Roll Number		

Code Number 43

INDIAN SCHOOL MUSCAT
FIRST TERM EXAMINATION

CHEMISTRY

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

20.09.2017 | Max. Marks: 70

General instructions:

- All questions are compulsory
- Mark for each question is indicated against it.
- Question numbers 1 to 5 are very short answer questions and carry one mark each.
- Question numbers 6 to 10 are short answer questions and carry two marks each.
- Question numbers 11 to 22 are short answer questions and carry three marks each.
- Question number 23 is a value based question and carry four marks.
- Question numbers 24 to 26 are long answer questions and carry five marks each.

1 State Gay Lussac's law of combining volumes. 1

2 Why is energy of an electron negative? 1

3 Write the IUPAC name and symbol of the element with atomic no.114 . 1

4 What is Eutrophication? 1

5 Give two examples of compounds in which the central atom has incomplete octet. 1

6 Calculate 2

a. the percentage composition of carbon in ethanol.

b. the number of molecules in I L of Chlorine gas at STP.

7 Define 2

a. Photoelectric work function.

b. Wave number

OR

Write short note on Planck's quantum theory.

8 a. Write any two favorable condition for the formation of ionic compounds. 2

b. Draw the Lewis dot structure of SO_2.

9 Arrange the following in the increasing order of the property given in bracket: 2

a. C, N and O (Atomic size)

b. $_{25}Mn$, $_{21}Sc$ and $_{29}Cu$ (Number of electrons in their d-orbital)

10 Differentiate between electron gain enthalpy and electronegativity. (any two points) 2

11 a. Draw the resonance structures of NO_3^-. 3

b. Calculate the formal charges on all the atoms of CO_3^{2-}

12 Account for the following statements. 3

a. BF_3 is a non-polar molecule.

b. Bond angle in water is 104.5^0

c. PCl_5 is a reactive molecule.

13. Using VSEPR theory, predict the geometry and structure of 3

a. NH_3 b. SF_4 c . CH_4

14. Give reason 3

a. Nitrogen differs from rest of the elements in its group in many properties.

b. The IE_1 of O is lower than N.

c. Electron gain enthalpy of S is greater than oxygen.

15. List any 3 characteristics of d- block elements. 3

16. A compound contains 58.54% carbon, 7.32% hydrogen and 34.14% nitrogen. Its molar mass is 41g. Identify empirical and molecular formulae. (RAM of C = 12u, N= 14u, H=1u) 3

OR

112g of Calcium oxide was treated with 45.0 g of water to prepare calcium hydroxide.

a. Calculate the mass & number of moles of calcium hydroxide produced.

b. Which compound acts as the limiting reagent?

(RAM of Ca = 40u, O= 16u)

17. a. What are the harmful effects of photochemical smog? 3

b. How can they be controlled?

c. Differentiate classical and photochemical smog.(any one difference)

18 Define 3

a. Atomicity b. Mole fraction c. Empirical formula

19 a. Calculate the energy associated with the first orbit of He^+ (Z = 2) 3

b. The threshold frequency of a metal is 7×10^{14} s^{-1}.Calculate the kinetic energy of an electron emitted when radiation of frequency 1.0×10^{15} s^{-1} strikes the metal.

($h=6.63 \times 10^{-34}$Js)

20 a. State Pauli's exclusion principle 3

b. Calculate the uncertainty in the position of an object of mass 1.5 g moving at a speed of 1.4m/s, if the speed is measured to an accuracy of 10 %

21 a. Distinguish between orbit and orbital.(any two points of difference) 3

b. Calculate the total number of nodes in 6d orbital.

22 a. Write any two drawbacks of Bohr model of atom. 3

b. What is meant by Emission spectra? What is its significance?

23 The quality of water is of vital concern for mankind because it is directly linked with human welfare. The pollution of water has frequently caused many water borne diseases and epidemics such as cholera, typhoid etc. Learning about water pollution, Sachin's neighbour planned to use distilled water for drinking purpose. Sachin is a Science student and he asked his neighbour not to use distilled water for drinking. 4

a. What are the major causes of water pollution?

b. How water pollution can be checked?

c. What reasoning did Sachin give to his neighbour for not drinking distilled water?

d. What values do you associate with Sachin's advice?

24 a. State 5

(i) Heisenberg's Uncertainty principle.

(ii) Hund's rule

(iii)Aufbau principle

b. Give the significance of magnetic quantum number.

c. Identify the orbitals with the following quantum numbers

(i) n=4, l=1 (ii) n=3, l=2

OR

a. Draw the boundary surface diagram of dz^2 orbital.

b. Which out of 4p or 4f will experience greater effective nuclear charge and why?

c. Write any two similarities and differences between 1 s and 2 s orbital.

d. Fe^{3+} is more stable than Fe^{2+} .Account (Z=26)

25 a. State law of multiple proportion 5

b. Why atomic mass is an average value? Explain with an example.

c. Carbon and oxygen combine to give two compounds. The carbon content in one is 42.9% and in the other it is 27.3%. How does this illustrate the law of multiple proportion?

OR

a. State Avogadro hypothesis.

b. Why molality is preferred over molarity in expressing the concentration of a solution.

c. An aqueous solution of NaCl is marketed as 10% (w/w) on the bottle. The density of the solution is 1.071g/mL. What is its molarity and molality?

26 a. What do you mean by isoelectronic species? 5

b. Na^+ is smaller than Na. Why?

c. Two elements P and Q have atomic numbers 16 and 19 respectively.

(i) Write the group numbers to which the elements belong to.

(ii) Name the element which is a powerful reducing agent.

(iii) Write the formula of the compound formed between P and Q

OR

a. Account for the following

(i) Lithium and Magnesium resemble in many of their properties.

(ii) Third period contains only 8 elements

(iii) Noble gases have positive electron gain enthalpy values.

b. Study the table given below and answer the questions that follow. Also give the reason for your answer.

Element	$\Delta_i H_1$ (KJ/Mol)	$\Delta_{eg}H$ (KJ/Mol)
A	496	-53
B	2080	+116
C	1256	-349
D	999	-200

(i) Which is a noble gas?

(ii) Which is an alkali metal?

End of the Question Paper