



# KENDRIYA VIDYALAYA SANGATHAN

## RANCHI REGION

SESSION ENDING EXAMINATION 2018 - 19

CLASS - XI

MARKS : 70

SUBJECT : CHEMISTRY

TIME : 3 HOURS

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**General Instruction:-**

- (a) All questions are compulsory.
- (b) Section A: Q.no. 1 to 5 are very short answer questions and carry 1 mark each.
- (c) Section B: Q.no. 6 to 12 are short answer questions and carry 2 marks each.
- (d) Section C: Q.no. 13 to 24 are also short answer questions and carry 3 marks each.
- (e) Section D: Q.no. 25 to 27 are long answer questions and carry 5 marks each.
- (f) There is no overall choice. However an internal choice has been provided in two questions of one mark, two questions of two marks, four questions of three marks and all the three questions of five marks weightage. You have to attempt only one of the choices in such questions.
- (g) Use of log tables if necessary, use of calculators is not allowed.

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**SECTION A**

1. How many significant figures are present in the following-
  - (a) 0.00520
  - (b) 4006.30

**OR**

Calculate the mass percentage of Na in  $\text{Na}_2\text{CO}_3$ .

2. Which type of H-Bond is stronger & why?
3. Why does Be show anomalous behaviour?

**OR**

Which is thermally most stable alkaline earth metal carbonate & why?

4. What is hyperconjugation?
5. Draw cis and trans structures of Pent-2-ene.

**SECTION B**

6. What are frequency of a photon emitted during a transition from  $n = 6$  to  $n = 1$  state in the hydrogen atom.

**OR**

- (i) Explain why the following electronic configuration is not possible  
 $n=1, l=0, m_l=+1, m_s=+\frac{1}{2}$
  - (ii) Write electronic configurations of Cu &  $\text{Cu}^{2+}$ .
7. Account for the following
    - (a) Second ionization enthalpy of Na is higher than Mg.
    - (b) Cs is used extensively in photoelectric cells.

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- a) Write the IUPAC name & symbol of element having atomic no. 117.
- b) Out of F & Cl which have high value electron gain enthalpy & why?
8. A balloon is filled with hydrogen at room temperature. It will burst if pressure exceeds 0.2 bar. If at 1 bar pressure the gas occupies 2.27 L volume, up to what volume can the volume be expanded?
9. What do you understand by electron deficient & electron precise hydride? Give one example of each.
10. An alkene 'A' on ozonolysis gives the mixture of Ethanal & Pentan-3-one. Write structure & IUPAC name of 'A'.
11. The wavelength of blue light is 480nm. Calculate the frequency & wave number of this light.
12. a) Write General electronic configuration of valence shell of d – block elements?
- b) Define electronegativity.

SECTION C

13. a) State law of multiple proportions.
- b) A compound contains C = 24.27%, H = 4.07% & Cl = 71.65%. Calculate the empirical formula.
14. Among the following molecules, select polar molecules, give suitable reason for your answer  $\text{CO}_2$ ,  $\text{H}_2\text{O}$ ,  $\text{BF}_3$ ,  $\text{NH}_3$ ,  $\text{CHCl}_3$  &  $\text{CCl}_4$

OR

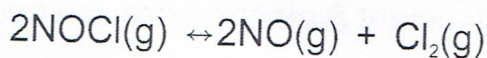
What is hybridisation? Give two examples of each  $sp^2$  &  $sp^3$  hybridisation.

15. a) Write any four postulates of Kinetic Theory of gases.  
b) What is anisotropy?

OR

Niobium crystallises in body-centred cubic structure. If the atomic radius is 143.1 pm, calculate the density of Niobium. (Atomic mass = 93u).

