Roll Number		

SET A

INDIAN SCHOOL MUSCAT
FINAL TERM EXAMINATION
CHEMISTRY

CLASS: XI | Sub. Code: 043 | Time Allotted: 3 Hrs

10.02.2019 | Max. Marks: 70

General Instructions:

(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.
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(g) Use of log tables if necessary, use of calculators is not allowed.

SECTION A

1. Write the IUPAC name and symbol of element with atomic number 112.

   OR

   Write the general outer electronic configuration of transition metals.
2. Arrange the following in the increasing order of basic character:
   AsH_3, NH_3, SbH_3, BiH_3, PH_3
3. Why is 3d orbital filled before 4s?
4. Describe the orbital with quantum numbers n= 4, l =3 and the maximum number of electrons that can be accommodated in this orbital.

   OR

   Draw the boundary surface of a) $2p_x$ b) $3d_{xy}$ orbitals.
5. State Gay Lussac's law of gaseous volumes.

SECTION B

6. Define 2
   a) Threshold energy b) node
7. Using the concept of hybridisation, explain the shape of ethene molecule. 2

   OR

   Explain the shapes of the following using VSEPR theory.
   (i) ClF_3 (ii) H_3O^+
8. Calculate the ΔH for the reaction $C_2H_4 + 3O_2 \rightarrow 2CO_2 + 2H_2O$,given C=C,C-H,C=O,O=O and O-H are 615,414,741,498 and 464 kJ/mol respectively. 2

OR

Calculate the ΔG at 400K for

$2NOCl \leftrightharpoons 2NO + Cl_2$

Given ΔH=77.2kJ/mol ,ΔS=122J/K

9. List any two diagonal relationship shown between lithium and magnesium. 2

10. Give the IUPAC names of the following: 2

    a) $CH_3CH(CH_3)CH_2CH{=}CCH_2CH_3$ (with CH_2CHO attached to the second C of the double bond: $CH_3CH(CH_3)CH_2CH{=}C(CH_2CHO)CH_2CH_3$)

    b) $CH_3CH(CH_3)CH_2COC_2H_5$

11. If the density of 3M solution of sodium chloride is 1.25g/ml, calculate the molality of solution. [Na=23, Cl=35.5] 2

12. a) Calculate the de Broglie wavelength of a bullet of mass 2.2×10^{-3} Kg fired with a velocity of 300 m/s.[h=6.6×10^{-34}Js] 2

    b) Calculate the energy of each of the photons which correspond to light of frequency 3×10^{15} Hz.

SECTION C

13. a) What are isoelectronic species? Name one cation that will be isoelectronic with F^- ion.

    b) Explain why cations are smaller than corresponding anions.

14. a) Explain expanded octet molecules and give two examples. 3

    b) Which is more polar and why: NH_3 or NF_3

OR

i) Differentiate between bonding and antibonding molecular orbital.

ii) Using molecular orbital theory, explain why Be_2 molecule does not exist.

15. a) Differentiate between ferromagnetism and ferrimagnetism. 3

    b) What are 12 – 16 compounds?

OR

i) Which two postulates of kinetic theory of gases are responsible for the deviation of gases from the ideal gas behaviour?

ii) The density of a gaseous oxide at 2 bar is the same as that of nitrogen gas measured at 5 bar at a given temperature. Find the molar mass of the oxide.

16. An element with density 6.22g/cm^3 forms an fcc lattice with edge length 4.077×10^{-8} cm. Calculate the molar mass and atomic radius of that element. [Given: Na=6.022×10^{23}] 3

17. a) State the third law of thermodynamics. 3

    b) Derive the relation $C_p - C_v = R$

18. Balance the following redox reaction using ion-electron method in basic medium: 3

    $Cr(OH)_3 + IO_3^- \rightarrow I^- + CrO_4^{2-}$

19. Give reason 3

    a) Lithium does not form peroxide

    b) Alkaline earth metals are harder than alkali metals

    c) Potassium carbonate cannot be prepared by Solvay's process

20. a) Name the repeating units in silicates. 3
    b) What are zeolites? Give an example.

21. Complete and balance the following reactions 3
    a) $P_4 + NaOH + H_2O \rightarrow$
    b) $BF_3 + NaH \rightarrow$
    c) $SiO_2 + HF \rightarrow$

OR

Draw the structure of
    i. H_3PO_3
    ii. $H_4P_2O_6$
    iii. $(HPO_3)_n$

22. a) What is the reason for i) permanent hardness and ii) temporary hardness of water? 3

    b) What are covalent hydrides? Give one example each of different types of covalent hydrides.

