

SECOND TERMINAL EXAMINATION, 2017

CHEMISTRY

Time - 3:00 hrs.

Class XI

M.M. - 70

Date 23.02.2017 (Thursday)

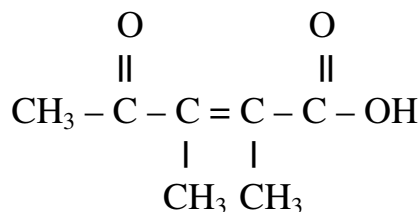
Name of the student _____ Section _____

General instructions :

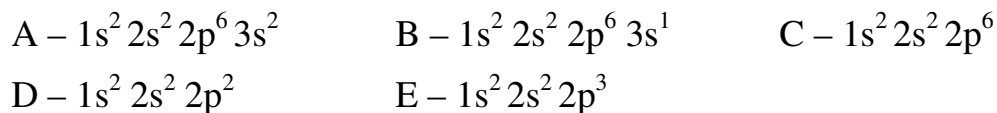
- All questions are compulsory.
- Q. Nos. 1 to 5 are very short answer questions carrying 1 mark each.
- Q. Nos. 6 to 10 are short answer questions carrying 2 marks each.
- Q. Nos. 11 to 22 are short answer questions carrying 3 marks each.
- Q. Nos. 23 is a value based question carrying 4 marks.
- Q. Nos. 24 to 26 are long answer questions carrying 5 marks.
- Use log tables, if necessary. Calculators are not permitted.
- Please check that this question paper contains 05 printed pages.

SECTION - A

- Q.1 Define molarity. Is it affected by temperature? (1)
- Q.2 Drops of liquids have spherical shape. Why? (1)
- Q.3 Write the IUPAC name of the following organic compound. (1)



- Q.4 How do you account for the formation of ethane during chlorination of methane? (1)
- Q.5 Arrange the following species in increasing order of their 1st ionization enthalpies. (1)



SECTION - B

- Q.6 Calculate the heat of combustion of glucose from the following data – (2)
- $$\text{C (graphite)} + \text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g}) \quad \Delta H = -395.0 \text{ KJ}$$
- $$\text{H}_2(\text{g}) + \frac{1}{2} \text{O}_2(\text{g}) \rightarrow \text{H}_2\text{O}(\text{l}) \quad \Delta H = -269.4 \text{ KJ}$$
- $$6 \text{ C(graphite)} + 6\text{H}_2(\text{g}) + 3\text{O}_2(\text{g}) \rightarrow \text{C}_6\text{H}_{12}\text{O}_6(\text{s}) \quad \Delta H = -1169.8 \text{ KJ}$$
- Q.7 a) What is the hybridized state of the central atom in the following - (2)
- NO_3^- , IF_5

b) What is the effect on the bond order of N_2 in the following process ?



Q.8 The sodium flame test has a characteristic yellow colour due to emissions of wave length 589 nm. What is the mass equivalence of one photon of this wave length? ($h = 6.626 \times 10^{-34}$ Js) (2)

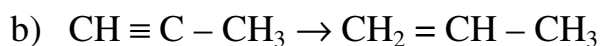
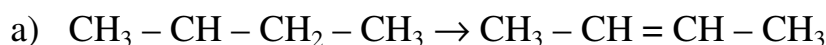
OR

Calculate the wave length of a moving electron having mass 9.1×10^{-31} kg and kinetic energy is 4.55×10^{-25} J.

Q.9 Write the reagent used in the following reaction – (2)

Cl

I



Q.10 A compound (A) of boron reacts with NMe_3 to give an adduct (B) which on hydrolysis gives a compound (C) and hydrogen gas. Compound C is an acid. Identify A, B and C and write the reaction involved. (Me = methyl) (2)

SECTION - C

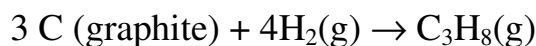
Q.11 What will be the pressure exerted by a mixture of 3.2 g of methane and 4.4 g of carbon dioxide contained in a 9 litre flask at $27^\circ C$? (3)

Q.12 a) A group 2 element forms an amphoteric oxide and a water soluble sulphate. Name the element. (3)

b) The second ionization enthalpy of Ca is higher than first and yet Ca forms $CaCl_2$ and not $CaCl$. Why ?

c) Name the alkali metals which form superoxides when heated in air.

Q.13 Calculate the standard Gibb's energy change for the formation of propane at 298 K. (3)



$$\Delta_f H^0 \text{ for propane } C_3H_8(g) = - 103.0 \text{ KJ mol}^{-1}$$

$$\text{Given } S_M^0 C_3H_8(g) = 270.0 \text{ JK}^{-1} \text{ mol}^{-1}$$

$$S_M^0 C \text{ graphite} = 5.70 \text{ JK}^{-1} \text{ mol}^{-1}$$

$$S_M^0 H_2(g) = 130.7 \text{ JK}^{-1} \text{ mol}^{-1}$$

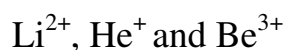
S_M^0 = standard molar entropy

Q.14 a) Why is H_2O_2 stored in wax lined bottles. (3)

b) Write a balanced equation to illustrate the oxidizing property of H_2O_2 .

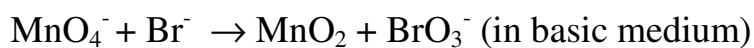
c) Why hydrogen generally forms covalent compounds.

Q.15 a) Arrange the following ions in increasing order of their ionic radii. (3)



b) The element with $Z=117$ has been discovered recently. In which group has it been placed in the periodic table? Write its electronic configuration and give its IUPAC name.

