

Chemistry Exam (B)

1) Which one of the following pairs paramagnetic:

- a) $_{30}\text{Zn}^{+2}$ and $_{26}\text{Fe}^{+2}$. b) $_{21}\text{Sc}^{+3}$ and $_{26}\text{Fe}^{+2}$
c) $_{30}\text{Zn}^{+2}$ and $_{24}\text{Cr}^{+2}$. d) $_{26}\text{Fe}^{+2}$ and $_{24}\text{Cr}^{+2}$.

2) The number of main transition elements in first and second series are

- a) 20 elements. b) 32 elements
c) 18 elements d) 16 elements

3) The ions which have the electronic configuration $[_{18}\text{Ar}], 3d^4$ are.....

- a) $_{25}\text{Mn}^{+2}$ and $_{27}\text{Co}^{+2}$
b) $_{26}\text{Fe}^{+3}$ and $_{24}\text{Cr}^{+3}$
c) $_{24}\text{Cr}^{+2}$ and $_{25}\text{Mn}^{+3}$.
d) $_{26}\text{Fe}^{+2}$ and $_{27}\text{Co}^{+3}$

4) The atomic radii of d-block elements from chromium to Copper are relatively constant, Which of the following causes this phenomenon ?

- a) Electrons filling the 3d orbital.
b) Increasing nuclear charge.
c) Greater repulsion between 3d electrons.
d) answers (b) and (c) are correct .

5) All the following from the properties of Titanium except.....

- a) Can form different oxides as TiO , Ti_2O_3 and TiO_2
b) Rigid and strong metal with low density.
c) Does not cause any poisoning effect so body when implanted.
d) Its melting point lower than Aluminum.

- 6) During Haber-method to prepare Ammonia: $N_{2(g)} + 3H_{2(g)} = 2NH_{3(g)}$. Which of the following conditions are suitable to increase amount ammonia ?
- Increasing pressure and adding Zinc powder
 - Decreasing pressure and adding Iron powder
 - Increasing pressure and adding Iron powder.
 - Decreasing pressure and adding Zinc powder
- 7) Which of the following processes does not aim to improve the physical and mechanical properties of iron ore.
- Sintering process
 - Roasting process
 - Crushing process
 - Concentrating process
- 8) Which of the following alloys its elements are chemically combined.....
- Alloys used in heating coils and electric furnaces
 - Alloys used in real way tracks
 - Cementite
 - Bauxite
- 9) Oxygen converter is charged with
- Hematite
 - Carbon dioxide
 - Molten Iron
 - Iron III Oxide
- 10) Reactions of Iron with acids depend on
- Type of acid and its amount
 - Amount of acid and its concentration
 - Type of acid and its concentration
 - Basicity of acid and its amount

11) One of iron compounds (X) when heated in air, a solid substance (B) is formed along with two different gases, one of them turbid clear lime water. Which of the following statements best compare between (X) and (B).

- a) X is diamagnetic substance while B is paramagnetic one.
- b) X is paramagnetic substance while B is diamagnetic one.
- c) X has magnetic moment more than that of B.
- d) X has magnetic moment less than that of B.

12) Which of the following salts when heated becomes insoluble in water

- a) NaHCO_3
- b) $(\text{NH}_4)\text{HCO}_3$
- c) $\text{Ca}(\text{HCO}_3)_2$
- d) KHCO_3

13) Which of the following is the chemical formula for the basic radical whose salt solution forms a white precipitate when dilute Sulfuric acid added to it.

- a) Cu^{2+}
- b) Fe^{2+}
- c) Ca^{2+}
- d) Al^{3+}

14) Which of the following could act as a standard solution for the determination of Ammonium hydroxide.....

- a) Ammonium chloride
- b) Ammonium carbonate
- c) Hydrochloric acid
- d) Sodium carbonate

15) What is the mass of the precipitate produced from the addition of 100 mL of a 0.1 M Sodium hydroxide solution to an excess of Iron (II) sulfate.

