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1) The electronic configuration of the cations of the two elements (X) and (Y) are



One of the properties of the alloy formed from element (X) and one of the alloys of element (Y) with carbon is

- a) Light in weight and very hard
- b) Resists corrosion and has high hardness
- c) Resists corrosion at high temperature
- d) Maintains its durability at high temperature

2) All the following reactions produce water except

- a) Burning of ethane
- b) Reaction of Propanoic acid with methanol
- c) Adding acidified KMnO_4 to 1- propanol
- d) Polymerization of propylene

3) In the following equilibrium reaction



If you know that partial pressure of ammonia 1.5 atm and oxygen 1.16 atm and water vapour 2.4 atm , So the partial pressure of nitrogen gas equal

- a) 2.4 atm
- b) 1.6 atm
- c) 0.8 atm
- d) 0.64 atm



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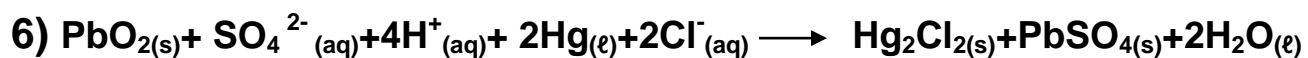
4) You have two solutions, one of them has litmus and the other has methyl orang and both of them have red colour in each medium.

Which one of the following salt solutions distinguishes between them....

- a) Na_2CO_3
- b) CaCO_3
- c) KNO_3
- d) $(\text{NH}_4)_2\text{SO}_4$

5) Which one of the following reactions results does not remove the color of alkaline potassium permanganate solution ?

- a) Adding one mole of H_2 to one mole of propyne.
- b) Adding one mole H Br to one mole of 2- methyl -2- butene.
- c) Removing water from 1-butanol.
- d) Removing water from 2-methyl -2- propanol.

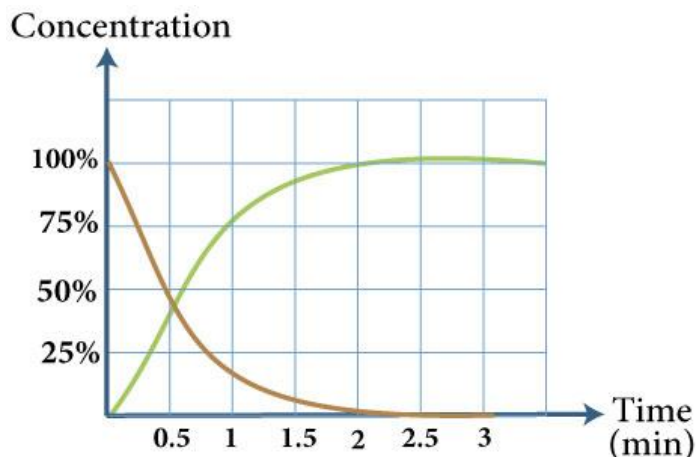


If you know $\text{Pb}^{2+}/\text{Pb}^{4+} = -1.69 \text{ v}$ $\text{Hg} / \text{Hg}^+ = -0.59 \text{ v}$

So this reaction is considered

- a) Non Spontaneous and emf = - 1.1 v
- b) Spontaneous and emf = 1.1 v
- c) Non Spontaneous and emf = - 2.28 v
- d) Spontaneous and emf = 2.28 v

7)



Which of the following reactions expresses the previous graph

- Sodium chloride solution + silver nitrate solution
- Iron nail covered by oil
- Iron nail in water
- Pieces from magnesium + dil. hydrochloric acid

8) Which one of the following solutions is used to distinguish between the salt solutions of $(\text{NH}_4)_2\text{SO}_4$ and MgSO_4

- NaNO_3
- KCl
- Na_2CO_3
- $\text{Ca}(\text{HCO}_3)_2$

9) Two organic compounds $\text{C}_8\text{H}_6\text{O}_4$, $\text{C}_6\text{H}_6\text{O}_2$, both of them reacts with

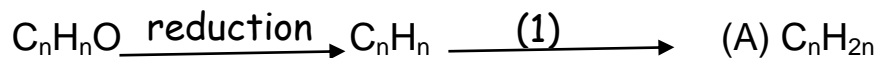
- NaOH
- Na_2CO_3
- $\text{C}_2\text{H}_5\text{OH}$
- HCl



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10) From the following diagram :-



The process (1) and the compound (A) are

- a) (1) polymerization, (A) cyclo hexane
- b) (1) hydrogenation, (A) cyclo hexane
- c) (1) hydrogenation, (A) hexene
- d) (1) polymerization, (A) hexene

11) When a piece of Zinc is added to diluted sulphuric acid then the evolved gas is passed in four solutions at the suitable conditions.

