chemistry I Two hours only

- Important**
- ♦ Periodic Table is provided.
 - ♦ Answer all the questions.
 - ♦ Use of calculator is not allowed.
 - ♦ Write your Index number in the space provided in the answer sheet.
 - ♦ In each of the questions 1 to 50, pick one of the alternatives form (1), (2), (3), (4), (5) which is correct or most appropriate and mark your response on the answer sheet with a cross (x) in accordance with the instructions given on the back of the answer sheet.

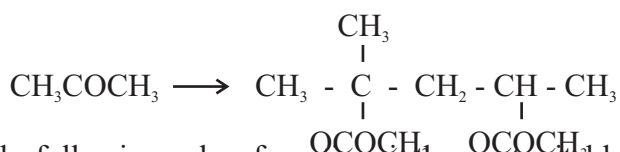
Universal gas constant $R = 8.314 \text{ JK}^{-1} \text{ mol}^{-1}$ | Avogadro constant $N_A = 6.022 \times 10^{23} \text{ mol}^{-1}$
 Planck's constant $h = 6.626 \times 10^{-34} \text{ Js}$ | Velocity of light $C = 3 \times 10^8 \text{ ms}^{-1}$

01. Could be explained by the Bohr Model is?
 1. Atomic spectrum of H only. 2. Spectrum of atom or ion having an electron.
 3. Atomic spectrum of He. 4. Rutherford's model.
 5. Gold foil experiment.
02. Incorrect statement regarding the modern periodic table is?
 1. There is only one very short period. 2. There are three long periods.
 3. There are 32 elements in the 6th period. 4. It was arranged according to the periodic law.
 5. Spaces allocated for undiscovered elements.
03. Type / (s) of bond / (s) in N_2O_4 molecule is?
 1. Ionic bonds only. 2. Covalent and dative bonds.
 3. Covalent bonds only. 4. Covalent and ionic bonds.
 5. Dative and Vanderwaals only.
04. IUPAC nomenclature following compound is?

$$\text{H}_2\text{N} - \text{CH}_2 - \underset{\text{CH}_3}{\underset{|}{\text{CH}}} - \overset{\text{OH}}{\underset{\text{H}}{\text{C}}} - \text{CH} = \text{CH}_2$$
1. 5 - amino - 4 - methylepent - 1 - en - 3 - ol
 2. 1 - amino - 2 - methylpent - 4 - en - 3 - ol
 3. 5 - amino - 3 - hydroxy - 4 - methylpent - ene
 4. 5 - amino - 4 - methylpent - 1 - ene - 3 - ol
 5. 5 - amino - 4 - menthyl - 3 - hydroxypent - 1 - ene