[$\text{NaOH} = 40 \text{ g/mol}$ and $\text{Fe}(\text{OH})_2 = 90 \text{ g/mol}$]

- a) 0.005 g
- b) 0.900 g
- c) 0.760 g
- d) 0.450 g

16) Which of the following is correct to detect the sulphite anion ?

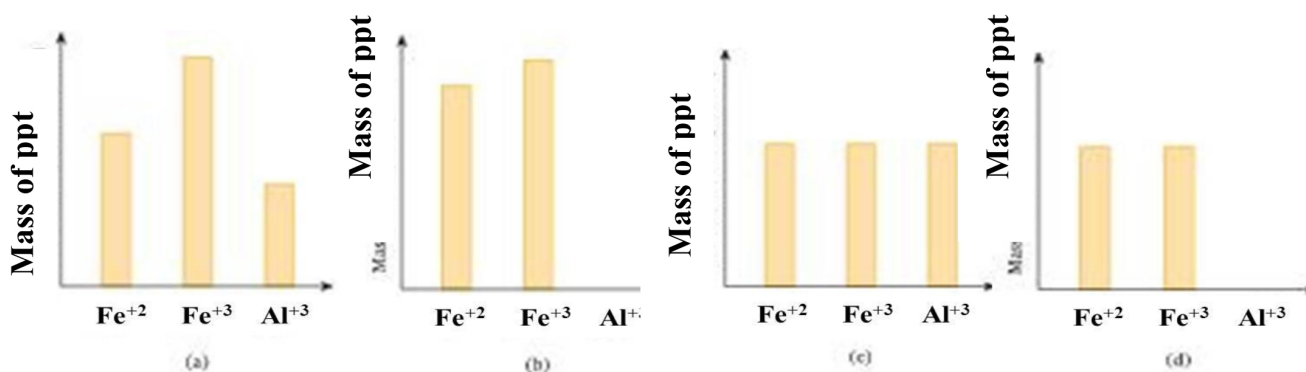
- a) Adding an equal volume of dilute HCl, followed by heating, which results in production of a gas that turns filter paper soaked in acidified aqueous KMnO_4 from purple to colorless
- b) Adding an equal volume of dilute NaOH, followed by heating, which results in production of a gas that turns moist litmus paper blue

- c) Adding an aqueous Ammonia solution, which produces a yellow precipitate
- d) Adding an equal volume of Acetic acid, followed by Silver nitrate, which gives a white precipitate

17) Which of the following used to differentiate between two separated solid salts of Barium Sulphate and Barium Phosphate

- a) Concentrated Sulphuric acid.
- b) Concentrated Ammonia solution.
- c) Acidified Potassium permanganate.
- d) Dilute HCl.

18) On adding excess amount of Sodium hydroxide to three different solutions containing equal amount of Fe^{+2} , Fe^{+3} and Al^{+3} , respectively. Three different precipitates are formed. Which of the following diagrams expresses the ratio between the mass of the precipitate ?



19) Dissolving 18.5 g of Calcium hydroxide in 0.5 L Nitric acid (2 molar), so the resulting solution will be [$\text{Ca}(\text{OH})_2 = 74 \text{ g/mol}$]

- (a) Neutral
- (b) Acidic
- (c) Alkaline
- (d) Amphoteric

20) An hydrated metal salt has the chemical formula $\text{XBr}_2 \cdot 6\text{H}_2\text{O}$. When

a 4.578 g sample of the salt is heated, the sample decreases in mass by 1.515 g.