Which of one of the following processes occurs?

- a) $YSO_4 \longrightarrow Y_2(SO_4)_3$
- b) $WCl \longrightarrow WCl_2$
- c) $X_2(SO_4)_3 \longrightarrow XSO_4$
- d) $ZCl_2 \longrightarrow ZCl_3$

12) From the following table :

Element	Fe	X	Y	Z
Reduction potential	- 0.409 v	- 2.375v	- 1.67v	- 0.23v

You have four pieces from iron. Three of them partially plated first by X, second by Y, third by Z and the fourth one is not plated.

Which pieces will rust faster

- a) first
- b) third
- c) Fourth
- d) Second



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13) 0.125 mol from hot conc. Sulphuric acid reacts with excess sodium nitrate. The produced nitric acid is neutralized with 200 ml of sodium hydroxide , So the concentration of sodium hydroxide equals

If [Molar mass of $\text{HNO}_3 = 63 \text{ g/mol}$, $\text{H}_2\text{SO}_4 = 98 \text{ g/mol}$]

- a) 6.25 M
- b) 0.12 M
- c) 0.625 M
- d) 1.25 M

14) Which one of the following represents a complete reaction

- a) $\text{CH}_3\text{COOH}_{(aq)} + \text{NH}_4\text{OH}_{(aq)} = \text{CH}_3\text{COONH}_4_{(aq)} + \text{H}_2\text{O}_{(l)}$
- b) $\text{HCOOH}_{(aq)} + \text{H}_2\text{O}_{(l)} = \text{HCOO}^-_{(aq)} + \text{H}_3\text{O}^+_{(aq)}$
- c) $\text{Ag Br}_{(s)} = \text{Ag}^+_{(aq)} + \text{Br}^-_{(aq)}$
- d) $\text{N}_{2(g)} + \text{O}_{2(g)} = 2\text{NO}_{(g)}$

15) Three hydrocarbons A, B and C that are characterized by :

A: is an organic solvent

B: is used to prepare a gas used in Midrex furnace

C: is prepared by removing water from tertiary alcohol.

The compounds A, B and C are.....

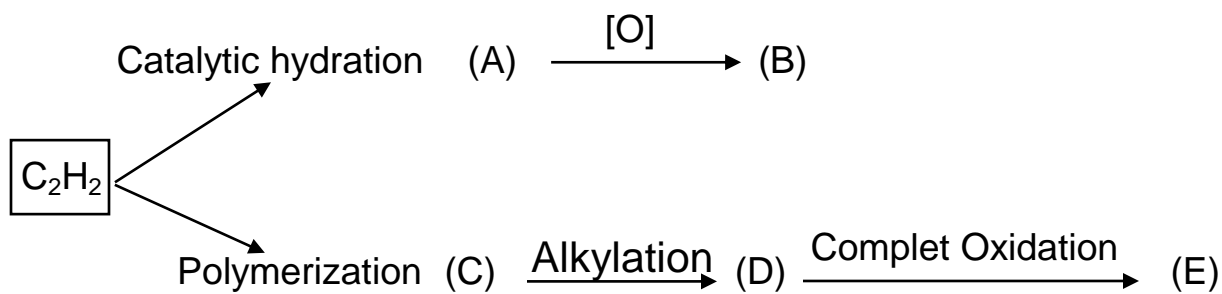
- a) A : Alcohol , B : Ethane , C : Diethyl ether
- b) A : Benzene , B : Methane , C : Branched alkene
- c) A : Branched alkene , B : Ethane , C : un- Branched Alkene
- d) A : Benzene , B : Methane , C : Branched alkane



16) The furnaces that change iron III oxide to an alloy of Iron and Carbon respectively are

- a) Open furnace then Medrix furnace
- b) Oxygen convertor then the blast furnace
- c) Blast furnace then Medrix furnace.
- d) Blast furnace then open furnace

17) From this diagram:-



Which of the following is correct ?