05. Molecule without dipole moment is?
1. CH_2Cl_2
 2. CHCl_3
 3. H_2S
 4. NH_3
 5. CCl_4
06. The Concentration of Mn^{2+} in mol dm^{-3} , if there is no change in volume when 50.00cm^3 of 0.08mol dm^{-3} $\text{Na}_2\text{C}_2\text{O}_4$ solution is mixed with 50.00cm^3 of 0.12mol dm^{-3} $\text{H}^+ / \text{KMnO}_4$ is?
1. 0.008
 2. 0.0016
 3. 0.016
 4. 0.06
 5. 0.015
07. Which of the following aqueous solutions do not give a precipitate by mixing them, is?
1. Acidified $\text{BaCl}_2 / \text{Na}_2\text{CO}_3$
 2. Acidified $\text{AgNO}_3 / \text{BaI}_2$
 3. Acidified $\text{Ba}(\text{NO}_3)_2 / \text{Na}_2\text{SO}_3 / \text{H}_2\text{O}_2$
 4. $\text{BaCl}_2 / \text{K}_2\text{Cr}_2\text{O}_7$
 5. Non of the above gives a precipitate.
08. In which of the following reaction at constant temperature decreases the entropy of the system?
1. $\text{C}_5\text{H}_{12(l)} \longrightarrow \text{C}_5\text{H}_{12(g)}$
 2. $2\text{H}_2\text{O}_{2(l)} \longrightarrow \text{O}_{2(g)} + 2\text{H}_2\text{O}_{(l)}$
 3. $2\text{NH}_{3(g)} \longrightarrow \text{N}_{2(g)} + 3\text{H}_{2(g)}$
 4. $2\text{H}_{2(g)} + \text{O}_{2(g)} \longrightarrow 2\text{H}_2\text{O}_{(l)}$
 5. $\text{Zn}_{(s)} + 2\text{HCl}_{(aq)} \longrightarrow \text{ZnCl}_{2(aq)} + \text{H}_{2(g)}$
09. Dissociation constant of a weak acid HA is $4.0 \times 10^{-9} \text{mol dm}^{-3}$. What is the pH value of 0.1mol dm^{-3} acid solutions?
1. 2.0
 2. 4.7
 3. 5.0
 4. 5.3
 5. 9.4
10. Reaction of Mg with aqueous NH_4Cl could be formed?
1. $\text{Mg}(\text{OH})_2 + \text{NH}_3 + \text{HCl}$
 2. $\text{MgCl}_2 + \text{NH}_3$
 3. $\text{MgCl}_2 + \text{NH}_3 + \text{H}_2$
 4. $\text{Mg}(\text{OH})_2 + \text{NH}_3 + \text{Cl}_2$
 5. $\text{Mg}(\text{OH})_2 + \text{NH}_3 + \text{H}_2 + \text{Cl}_2$

11.



Which of the following order of reactions is the most suitable for the above translation?

1. $\text{CH}_3\text{MgBr} / \text{H}_2\text{O} \xrightarrow{\text{dil H}_2\text{SO}_4} \text{CH}_3\text{COOH}$
 2. $\text{NaOH}_{(aq)} \xrightarrow{\text{dil H}_2\text{SO}_4} \text{CH}_3\text{COCl} \longrightarrow$
 3. $\text{LiAlH}_4 / \text{H}_2\text{O} \xrightarrow{\text{PBr}_3} \text{Mg dry ether} \xrightarrow{\text{CH}_3\text{COCH}_3} \text{CH}_3\text{COOH}$
 4. $\text{NaOH}_{(aq)} \longrightarrow \text{LiAlH}_4 / \text{H}_2\text{O} \xrightarrow{\text{CH}_3\text{COOH}} \longrightarrow$
 5. $\text{NaCN} / \text{HCl} \longrightarrow \text{LiAlH}_4 / \text{H}_2\text{O} \xrightarrow{\text{CH}_3\text{COOH}} \text{CH}_3\text{CH}_2\text{OH}$
12. Which of the following would not be an electron acceptor in a dative bond?
1. Protonium ion
 2. BF_3 molecule
 3. Oxygen atom
 4. Oxygen molecule
 5. AlCl_3
13. Which of the following has the highest basicity?

smell of Ammonia when heated with Al powder and NaOH. This compound would be.

1. KNO_3 2. KBr 3. NH_4NO_2 4. NaCl 5. KI

21. RMM of a dimethyl ester of dicarboxylic acid M is 200. RAM of M would be.

1. 172 2. 148 3. 186 4. 132 5. 170

22. Which of the following could be used to distinguish $\text{Mg}(\text{NO}_3)_2$ and $\text{Ba}(\text{NO}_3)_2$?

1. aqueous Na_2CO_3 2. aqueous NaHCO_3 3. aqueous NH_3
4. aqueous KI 5. Non of the above.