Which of the following is the identity of metal X. [$\text{Br}=80$, $\text{H}=1$, $\text{O}=16$]

- a) Mn [$M=55 \text{ g/mol}$]
- b) V [$M=51 \text{ g/mol}$]
- c) Cu [$M=63.5 \text{ g/mol}$]
- d) Co [$M=58.35 \text{ g/mol}$]

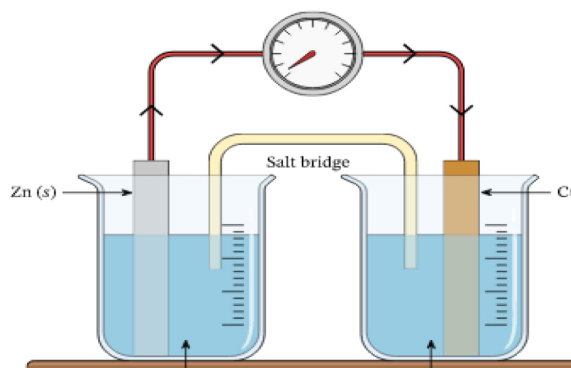
21) Calculate the volume of evolved Chlorine when passing 19300 Coulombs in a solution of Copper II chloride between two Platinum electrodes.

- a) 11.2 L b) 22.4 L c) 2.24 L d) 1.12 L

22) Consider the figure below:

What may cause the electric current to stop flowing.

- a) The full consumption of the Cu^{2+} ions
 b) Removing the salt bridge
 c) The full consumption of the Cu electrode
 d) Bot (a) and (b) are correct.



23) If you know that , the standard reduction potentials of
 ($\text{Ni} = -0.23 \text{ V}$) , ($\text{Fe} = -0.41 \text{ V}$) , ($\text{Cu} = +0.34 \text{ V}$) , ($\text{Al} = -1.67 \text{ V}$)

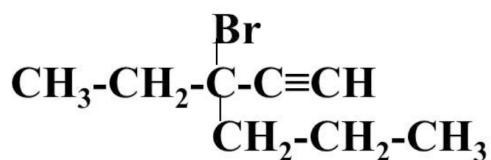
- a) Copper oxidized aluminum and doesn't oxidize iron
 b) Nickel reduced iron and doesn't reduce copper
 c) Aluminum oxidized iron and doesn't oxidize copper
 d) Iron oxidized aluminum and reduced Nickel

24) You have oxidation potentials of some elements, which of them is the best reducing agents ?

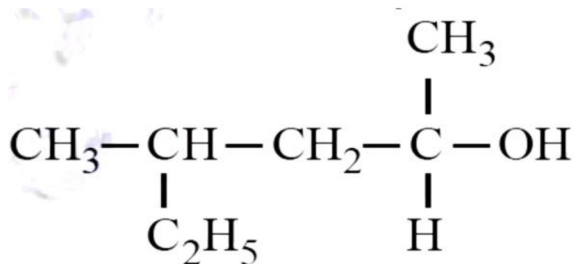
- a) 3 Volts b) 2.3 Volts c) zero Volt d) - 2.8 Volts

25) The IUPAC name of the following compound is :

- a) 3-Bromo Hexene
 b) 4-Bromo Hexene.
 c) 3-Bromo-3-Propyl Hex-4-ene
 d) 3-Bromo-3-Ethyl Hexyne



26) The IUPAC name of the following.....



- a) 3-methyl hexan-5-ol
 b) 4-methyl hexan-1-ol
 c) 4-ethyl pentan-2-ol
 d) 4-Methyl-2-Hexanol.

27) Which of the following pairs represent isomers.....

- a) Propanol and Propanal
 b) Pentane and 2,2-dimethyl butane
 c) Propanone and dimethyl ether
 d) Butanoic acid and 2-methyl propanoate.

28) Which of the following equations describes the substitution reaction of an alkane.....