- a) (B) sparingly soluble in water, (E) used in industry of insecticide
- b) (B) used in silk industry, (E) its salt used in preservation of food
- c) (B) prevent growth of bacteria, (E) used in cosmetic industry
- d) (B) used in industry of insecticide, (E) prevent growth of fungi

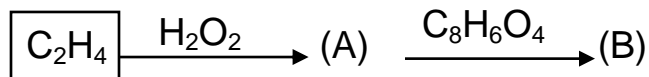
18) During operation of fuel cell.

Which one of the following choices is correct ?

- a) Concentration of electrolyte remains constant
- b) Decreasing the concentration of electrolyte
- c) Decreasing the value of pH of electrolyte
- d) Increasing the value of pH of electrolyte



19) From the following diagram



So uses of (A) and (B) are

- a) (A) Used as a fuel, (B) used as an electric insulator
- b) (A) Used in drugs industry , (B) used in cars radiator
- c) (A) Used in cars radiator, (B) used in industry of heart valve
- d) (A) Used in industry of heart valve, (B) used to substitute the spoiled arteries

20) On adding diluted hydrochloric acid to two different salts individually, two gases evolve that can be oxidized, So the salts are

- a) $\text{K}_2\text{S}_2\text{O}_3 - \text{KHCO}_3$
- b) $\text{K}_2\text{S} - \text{KNO}_2$
- c) $\text{K}_2\text{CO}_3 - \text{KNO}_2$
- d) $\text{K}_2\text{SO}_3 - \text{KNO}_2$

21) The processes which are used to convert alkane consists of 5 atoms to insecticide consists of (18)z atoms are.....

- a) Strong heating then rapid quenching then halogenation then polymerization
- b) Polymerization then halogenation then strong heating then rapid quenching
- c) Strong heating then rapid quenching then polymerization then halogenation
- d) Halogenation then rapid quenching then strong heating then polymerization



22) Galvanic cell which represented by the following cell diagram



Choose the correct answer to increase time of working this cell

- a) Increasing the concentration of silver ions in half cell of cathode
- b) Decreasing the concentration of Nickel ions in half cell of anode
- c) Decreasing the mass of anode
- d) Increasing the mass of cathode

23) The molecular formula $\text{C}_5\text{H}_{10}\text{O}$ expresses.....

- a) Ethyl propyl ether and pentanal
- b) Butanoic acid and 3- Pentanol
- c) Pentanoic acid and 3- methyl butanone
- d) 2- methyl butanal and pentanone

24) Which of the following steps are suitable to obtain red iron oxide

- a) Heating iron in air to redness for short time
- b) Adding dil. Sulphuric acid to iron II oxide then heat the product
- c) Heating iron II carbonate in absence of air
- d) Passing stream of hot water vapour over hot iron at $500\text{ }^{\circ}\text{C}$



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25) (X, Y and Z) are three hydrocarbon derivatives

X: can be oxidized and reduced

Y: is isomer for alcohol

Z: is produced from reaction of acid and alcohol

Which of the following is correct?

- a) (X) is aldehyde, (Y) is ether
- b) (X) is ketone, (Z) is ester
- c) (X) is aldehyde, (Z) is ether
- d) (X) is alcohol, (Y) is ester

26) Adding dopes of dil. hydrochloric acid to equilibrium system for sodium acetate solution causes

- a) Decreasing the concentration of sodium cations
- b) Decreasing the concentration of acetic acid
- c) Increasing the concentration of sodium cations
- d) Increasing the concentration of sodium acetate

27) The following sentences express properties of some elements in the first transition series. Which one represents the element of the highest density?

- a) Has lower atomic mass than its proceeding element
- b) Has greatest magnetic moment in its atomic state
- c) Its ion is hardly reduced from (+3) to (+2)
- d) The biggest atomic size in the first transition series.



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28) Adding dil Sulphuric acid to substance (x), a salt solution (Y) is formed and after a period of time ammonia solution is added to the products forming a precipitate. Which of the following is correct for the substance (X), the salt solution and the precipitate respectively?