16. What is the value of equilibrium constant for the following at 400K?



$$\Delta H^\circ = 77.5 \text{KJ mol}^{-1}, \Delta S^\circ = 135 \text{JK}^{-1} \& R = 8.314 \text{JK}^{-1} \text{mol}^{-1}.$$

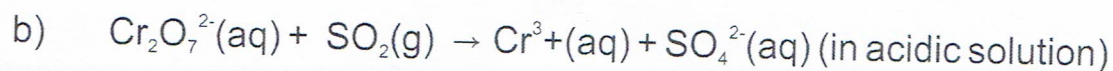
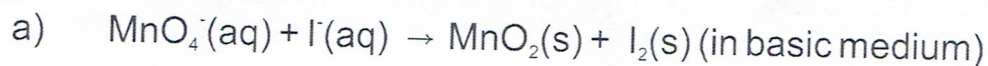
OR

Enthalpies of formation of  $\text{CO}(\text{g})$ ,  $\text{CO}_2(\text{g})$ ,  $\text{N}_2\text{O}(\text{g})$  and  $\text{N}_2\text{O}_4(\text{g})$  are  $-110$ ,  $-393$ ,  $81$  and  $9.7 \text{KJ mol}^{-1}$  respectively. Find value of  $\Delta_r H$  for the reaction



17. (a) Define:-  
(i) Intensive properties  
(ii) Adiabatic process  
(b) Starting with thermodynamic relationship  $G = H - TS$  derive the following relationship  $\Delta G = -T\Delta S_{\text{total}}$

18. Balance the following equations by ion electron method & identify the oxidizing and reducing agent:-



19. Which type of salt makes water permanent hard. Discuss the principle & method of softening of hard water by synthetic ion exchange method.
20. Explain:
- (i) Alkali metals are soft and can be cut with help of a knife.
  - (ii) Potassium is more reactive than sodium.
  - (iii) Be & Mg do not impart colour to the flame.

OR

- a) Draw the structure of  $\text{BeCl}_2$  in vapour phase
  - b) Lithium carbonate decomposed at a lower temperature.
  - c) Sodium is found more useful than potassium.
21. Explain the structure of Diborane.
22. Write a short note on the following with example:-
- (i) Wurtz Reaction
  - (ii) Friedel-crafts alkylation
  - (iii) Ozonolysis of alkene
23. Convert:-
- a) Ethane to Butane
  - b) Ethane to Formaldehyde
  - c) Propane to Benzene
24. a) What are CFC?
- b) What is the harmful effect of CFC?

- c) Give chemical reaction involving harmful effect of CFC.
25. a) Write the IUPAC name of the following:-
- $\text{CH}_3\text{COCH}_2\text{CH}_2\text{CH}_2\text{COOH}$
  - $(\text{CH}_3)_2\text{CHCH}(\text{OH})\text{CH}(\text{Br})\text{COCl}$
  - $(\text{CCl}_3)_3\text{C}-\text{Cl}$
- b) Explain Positive Resonance Effect & Negative Resonance Effect with example.

OR

- a) Write the structural formula of the following:-
- 2,4,6 – Trinitrophenol
  - Ethylpentanoate
  - 3-Cyclopentyl-1-butene
- b) Explain stability of carbocation.
- c) Which type of organic compound can be purified by distillation under reduced pressure ?
26. a) State Law of chemical equilibrium.
- b) Derive the relationship between  $K_c$  &  $K_p$  for any reversible reaction.
- c) 2 moles of  $\text{PCl}_5$  were introduced in a 2 L flask and heated to 625 K to establish equilibrium when 60% of  $\text{PCl}_5$  was dissociated into  $\text{PCl}_3$  &  $\text{Cl}_2$ . Find the value of equilibrium constant.

OR

- a) State Le Chatelier's Principle.
- b) From the value of concentration quotient  $Q_c$  & equilibrium constant  $K_c$  how we can predict the direction of reversible reaction.
- c) At 700 K, the equilibrium constant  $K_p$  for the reaction



Is  $1.8 \times 10^{-3} \text{ k Pa}$ . What is the numerical value in moles per litre of  $K_c$  for this reaction at same temperature?

27. a) Give reason for the following:-
- i) Boric acid is not a protic acid.
  - ii) Gallium have high value of ionisation than Aluminium.
- b) What happens when:-
- i) Borax is heated strongly.
  - ii) Boric acid is added to water.
  - iii) Aluminium is treated with HCl.

**OR**

- a) Give reason for the following:-
- i) Graphite is used as a lubricant in machine working at high temperature.
  - ii)  $\text{PbX}_2$  is more stable than  $\text{PbX}_4$ .
  - iii)  $\text{CCl}_4$  is not able to hydrolyse.
- b) Write equation for the preparation of silicones.