Q.16 Balance the following equation by the ion electron method (3)



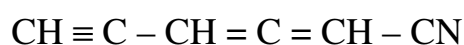
Q.17 A photon of wavelength 4×10^{-7} m strikes on a metal surface, the work function of metal being 2.13 eV. Calculate – (3)

- Energy of photon in eV
- Kinetic energy of the emission
- Velocity of the photoelectron

Q.18 a) What is 'Photo chemical Smog'? How is it formed in the atmosphere? (3)

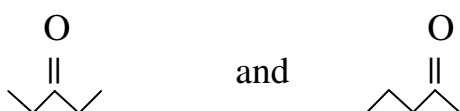
- How ozone layer is formed and how it is acting as a protecting umbrella?
- Define B.O.D.

Q.19 a) Indicate the number of sigma and pi bonds in the following molecule (2+1)



b) What are electrophiles and nucleophiles? Give one example of each.

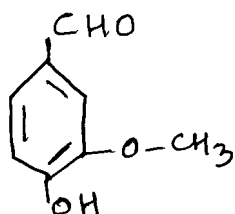
Q.20 a) What is the relation between the following pairs of structures? (3)



b) Which electron displacement effect explains the following order of acidity of the carboxylic acids?



c) Identify the principal functional group in the following compound and write IUPAC name of the compound.



OR

- What is metamerism? Explain with an example.
- In Carius method of estimation of halogen 0.75g of an organic compound

gives 0.60 g of AgBr. Find out the percentage of bromine in the compound. (Atomic mass of Ag = 108u, Br = 80u)

Q.21 a) An ion with mass number 56 contains three units of positive charge ($1\frac{1}{2}+1\frac{1}{2}$) and 30.4% more neutrons than electrons. Assign the symbol to this ion.

b) What is the number of photons of light with a wave length of 4000 pm that provides 1 joule of energy?

Q.22 a) Calculate the mass percentage of carbon in carbon dioxide. (1+1+1)

b) Calculate the mass of sodium acetate (CH_3COONa) required to make 500 ml of 0.375 molar aqueous solution. (Molar mass of sodium acetate is 82 g mol^{-1})

c) How is molecular orbital different from atomic orbital?

SECTION - D

Q.23 Tanu loved to learn from experiments. When she read about the solubility of different compounds in water, she decided to prove it. She took some chemical compounds from her teacher in the laboratory and tried to dissolve them in water. These compounds were magnesium chloride, lime, ethanol and ethyl amine. But she got confused because she found all of these are soluble in water. She discussed these results with her teacher who clarified the reason for this. (4)

a) Why did Tanu think that only certain compounds are soluble in water while others are not?

b) What explanation was given by the teacher? Explain.

c) Draw the Lewis electron dot structure of ethanol and ethyl amine.

d) What values are associated with Tanu and her teacher?

SECTION - E

Q.24 a) How would you account for the following – (3+2)

i) C and Si are tetra valent but Ge, Sn and lead show divalency.

ii) CO_2 is a gas but SiO_2 is a solid.

iii) Lithium carbonate is not so stable to heat.

b) Complete the following equations –

i) $\text{CaCO}_3 + \text{H}_2\text{SO}_4 \rightarrow$

ii) $\text{BF}_3 + \text{NaH} \xrightarrow{450\text{K}}$

OR

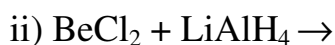
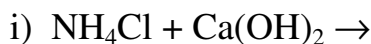
a) Answer the following questions -

i) Why lithium shows anomalous behaviour in the group?

ii) What happens when sodium metal is dropped in water? Give equation.

iii) Why alkaline earth metals are denser than alkali metals?

b) Complete the following equations -



Q.25 a) How will you convert the following – **(3+2)**

i) Ethanoic acid to methane

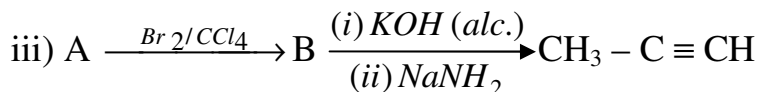
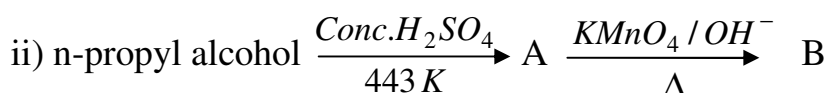
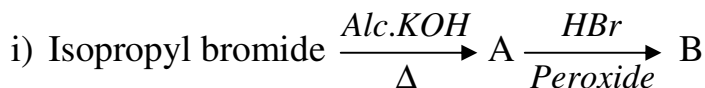
ii) Benzene to m-nitrobromobenzene

iii) Benzene to p-nitro toluene

b) Propanal and pentan-3-one are the ozonolysis products of an alkene. Write the structural formula of the alkene and give its IUPAC name.

OR

a) Find out the products A and B in the following reaction –



b) Why is Wurtz reaction not preferred for preparing alkanes with odd number of carbon atoms. Illustrate with example.

Q.26 a) The solubility of $\text{Mg}(\text{OH})_2$ is $3.352 \times 10^{-3} \text{ gL}^{-1}$ at 290°C . Find out its solubility product at this temperature. (Mg = 24 u) **(3+2)**

b) On the basis of Le-Chatelier's principle explain how temperature and pressure on the following equilibrium can be adjusted to increase the yield of ammonia in the following reaction.



(g) (g) (g)

OR

a) The equilibrium constant K_p for the thermal dissociation of PCl_5 at 200°C is 1.6 atm. What is the pressure (in atm) at which it is 50% dissociated?

b) Calculate the pH of a solution prepared by dissolving 0.3g of $\text{Ca}(\text{OH})_2$ in 500 ml of H_2O . (Ca = 40 u)