Choice	Substance (X)	The salt	The precipitate
a	FeO	FeSO ₄	Fe(OH) ₂
b	Fe ₂ O ₃	Fe ₂ (SO ₄) ₃	Fe(OH) ₃
c	Fe ₃ O ₄	Fe ₂ (SO ₄) ₃	Fe(OH) ₂
d	FeO	FeSO ₄	Fe(OH) ₃

29) On connecting lead accumulator to an external source of electricity its emf =14 V. Which one of the following choices is correct

- a) decreasing the pOH value of electrolyte
- b) decreasing the pH value of electrolyte
- c) increasing oxidation number of lead at anode
- d) increasing the quantity of water in battery

30) The general formula of two organic acids are:



Which one of the following choices is correct

- a) Boiling point of (B) more than boiling point of (A)
- b) Reduction of compound (A) produces simplest alcohol
- c) Reduction of compound (B) produces compound used in thermometer
- d) Solubility of compound (A) in water more than solubility of (B)



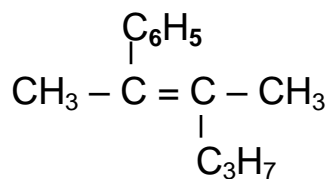
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31) Which one of the following salts gives a gas and a precipitate on adding Hydrochloric acid at suitable conditions?

- a) NaNO_2
- b) AgNO_3
- c) HgNO_3
- d) $\text{Pb}(\text{NO}_2)_2$

32) The correct name of the following compound according to IUPAC system is



- a) 4,5-dimethyle decane
- b) 2-phenyl-3- methyle-2-hexene
- c) 3-methyle-2-phenyl-2-hexene
- d) 2-propyl-3-phenyl butane

33) The process that increases the iron percentage in the ore by changing some of impurities in form of gases is called.....

- a) Sintering
- b) Cracking
- c) Concentration
- d) Roasting

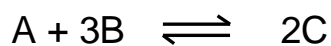
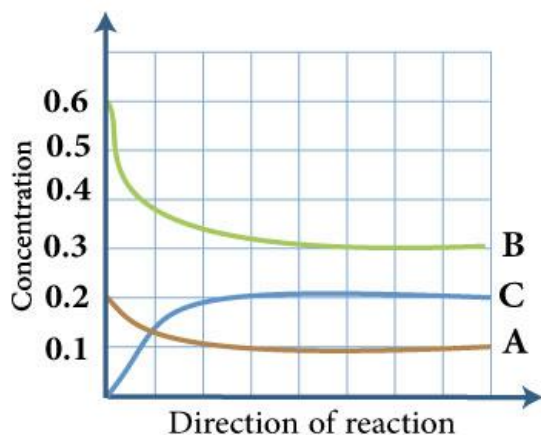
34) By using electrode potential from the following table.

Element	A	B	C
Oxidation potential	+ 0.52v	+ 0.12v	- 0.34v

To purify metal its reduction potential 0.8V, the electrolytic cell is connected to galvanic cell consists of

- A and C and impure metal connected by A
- B and C and pure metal connected by C
- B and A and pure metal connected by B
- A and C and impure metal connected by C

35) The following graph represents equilibrium system



So the value of K_c equals

- 6.66
- 14.81
- 0.9
- 15.49



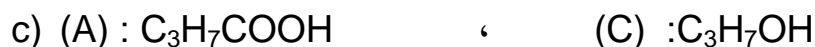
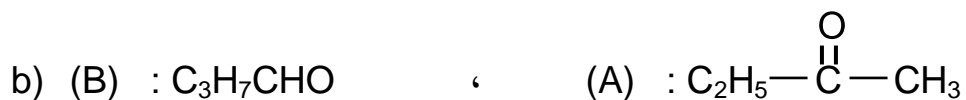
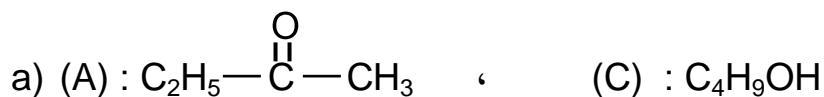
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36) Three organic compounds A, B and C:

Compounds (A and C) change the colour of acidified potassium dichromate, while Compound B does not change the colour of acidified potassium dichromate.