23. Which of the following pair of compounds would be distinguished by using aqueous KOH solution as the only reagent?

1. $\text{CH}_3\text{CH}_2\text{Cl}$ and CH_3COCl
2. CH_3CONH_2 and $\text{CH}_3\text{COONH}_4$
3. $\text{CH}_3\text{COOCH}_2\text{CH}_3$ and $\text{C}_6\text{H}_5\text{COOCH}_2\text{CH}_2\text{CH}_3$
4. $\text{CH}_3\text{COOCH}_2\text{C}_6\text{H}_5$ and $\text{C}_6\text{H}_5\text{COOCH}_2\text{CH}_3$
5. $\text{CH}_3\text{CH}_2\text{-N-CH}_3$ and $\text{C}_6\text{H}_5\text{NHCOCH}_3$



24. The equilibrium $\text{A}(\text{s}) \rightleftharpoons \text{B}(\text{s}) + \text{C}(\text{g})$ is at 1100K temperature. Which of the following

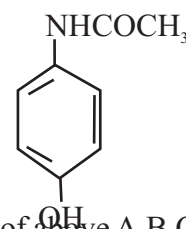
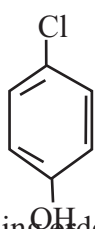
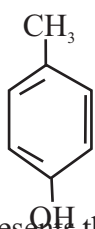
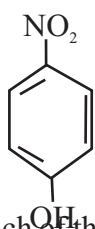
is true regarding ΔH and ΔS values for the forward reaction.

1. $\Delta H = \Delta S = 0$ 2. $\Delta H > 0, \Delta S > 0$ 3. $\Delta H < 0, \Delta S > 0$
4. $\Delta H > 0, \Delta S < 0$ 5. $\Delta H < 0, \Delta S < 0$

25. If particular solid compound is heated, releases a gas which does not help for the combustion of Magnesium and Phosphorous. This solid compound would be?

1. NH_4NO_2 2. NaNO_3 3. NH_4NO_3
4. $\text{Pb}(\text{NO}_3)_2$ 5. AgNO_3

26. A). B). C). D.)



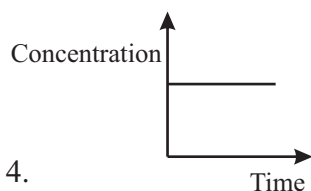
Which of the following represents the correct increasing order of acidic strength of above A,B,C,D compounds.

1. $\text{A} > \text{C} > \text{B} > \text{D}$ 2. $\text{A} > \text{C} > \text{D} > \text{B}$ 3. $\text{B} > \text{D} > \text{C} > \text{A}$
4. $\text{C} > \text{A} > \text{B} > \text{D}$ 5. $\text{A} > \text{B} > \text{C} > \text{D}$

27. The order with respect to B in the reaction $\text{A} + \text{B} \rightarrow \text{Products}$, is zero. Which of the Following graph represents the variation of the concentration of B with time during the reaction while other

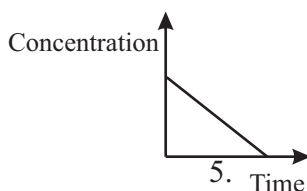
factors kept constant ?

1.



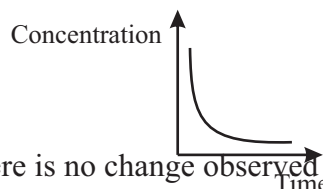
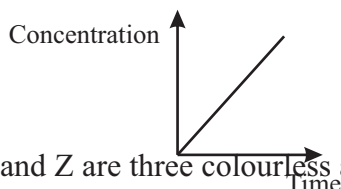
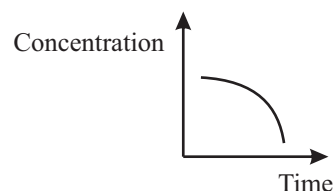
4.

2.



5.

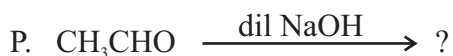
3.



28. X, Y and Z are three colourless aqueous solutions. There is no change observed when X and Y are mixed. When small amounts of solutions Z is added to solutions X and Y separately evolved a gas with unpleasant odour and white precipitate was given. The gas evolved with unpleasant smell gives brown colour with K_2HgI_4 . The white precipitate observed from X dissolves in dil HNO_3 releasing a gas. White precipitate observed from Y not dissolves in dil HNO_3 . The solutions X, Y, and Z contains respectively are?