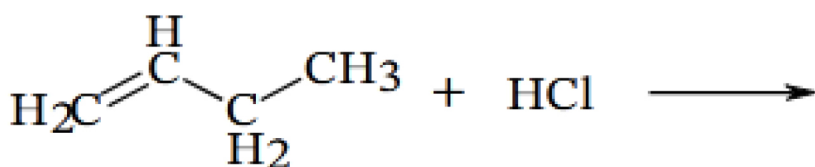
- a) Alkane + Halogen → di halo alkane
 b) Alkane + Oxygen → Carbon dioxide + water
 c) Alkane + Halogen → Haloalkane + Hydrogen halide
 d) Alkane + Hydrogen halide → Haloalkane + water

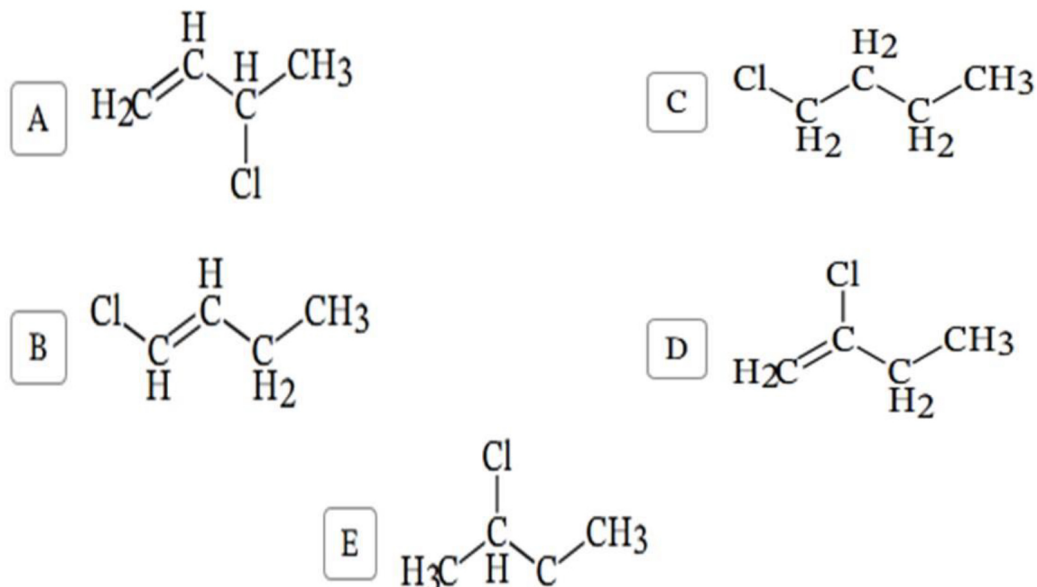
29) Which of the following reagents used to detect the double bond of alkenes:

- a) Hydrogen peroxide
 b) Combustion in air
 c) Bromine water
 d) Hydrolysis in acidified water

30) Consider the reaction of but-1-ene with HCl:

What is the major product.....

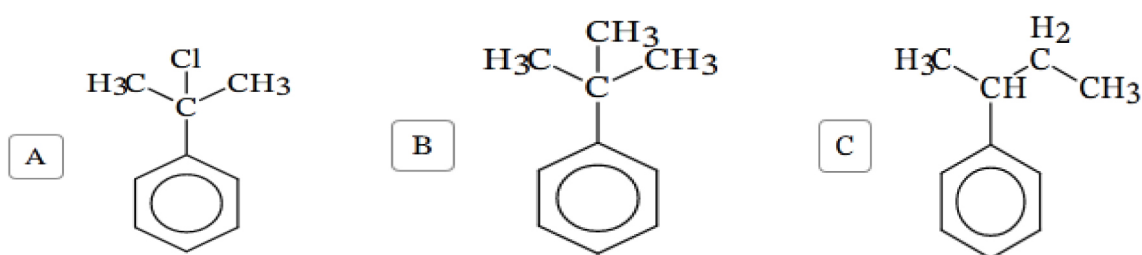
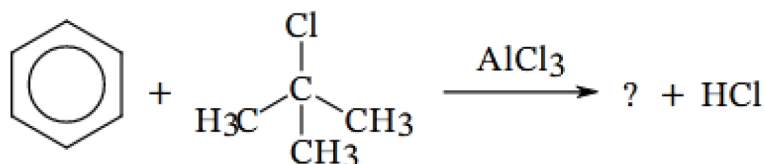




31) Which of the following is correct in, Burning Ethyne gas in atmospheric air

- Carbon dioxide completely formed.
- Forming smoky flam.
- Forming highly thermal flam.
- Carbon monoxide totally forming Carbon dioxide.