Which one of the following choices is correct?



37) If the value of POH for weak acid equal 10 and its equilibrium constant $K_a = 5.1 \times 10^{-4}$, So the degree of ionization of the acid equals

- a) 6.3
- b) 4.8
- c) 7.2
- d) 5.1



38) Which of the following standard solutions is used to determine the concentration of silver nitrate.....

- a) Na_3PO_4
- b) NaHCO_3
- c) HNO_3
- d) CH_3COOK

39) The number of isomerism of alkyne has three carbon atoms, bromine atom and chlorine atom equals.....

- a) 5
- b) 2
- c) 4
- d) 3

40) An alloy consists of two elements (X) and (Y), Both are in the same period. The element (X) is from coinage elements.

The element (Y) is a representative element exists in group (4A).

The kind of alloy is....

- a) Substitution
- b) Interstitial- substitution
- c) Intermetallic
- d) Interstitial- Intermetallic

41) The correct arrangement of the following solutions according to their pOH value is

- a) $\text{NaCl} > \text{CH}_3\text{COOK} > \text{NH}_4\text{NO}_3$
- b) $\text{NH}_4\text{NO}_3 > \text{NaCl} > \text{CH}_3\text{COOK}$
- c) $\text{CH}_3\text{COOK} > \text{NaCl} > \text{NH}_4\text{NO}_3$
- d) $\text{NH}_4\text{NO}_3 > \text{CH}_3\text{COOK} > \text{NaCl}$



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42) When 2-methyl propanoic reacts with sodium metal, then the product is heated with soda lime producing a compound of

- a) 2-methyl propane
- b) Butane
- c) 2-methyl butane
- d) Propane

43) The following reactions occur in galvanic cells at standard conditions:

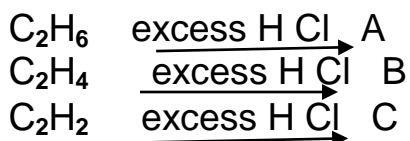


From the above reactions the value of emf of the following cell equals.....



- a) - 1.1 V
- b) 1.1 V
- c) 0.398 V
- d) - 0.398 V

44) From the following reactions that occur at suitable conditions



Then the molecular mass of compounds A,B, and C can be arranged as.....

- a) $C > B > A$
- b) $A > C > B$
- c) $A > B > C$
- d) $B > C > A$



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45) When adding sodium hydroxide solution to 10 mL from aluminum sulphate solution its concentration 0.1M to obtain clear solution ,
The mass of sodium hydroxide needed for this reaction is

If you Know m Mass NaOH =40 g/mole

- a) 2.40 g
- b) 320 g
- c) 0.320 g
- d) 0.24 g

46) The number of moles of hydrogen gas needed to saturate 2 moles from phenyl acetylene equals

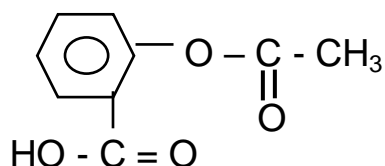
- a) 5 moles
- b) 10 moles
- c) 4 moles
- d) 6moles

47) Elements (X) and (Y) from first transition series.

- The oxide of element (X) is used as catalyst in preparation of oxygen
- Element(Y) forms an alloy with element (X)

Which of the following cations of these oxides (X_2O_3 & Y_2O_3) has the highest magnetic moment? explain why?

48)



Calculate:

- 1- The Number of sodium hydroxide moles required to react completely with one mole of Aspirin solution in presence of heat?
- 2- The Number of required hydrogen moles to convert the Aspirin compound to aliphatic compound neutral on litmus at suitable conditions?



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49) When amount of electricity passing through two cells connected in series. The first cell contains $Pb(NO_3)_2$. Then 8.28 g of lead precipitated, While in the second cell the reaction $X^{4+} + 3e^- \longrightarrow X^{+}$ takes place
Calculate the number moles formed from X^{+} ? [Pb=207]

50) Di hydroxide basic compound that is sparingly soluble in water.
If PH value equal 8
Calculate K_{sp} for this compound?