1. NH_4NO_3 , $(NH_4)_2SO_3$, NaOH
2. $(NH_4)_2CO_3$, NH_4NO_3 , $Ba(OH)_2$
3. $(NH_4)_2CO_3$, $(NH_4)_2SO_3$, $Ba(OH)_2$
4. $(NH_4)_2CO_3$, $(NH_4)_2SO_4$, $Ba(OH)_2$
5. $(NH_4)_2CO_3$, $(NH_4)_2SO_4$, $Mg(OH)_2$

29. Consider the mechanisms of following reactions?



(a) Only a nucleophilic substitution. (S_N).

(b) Only a nucleophilic addition. (A_N)

(c) Nucleophilic substitution and Elimination reaction (S_N and E) only.

(d) Nucleophilic addition and Elimination reaction (A_N and E) only.

The correct order of the mechanisms of P, Q, R, and S.

1. b, a, d, a

2. d, a, d, a

3. d, c, d, a

4. b, c, d, a

5. d, a, c, a

30. Equilibrium constant for the system $N_2O_4(g) \rightleftharpoons 2NO_2(g)$ at particular temperature is 6.0 barr. If mole fraction of $N_2O_4(g)$ at the same temperature in an equilibration mixture containing $N_2O_4(g)$ and $NO_2(g)$ only is $2/3$, what is the total pressure inside the vessel.

1. 1.0 bar

2. 4.0 bar

3. 6.0 bar

4. 36 bar

5. Data given are not enough for the calculation.

For each of the questions 31 to 40, one or more responses out of the four responses (a), (b), (c) and (d) given is / are correct. Select the correct response / responses. In accordance with the instructions given on your answer sheet, mark,

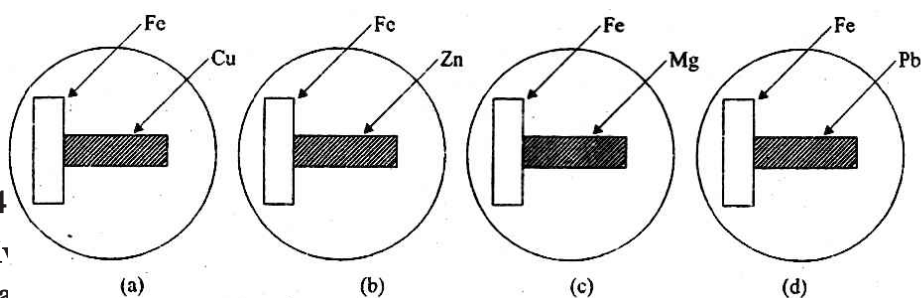
- (1) If only (a) and (b) are correct
 (2) If only (b) and (c) are correct
 (3) If only (c) and (d) are correct
 (4) If only (d) and (a) are correct
 (5) If only other number or combination of responses is correct.

Summary of above Instructions.

	(1)	(2)	(3)	(4)	(5)
31.	Acceptable set / (s) of quantum numbers are!	only (a) and (b) are correct	only (c) and (d) are correct	only (d) and (a) are correct	any other number or combination of responses is correct.
	(a) 3, 2, 0, +1/2	(b) 2, 2, 0, +1/2	(c) 2, 2, 0, +1/2	(d) 3, 2, +3, -1/2	(d) 3, 2, -2, -1/2

