DH-003-001606   Seat No. _____

B. Sc. (Sem. VI) (CBCS) Examination

March-2022

Chemistry : C-601

(Inorganic & Industrial Chemistry)

(Old Course)

Faculty Code : 003

Subject Code : 001606

Time : $2\frac{1}{2}$ Hours]   [Total Marks : **70**

Instructions :   (1)   All the questions are compulsory.

(2)   Q-1 carries 20 Marks; 1 marks for each question; all are Compulsory.

(3)   Q-2 and Q-3 carries 25 marks each with internal option.

1   Answer the following   **20**

(1)   Give equation to calculate spin multiplicity.

(2)   How many microstates are in d^2 system ?

(3)   What is the ground state spectral term of Ti^{+2} ?

(4)   For P^2 system, what is the order of stability of ^1D, ^1S, ^3F, ^1G and ^3P.

(5)   Give any one Hole-Formality pair of d-orbitals ?

(6)   Which transitions are allowed according to spin selection rule ?

(7)   For S=1 and L=1, What is term Symbol ?

(8) What is the effect of temperature change on magnetic susceptibility of paramagnetic Compounds?

(9) What will be the magnetic nature of substance when P>1 and K(Kappa) is +Ve ?

(10) Give equation of total magnetic momentum.

(11) What is main used of charcoal in glass industries ?

(12) Which type of glass is used in lenses ?

(13) Glass is ionic or crystalline solid. [True or False]

(14) Which catalyst is used for hydrogenation of oil ?

(15) Which gas is mainly responsible for global warming?

(16) Give full form of CFC which deplete O_3 layer.

(17) Which substance protects life on the earth from UV radiation of the Sun ?

(18) Give full form of STPP which is use as binder in detergents ?

(19) Give IUPAC name of Glycerol.

(20) Define saponification value of oil.

2 (A) Answer any **three** : 6

(1) Derive Russel-Saunders term for Cu^{+2}.

(2) Calculate micro state for P^2 system

(3) Explain Laporte symmetry selection rule.

(4) Why splitting of ^3F term of d^2 and d^8 systems are opposite in same field ?

(5) What is Larmor rotation ?

(6) Define magnetic permeability.

(B) Answer any **three** : 9

   (1) Give vector representation of 1-1 coupling for p^2 system.

   (2) Find out the spectral term of ground state of Mn^{+2} and Fe^{+2}.

   (3) Explain splitting of d-orbital in square planar complexes.

   (4) Write note on Hole Formalism.

   (5) Explain effect of temperature on magnetic behavior of substance.

   (6) Give characteristics of Diamagnetism.

(C) Answer any **two** : 10

   (1) Discuss Hund's rule for the determination of ground state term symbol.

   (2) Discuss Jahn-Teller theorem.

   (3) Explain electronic specturm of $[Ti(H_2O)_6]^{+3}$

   (4) Derive equation for total magnetic momentum of a paramagnetic substance.

   (5) Discuss Gouy method for the determination of magnetic susceptibility.

3 (a) Answer any **three** : 6

   (1) What is Iodine value ?

   (2) Explain the term "acid rain".

   (3) Define glass and write its physical properties.

   (4) Give uses of Olive oil and Castor oil.

   (5) Write differentiates between BOD and COD.

   (6) What is soft and hard soap ?

   (b) Answer any **three** : 9

   (1) What is Thermal pollution ? Give its sources.

   (2) Write the chemical reaction involved in formation of glass.

   (3) State classification of detergents with suitable examples.

(4) Explain the recovery of glycer in from spent lye.

(5) Explain WIJS method.

(6) Explain general properties of oils and fats.

(c) Answer any **two** :   **10**

(1) Describe the raw materials used for manufacture of glass.

(2) How will you find the saponification value of oil ? Explain with formula.

(3) List different types of glass. Discuss about safety glass and high silica glass.

(4) What is pollution ? Discuss about air pollution.

(5) What is soap ? Discuss the continuous process for the manufacture of soap.

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