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BBF-003-001606 Seat No. _____

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

June / July – 2021

C - 601 : Inorganic Chemistry And Industrial Chemistry

(Old Course)

Faculty Code : 003

Subject Code : 001606

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

Instructions : (1) Questions one contains 20 short questions of one mark each. All are compulsory.

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

(3) Write answer of all questions in main answer sheet.

1 Answer the following Short questions : **20**

(1) For P^2 system, give the order of energy of ^1S, ^3P and ^1D.

(2) For d^5 case, ground state spectral term is _____

(3) What is general symbol for spectral term?

(4) What are microstates?

(5) Give three transitions found in $\left[Cu(H_2O)_6\right]^{2+}$ absorption spectra.

(6) Which colour is observed in Absorption spectra of $\left[Cu(H_2O)_6\right]^{3+}$?

(7) Draw two eg orbitals.

(8) What is magnetic permeability?

(9) Write formula of total magnetic moment.

(10) What is Neel temperature?

(11) What is Litharge?

(12) What is Miscella?

(13) Give formula of Feldspars.

(14) Which metal oxide is used to removal of air bubbles from liquid glass?

(15) Which oil has high Saponification value?

(16) Write full form of PAN.

(17) What is smog?

(18) Give full form of STPP.

(19) What is Saponification?

(20) Complete the reaction : $NiCl_2 + 2HCOONa \rightarrow$

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

(1) Calculate the ground state spectrum term for Cr^{+3}.

(2) If spectral term is ^1S then M_J = _____

(3) Give vector representation for $^3P_2$ and $^3P_1$.

(4) What is distorted tetragonal structure?

(5) Explain behavior of paramagnetic substance.

(6) Explain Larmor Rotation.

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

(1) Explain "j-j Coupling".

(2) Give name of four quantum numbers and write one use each.

(3) Give Laporte selection rules.

(4) What is Orgel Diagram? Draw the Orgel Diagram of 'F' term.

(5) Write note on "Guoy balance method".

(6) At 27°C temperature, applying magnetic field is 5×10^3 gaues on 0.5 gm substance, weight become 0.52 gm. If the sample tube cross section is one square cm and density of substance is 1.2, calculate the magnetic susceptibility and magnetic momentum.

$\left[g = 981, \rho_a \chi_a = 3 \times 10^{-8} \, cgs \; and \; M.W. = 372 \right]$

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

(1) Explain absorption spectra for $\left[Ti(H_2O)_6\right]^{3+}$ complexes.

(2) Discuss Jahn-Teller Effect with Cu^{2+} ion.

(3) Derive the spectral terms for d^2 case by hole pegion diagram.

(4) Calculate microstates for the p^2-system for any method.

(5) Explain the diamagnetism and derive the equation for diamagnetic momentum.

3 (A) Answer any **Three** : **6**

(1) Explain physical properties of glass.

(2) Define with example : Hard and soft soap.

(3) What is Winterization?

(4) Give some examples of Additives in use of detergent.

(5) Give sources of water pollution in short.

(6) How occurs Acid rain?

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

(1) Give chemical reaction of glass.

(2) Give classification of detergents in short with example.

(3) How will you find the acid value of oil? Explain with formula.

(4) Explain manufacture of shampoo.

(5) Give reaction of ozone with CFC.

(6) Give synthesis of detergent by Alfol method.

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

(1) Explain Regenerative Tank and Pot furnace with diagram.

(2) What is COD and BOD? Explain method of determination of COD.

(3) Describe hydrogenation of oil by wet process.

(4) Explain how glycerin is recovered from spent lye.

(5) Explain major sources of air pollution and control of air pollution.