32. Which of the following statement / (s) is / are true regarding the isotope
- (a) Contains 92 neutrons. (b) Charge of e is $36 \times 96490 \times$
- (c) Neucleus contains 92 neutrons. (d) Neucleus contains 36^{92}_{36}Kr proron.
33. Which of the following pair / (s) of compound / (s) reacted to obtained an organic product which gives natural aqueous solutions ? 6.022×10^{23}
- a. CH_3COOH and PCl_5 b. $\text{C}_6\text{H}_5\text{NH}_2$ and HCl
 c. CH_3COCH_3 and NABH_4 d. CH_3COOH and KOH
34. Uses obtained from an emission spectrum of an atom would be?
- (a) Existance of sub energy levels. (b) Large area of an atom is empty.
 (c) Calculation of ionization energies. (d) Existance of isotopes.
1. only a,b 2. only a,b,c 3. only a,c 4. only a,d 5. a,b,c,d
35. Which of the following pair / (s) is / are distinguished using conc NaOH Solution ?
- (a) Al^{3+} and Cr^{3+} (b) Cu^{2+} and Co^{2+} (c) Al^{3+} and Zn^{2+} (d) Zn^{2+} and Pb^{2+}
36. Which of the following is / are true?
- a. Always the reduction takes place in the negative electrode during an electrolysis.
 b. In an electro chemical cell oxidation takes place in the anode and in the electrolysis, reduction take place in the anode.
 c. During the all electrode chemical oxidation neutral atoms convert to positive ions.
 d. Equilibrium electrode reactions not happens on the electrode during electrolysis.
37. Gree house gas / (es) which is / are not effected to make acid rains.
- a. SO_2 b. NO_2 c. CO_2 d. CH_4
38. Types of products obtained by electrolysis process is depend on ?
- a. Concentration of the electrolyte b. Volume of the electrolyte.
 c. Surface area of electrodes. d. nature (type) of electrodes.

39. Which of the following statement / (s) is / (are) true regarding the Galvanic cell represents by $A(s) | A^{2+}(aq) || B^{2+}(aq) | B(s)$
- Electrons are travelled from Electrode A to Electrode B.
 - Standard current is traveled from Electrode B to Electrode A.
 - Electrode A is positively charged.
 - Electrode B is negatively charged.
40. Different metals are combined with iron in a medium of agar gel containing potassium ferri cyanide, Sodium Chloride and Phenolphthaline as follows. The set / (s) give pink colour around iron is / are?




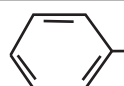
In question Nos. 4
From the Table give
statements and ma

t best fits the

Response	First Statement	First Statement
(1)	True	True and correctly explains the first statement.
(2)	True	True, but does not explains the first statement correctly.
(3)	True	False
(4)	False	True
(5)	False	False

First Statement	Second Statement
42. $\begin{array}{c} \text{H} - \text{C} = \text{O} \\ \\ \text{OH} \end{array}$ from Ag precipitate with tollen' reagent.	Reaction between $\begin{array}{c} \text{O} \\ \\ -\text{C} = \text{H} \end{array}$ and tollen's reagent is nucleophilic addition reaction.

43. Pure Br_2 gas is released by adding small amount of conc. HNO_3 to a sample Solid MgBr_2	Any solid bromid form HBr gas with conc. H_2SO_4
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44.	If aqueous solution of a simple salt is reacted with BaCl_2 and gives a white precipitate, that salt should be a sulphate.	BaSO_4 is insoluble in water.
45.	Ca(OH)_2 can be used to remove temporarily hardness of water.	Industries of lime production causes to increase the hardness of water in related, areas.
46.	 CH_2Cl give a precipitate with aqueous AgNO_2 .	Stability of  $^+\text{CH}_2$ is very high.
47.	NaOH can be used to distinguished a mixture of Al(OH)_3 and Fe(OH)_3	NaOH react with Fe(OH)_3
48.	NaOCl is a good bleaching agent.	Cl atoms are given by NaOCl
49.	If phenolphthalene is added to an aqueous solution of pH value 7.5 at room temperature turns pink.	Acidic solutions are colourless with phenolphthalene while basic solutions are pink.
50.	Ability of hydrolysis of BiCl_3 is lower than that of NCl_3	BiCl_3 shows acidic properties than NCl_3
	The amount of A in the system is increased by adding an inert gas to the equilibrium $\text{A (g)} \rightleftharpoons \text{B (g)} + 2\text{C (g)}$ in closed system of constant volume.	Partial pressures of gases A, B and C is changed by adding an inert gas to the equilibrium system $\text{A (g)} \rightleftharpoons \text{B (g)} + 2\text{C (g)}$ when the volume is constant.