Roll Number		

SET B

INDIAN SCHOOL MUSCAT
FIRST TERM EXAMINATION
CHEMISTRY

CLASS: XI Sub. Code: 042 Time Allotted: 3 Hrs

16.09.2018 Max. Marks: 70

- **General Instructions:** All questions are compulsory.
- Marks for each question are indicated against it.
- Question numbers 1 to 5 are very short answer questions and carry 1 mark each.
- Question numbers 6 to 12 are short answer questions and carry 2 marks each.
- Question numbers 13 to 24 are also short answer questions and carry 3 marks each
- Question numbers 25 to 27 are long answer questions and carry 5 marks each.
- Use log tables if necessary, use of calculators is not allowed.

1 Write the IUPAC name and symbol of the element with atomic number 104. 1

2 Draw Lewis dot structure for CCl_4. 1

3 Give two instances of green chemistry in everyday life. 1

4 Draw the boundary surface following orbitals a) 2pz b) 3dxy 1

5 Why do atomic masses of most elements in atomic mass unit involve fractions? 1

6 a) Define mole fraction 2
b) How is vapour density of a gas related to its molecular mass?

7 Calculate the frequency and wave number of a radiation having wavelength 600nm. 2

8 What are isoelectronic species? Name one anion and one cation isoelectronic with argon [Ar]. 2

9 Differentiate between photochemical and classical smog[2points] 2

OR

What do you understand by greenhouse effect? Name any two gases responsible for green house effect.

10 Write the general outer electronic configuration of d-block elements. Also mention any two properties of these elements. 2

11 Name the chemical responsible for ozone depletion. Give any two harmful effects of ozone depletion. 2

12 Define lattice enthalpy. Use Lewis symbol to show the electron transfer between calcium and oxygen to form calcium oxide. 2

13 a) What is eutrophication? 3
b) What is acid rain? How is it harmful to the environment?

14 What do you understand by the term limiting reagent? 1.2g of magnesium was dropped in 100ml of 0.1M HCl solution. Identify the limiting reagent and calculate the volume of hydrogen obtained at STP. [Mg=24, H=1, Cl=35.5] 3

15 a) How is formal charge of an atom in a molecule calculated? 3
b) What do you understand by the term resonance? Draw resonating structures of carbonate ion.

16 The first & second ionization enthalpies & electron gain enthalpies of elements A, B, C & D are as follows 3

Element	Δ_iH_1	Δ_iH_2	$\Delta_{eg}H$
A	419	3051	-48
B	1681	3374	-328
C	403	2640	-47
D	2372	5251	+49

Identify the element which is likely to be

i. A most reactive non-metal

ii. A noble gas

iii. A most reactive metal

17 Light of wavelength 400nm strikes a certain metal which has a photoelectric work function of 2.13eV. Find out the maximum kinetic energy of the photoelectrons. [1eV=1.6×10^{-19}J, h=6.626×10^{-34}Js, c=3×10^{8}] 3

OR

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=6.626×10^{-34}Js]
b) Determine the wavenumber for the transition of an electron from n=3 to n=2 in a hydrogen atom.

18 Account for the following 3
a) Anions are larger in size than their parent atom
b) Nitrogen has higher first ionization enthalpy than oxygen
c) Electron gain enthalpy of fluorine is less negative than chlorine

19 State 3

a) Gay Lussac's law of gaseous volume.
b) Law of multiple proportion
c) Avogadro's law

20 a) To which group and period does an element with atomic number 32 belong? 3
b) What do you understand by the term electronegativity?
c) Which has greater atomic radius: neon or fluorine? Why?

21 a) Designate the orbital with following quantum numbers n=4, l=3. 3
b) Arrange the following orbitals in the increasing order of energy:1s, 3d,4s, 2p.
c) How many electron in an atom can have following quantum numbers n=4, l=1, s=+ ½ ?

22 Mention the favorable conditions for the formation of ionic bond. 3

23 Which is more stable and why: Fe^{2+} or Fe^{3+}? [Fe=26] 3

24 a) Which of the following orbitals are not possible :1p,2s,3f and 4d? Give reason. 3
b) Explain Hund's rule taking nitrogen as an example.

25 a) Define empirical formula of a compound. 5
b) Write the empirical formula for B_2H_6
c) An acid of molecular mass 88g/mol contains 54.24% carbon, 9.05% hydrogen and the rest oxygen. Calculate the molecular formula of the acid. [C=12,H=1,O=16].

OR

i. Define molarity.
ii. Which is better concentration term: molarity or molality? Why?
iii. Commercially available conc. HCl contains 38%HCl by mass. What is the molarity of this solution? [d=1.10g/ml, H=1, Cl=35.5]
iv. Calculate the percentage of Sulphur in sodium sulphate. [Na=23, S=32, O=16]

26 a) What do you understand by degenerate orbitals? 5
b) State Heisenberg's uncertainty principle
c) A ball weighing 2.5g has a speed of 20m/s. If the speed can be measured within an accuracy of 1%, calculate the uncertainty in the position.

OR

i. What are the limitations of Bohr's model of atom? [any two]
ii. The energy associated with the first orbit in the hydrogen atom is -2.18×10^{-19}J. What is the energy associated with the fifth orbit? Also calculate the radius of the fifth orbit for the hydrogen atom.

27 a) Discuss the geometry of following molecules on the basis of VSEPR theory: H_2O, CH_4 , ClF_3 5

b) Explain incomplete octet and expanded octet molecules with an example each.

OR

i. What do you understand by bond pairs and lone pairs of electrons? Illustrate with an example

ii. Give reason

a) SF_4 has a see-saw shape

b) NH_3 is more polar than NF_3

End of the Question Paper