32) Which of the following is the correct product for the following reaction?

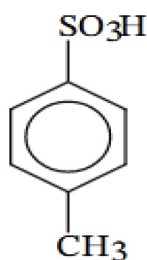


33) Which of the following consecutive combinations will lead to obtaining cyclohexane from normal hexane.

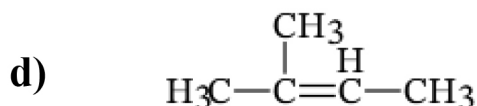
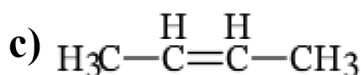
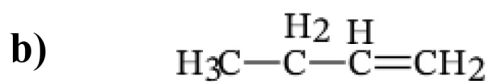
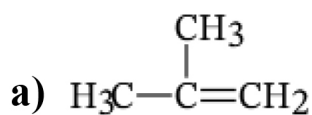
- Catalytic reforming followed by Oxidation
- Polymerization followed by Reduction
- Polymerization followed by Oxidation
- Catalytic reforming followed by Reduction

34) Which two compounds would react to give the following compound?

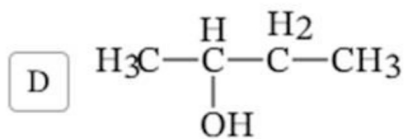
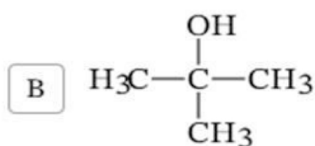
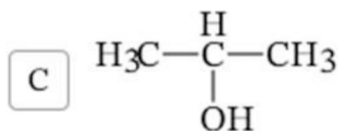
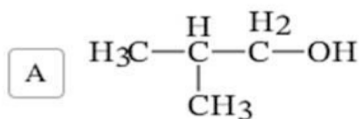
- a) Benzene and Sulfur dioxide
- b) Benzene and Sulfuric acid
- c) Toluene and Sulfuric acid
- d) Toluene and Hydrogen sulfide



35) Which of the following alkenes is a possible product upon the dehydration of one mole of 1-butanol



36) Alkaline hydrolysis of tertiary butyl Iodide, gives.....



37) Which of the compounds has the lowest boiling point.

- a) 1,3-Propan-diol ($\text{C}_3\text{H}_8\text{O}_2$)
- b) 1-Propanol ($\text{C}_3\text{H}_8\text{O}$)
- c) Ethyl Methanoate ($\text{C}_3\text{H}_6\text{O}_2$)
- d) Propanoic acid ($\text{C}_3\text{H}_6\text{O}_2$)

38) An ester (A) with molecular formula $\text{CH}_3\text{COOC}_6\text{H}_5$, What are the Ammonolysis products of an ester (B) which considered isomer of (A):

- a) Acetamide , Benzoic acid
- b) Acetamide, Phenol
- c) Benzamide , Ethanol
- d) Benzamide , Methanol

39) Which of the following reagents could be used to differentiate between Aspirin and Marookh oil.

- a) Sodium carbonate
- b) Sodium hydroxide solution
- c) Sodium bromate
- d) Ethyl alchol solution

40) A , B and C are three organic compounds:

* Compound (A) reacts with HCl, but does not react with NaOH

* Both (B) and (C) react with NaOH and do not react with HCl.

* Only compound (B) gives effervescence on reacting with NaHCO_3 .

Identify the organic families that A, B and C belong to.

(a)	(A) Phenol	(B) Alcohol	(C) Acid
(b)	(A) Alcohol	(B) Phenol	(C) Acid
(c)	(A) Alcohol	(B) Acid	(C) Phenol
(d)	(A) Phenol	(B) Acid	(C) Phenol

41) Heating Ethyl alcohol with concentrated Sulphuric acid in different conditions, give three different products, Which of these products respond to the polymerization by addition.

