COMMON QUARTERLY EXAMINATION - SEPTEMBER 2019

Standard - 12   Reg No. M K S ☐ ☐ ☐
PART - III - CHEMISTRY

Time Allowed: 2.30 Hours   Maximum Marks: 70

Instructions:
1. Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.

Note:
2. Use Blue or Black ink to write and underline and pencil to draw diagrams.

Draw diagrams and write equations wherever necessary.

PART - I

Note:
i) Answer all the questions.   15×1=15
ii) Choose the most appropriate answer from the given four alternatives and write the option code and the corresponding answer.

1) The magnetic moment of Cr^{3+} is
   a) 1.73 BM   b) 2.73 BM   c) 3.87 BM   d) 4.90 BM

2) The structure of diborane contains
   a) four (2C–2e) and two (3C–2e) bonds b) two (2C–2e) and four (3C–2e) bonds
   c) two (2C–2e) and two (3C–2e) bonds   d) four (2C–2e) and four (3C–2e) bonds

3) The stability of +1 oxidation state increases in the sequence is
   a) Ga < In < Al < Tl   b) Al < Ga < In < Tl
   c) Tl < In < Ga < Al   d) In < Tl < Ga < Al

4) Which of the following is the strongest oxidizing agent?
   a) Cl_2 b) F_2 c) Br_2 d) I_2

5) The compound used in smoke screen is
   a) PH_3 b) NH_3 c) AsH_3 d) BiH_3

6) The metal used to prevent rusting of Iron and Steel is
   a) Au   b) Zn   c) Ag   d) All of these

7) Which of the following statement is incorrect?
   a) Nickel is refined by Mond's process b) Titanium is refined Van-Arkel's process
   c) Zinc blende (ZnS) is concentrated by froth flotation method
   d) In the metallurgy of gold, the metal is leached with dilute NaCl solution

8) **Assertion :** Ce^{4+} is used as an oxidizing agent in volumetric analysis.
   Reason : Ce^{4-} has the tendency of attaining +3 oxidation state.
   a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
   b) Both Assertion and Reason are true and Reason is not the correct explanation of Assertion.
   c) Assertion is true but Reason is false.   d) Both Assertion and Reason are false.

9) Crystal field stabilization energy for high spin d^5 Octahedral Complex is
   a) $-0.6 \Delta_0$ b) 0   c) $2(P-\Delta_0)$ d) $2(P+\Delta_0)$

10) Zeise's Salt is
    a) $[Pt(NH_3)_2]Cl_2$ b) $K[Pt\ Cl_3(C_2H_4)]$ c) $[Pt(NH_3)_4]\ [PtCl_4]$ d) $K_4[Fe(CN)_6]$

11) The radius of an atom is 300pm. If it crystallizes in a Face Centered Cubic lattice then its edge length is
    a) 488.5pm   b) 848.5pm   c) 884.5pm   d) 484.5pm

12) Solid CO_2 is an example of
    a) Covalent solid   b) Metallic solid   c) Molecular solid   d) Ionic solid

13) If 50% of a first order reaction is completed in 60 minutes, 75% of the same reaction would complete in
    a) 90 min   b) 30 min   c) 120 min   d) 180 min

14) If the rate constant of a reaction is $5.8×10^{-2}$ mol.$L^{-1}s^{-1}$ then the reaction follows
    a) First order   b) Zero order   c) Second order   d) Third order

15) The addition of a catalyst in a chemical reaction alters
    a) Enthalpy   b) Activation energy   c) Entropy   d) Internal energy

PART - II

Answer any six questions and Question No. 24 is compulsory: **6×2=12**

16) Why is Fluorine more reactive than other halogens?

17) Why is Gd^{3+} ion colourless?

18) Give one test to differentiate the coordination compounds.
$[Co(NH_3)_5Cl]SO_4$ and $[Co(NH_3)_5SO_4]Cl$

19) Oxides like Ag_2O and HgO undergo self reduction. Why?

20) Although Graphite and Diamond are allotropes of carbon, graphite is soft whereas diamond is hard. Why?

21) Mention the uses of Potash alum.

22) Sodium metals crystallizes in BCC structure with edge length of the unit cell $4.3×10^{-8}$ cm. Calculate the radius of sodium atom.

23) What are the limitations of VB theory?

24) Give the schematic representation of proper and improper alignment of reactant for a general reaction $A_2 + B_2 \rightarrow 2AB$.

PART - III

Answer any six questions and Question No. 33 is compulsory: **6×3=18**

25) Classify molecular crystals with an example for each type.

26) Describe the role of the following in the process mentioned.
i) Cryolite in the extraction of Aluminium   ii) Iodine in the refining of Zirconium

27) Complete the following reactions: (i) $B + NaOH \rightarrow$ (ii) $SiCl_6 + NH_3 \rightarrow$

28) Show that for a first order reaction, the time required for 99.9% completion of the reaction is nearly 10 times that required for half completion of the reaction.

29) Compare Lanthanides with Actinides.

30) Explain the dehydrating property of sulphuric acid with suitable example.

31) Which is more stable among Fe^{3+} and Fe^{2+}? Why?

32) Differentiate molecularity from order.

33) Write the IUPAC names of the following coordination compounds.
(i) $Na_2[Ni(EDTA)]$ (ii) $[Co(en)_3]_2(SO_4)_3$ (iii) $[Pt(NH_3)_2Cl.NO_2]$

PART - IV

Answer all the questions.   **5×5=25**

34) a) i) What are the main observations of Ellingham diagram?
   ii) How will you identify borate radical?   **(OR)**
b) i) Drive the integrated equation for a zero order reaction A → Products.
   ii) What is inert pair effect?

35) a) i) The composition of a sample of Wurtzite is $Fe_{0.93}O_{1.00}$.
Calculate the percentage of ions present in the form of Fe^{3+}.
   ii) What is pseudo first order reaction? Give an example.   **(OR)**
b) i) Explain Schottky defect.
   ii) Write the differences between mineral and ore.

36) a) Write note on Zeolites.   **(OR)**
b) i) What are inter halogen compounds? Mention their properties.
   ii) Give two uses of Helium.

37) a) What is packing efficiency? Calculate the packing efficiency in BCC arrangement.   **(OR)**
b) i) Explain the bleaching action and oxidizing nature of chlorine with suitable example.
   ii) Why do d-block elements readily form coordination compounds?

38) a) Write the postulates of Crystal field theory.   **(OR)**
b) i) Calculate the equivalent weight of $KMnO_4$ in the following reactions.
a) $MnO_4^- + 2H_2O + 3e^- \rightarrow MnO_2 + 4OH^-$
b) $2MnO_4^- + 10Fe^{2+} + 16H^+ \rightarrow 2Mn^{2+} + 10Fe^{3+} + 8H_2O$
   ii) In metallurgy roasting of ore is done below its melting points whereas smelting is done above its melting point. Why?