23. Ethyne when passed through red hot iron tube at 873K gives X as the product. X when treated with chloromethane in presence of anhydrous $AlCl_3$ gives Y. Identify X and Y and write the reactions involved. 3

OR

Explain with equations
    a) Wurtz reaction
    b) Friedel craft acylation
    c) Dehydrohalogenation

24. Define 3
    a) BOD
    b) Eutrophication
    c) Green Chemistry

SECTION D

25. a) State LeChatelier's principle. 5
    b) Describe the effect of
        i) increase in temperature and
        ii) increase in pressure

on the equilibrium of the following endothermic reaction

$CH_4(g) + H_2O(g) \leftrightharpoons CO(g) + 3H_2(g)$

c)At 450K, $K_p = 2.0 \times 10^{10}$/bar for the given reaction at equilibrium

$2SO_2(g) + O_2(g) \leftrightharpoons 2SO_3(g)$. What is K_c at this temperature? [R=0.083Lbar/K/mol]

OR

i) Define solubility product.
ii) Write the expression for solubility product of magnesium hydroxide.
iii)Calculate the pH of 0.1 M Sodium hydroxide solution.
iv)The ionisation constant of dimethylamine is 5.4×10^{-4}. Calculate its degree of ionisation in its 0.02M solution.

26. a) Explain the mechanism of Kolbe's electrolysis of sodium acetate. 5
    b) How will you distinguish between propene and propyne?
    c) Draw the geometrical isomers of but-2-ene.

OR

i) Predict the product of ozonolysis of 2-methyl but-2-ene.
ii) What happens when phenol is heated with zinc dust?
iii) Convert benzene to nitrobenzene.
iv) Explain aromaticity of benzene using Huckle's rule.

27. a) Explain the following 5
i. Sodium fusion extract is boiled with nitric acid before testing halogens
ii. Aniline is purified by steam distillation
iii. $NO_2CH_2O^-$ is more stable than $CH_3CH_2O^-$
b) Define hyperconjugation. Draw hyperconjugation resonances in but-1-ene.

OR

i) Draw the resonance structures of $C_6H_5NH_2$.
ii) Draw a pair of chain isomers and functional isomers of C_4H_9OH.
iii) Define electromeric effect.

End of the Question Paper

Roll Number		

SET B

INDIAN SCHOOL MUSCAT
FINAL TERM EXAMINATION
CHEMISTRY

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SECTION A

1 Why is 3d orbital filled before 4s? 1

2 Describe the orbital with quantum numbers n= 4, l =3 and the maximum number of electrons that can be accommodated in this orbital. 1

OR

Draw the boundary surface of a) $2p_x$ b) $3d_{xy}$ orbitals.

3 Arrange the following in the increasing order of basic character: 1
AsH_3, NH_3, SbH_3, BiH_3, PH_3

4 State Gay Lussac's law of gaseous volumes. 1

5 Write the IUPAC name and symbol of element with atomic number 112. 1

OR

Write the general outer electronic configuration of transition metals.

SECTION B

6 a) Calculate the de Broglie wavelength of a bullet of mass 2.2×10^{-3} Kg fired with a velocity of 300 m/s.[$h=6.6\times10^{-34}$Js] 2
b) Calculate the energy of each of the photons which correspond to light of frequency 3×10^{15} Hz.

7 If the density of 3M solution of sodium chloride is 1.25g/ml, calculate the molality of solution. 2
[Na=23, Cl=35.5]

8 Give the IUPAC names of the following: 2

a) $CH_3CH(CH_3)CH_2CH{=}CCH_2CH_3$
$$\begin{array}{r} | \\ CH_2CHO \end{array}$$

b) $CH_3CH(CH_3)CH_2COC_2H_5$

9 List any two diagonal relationship shown between lithium and magnesium. 2

10 Calculate the ΔH for the reaction $C_2H_4 + 3O_2 \rightarrow 2CO_2 + 2H_2O$, given C=C,C-H,C=O,O=O and O-H are 615,414,741,498 and 464 kJ/mol respectively. 2

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11 Using the concept of hybridisation, explain the shape of ethene molecule. 2

OR

Explain the shapes of the following using VSEPR theory.

(i) ClF_3 (ii) H_3O^+

12 Define 2

a) Threshold energy
b) node

SECTION C

13 Complete and balance the following reactions 3

a) $P_4 + NaOH + H_2O \rightarrow$
b) $BF_3 + NaH \rightarrow$
c) $SiO_2 + HF \rightarrow$

OR

Draw the structure of

i. H_3PO_3
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b) Which is more polar and why: NH_3 or NF_3

OR

i) Differentiate between bonding and antibonding molecular orbital.
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b) What are covalent hydrides? Give one example each of different types of covalent hydrides.

23 Define 3
a) BOD
b) Eutrophication
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24 Ethyne when passed through red hot iron tube at 873K gives X as the product. X when treated with chloromethane in presence of anhydrous $AlCl_3$ gives Y. Identify X and Y and write the reactions involved. 3

OR

Explain with equations
a) Wurtz reaction
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SECTION D

25 a) Explain the following 5
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c) At 450K, $K_p = 2.0 \times 10^{10}$/bar for the given reaction at equilibrium
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OR

i) Define solubility product.
ii) Write the expression for solubility product of magnesium hydroxide.
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iv) The ionisation constant of dimethylamine is 5.4×10^{-4}. Calculate its degree of ionisation in its 0.02M solution.

End of the Question Paper

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SET C

INDIAN SCHOOL MUSCAT
FINAL TERM EXAMINATION
CHEMISTRY

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