- a) Di ethyl ether
- b) Acetone
- c) Ethylene
- d) Ethyl hydrogen sulphate

42) Calculate the volume of water that should be added to 1L of 0.05 M Hcl acid in order for its pH value to become 2:

- a) 1 L
- b) 4 L
- c) 5 L
- d) 9 L

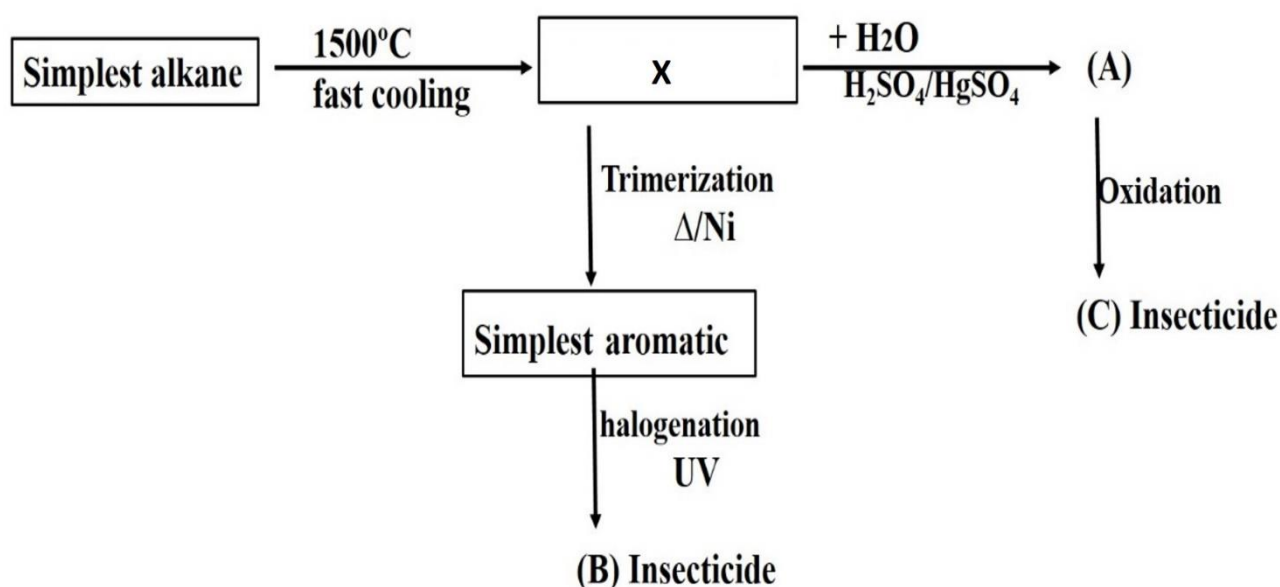
43) The compounds which can be similar in physical and chemical character

- a) $\text{C}_{20}\text{H}_{42}$ and $\text{C}_{18}\text{H}_{38}$
- b) C_8H_{18} and $\text{C}_{18}\text{H}_{38}$
- c) C_3H_6 and $\text{C}_{15}\text{H}_{32}$
- d) C_6H_{12} and C_6H_6

44) (A) and (B) are two Aliphatic compounds, compound (A) produced from acidic hydrolysis of Aspirin while compound (B) used in condensation reaction to prepare Dacron fibers

- Acetic acid, Ter Phthalic acid
- Salicylic acid, Ter Phthalic acid
- Acetic acid, Ethylene glycol
- Salicylic acid, Ethylene glycol

45) *Essay: Study the following figure:*



-What are the names of compounds (B) and (C)

-What is the name of compound produced from reduction of (A)

-Write the polymer obtained from adding 1 mole of HCl to Compound X.

46) What is the similarity and difference between copper and zinc ions in CuCl and ZnSO₄ respectively.