AAG-003-001606 Seat No. _____

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

April/May – 2016

Chemistry

C-601 - Inorganic & Industrial Chemistry

(New Course)

Faculty Code : 003
Subject Code : 001606

Time : **2.30** Hours] [Total Marks : **70**

Instructions :
(1) Answers of MCQ should be given in the Answer Book.
(2) Q-1 carries 20 Marks; 1 mark for each MCQ; All are compulsory.
(3) Q-2 and Q-3 carries 25 marks each with internal option.

1 Answer the following MCQs. **20**

(1) For ^3F state, J = _____.

(A) 0,1,2 (B) 1,2,3

(C) 2,3,4 (D) None

(2) Microstates are _____ for $J = 3$

(A) 6 (B) 7

(C) 8 (D) 9

(3) For d^2 system, Resultant Angular momentum quantum number L in its ground state is _____.

(A) 1 (B) 2

(C) 3 (D) 4

(4) Positrons are the number of _____ electrons compared to d^{10} system.

(A) more (B) less

(C) present (D) None

(5) Intense colour of MnO_4^- is because of _____ in it.

(A) Totally allowed transitions

(B) Charge transfer

(C) Both (A) & (B)

(D) None

(6) Electronic transition spectrum can be studied on the basis of _____.

(A) X_{max} (B) Band width

(C) Intensity of the band (D) All

(7) According to Hole formalism theory, ^3F state of d^8 system split up into _____ states.

(A) $^3A_{2g}, ^3T_{2g}, ^3T_{1g}$ (B) $^3B_{1g}, ^3B_{2g}, ^3E_g$

(C) $^3T_{1g}, ^3A_{2g}, ^3E_g$ (D) $^3E_g, ^3T_{2g}, ^3A_{2g}$

(8) The intensity of Magnitisation is defined as _____ per unit volume.

(A) Pole strength (B) Magnetic moment

(C) Force lines (D) None

(9) For a diamagnetic substance, _____ is true.

(A) P<1, K is –ve (B) P>1, K is +ve

(C) P=1, K=0 (D) None

(10) In paramagnetic substance, χ_{para} is _____ to the temperature.

(A) inversely proportional (B) not proportional

(C) directly proportional (D) None

(11) For optical glass, iron must not exceed _____ by amount.

(A) 0.1% (B) 2%

(C) 0.015% (D) 0.5%

(12) Molten glass can be deairated using _____.

(A) As_2O_3 (B) BaO

(C) $Na_2B_4O_7$ (D) ZnO

(13) Black colouration to glass is obtained by adding _____.

(A) Mixture of oxides of Co, Mn, Fe

(B) As_2O_3, NiO, CoO

(C) 1% of CoO

(D) None

(14) Iodine value indicates _____ present in the oil.

(A) Acid (B) Base

(C) Saturation (D) Unsaturation

(15) Oil can be made free from fatty acids by addition of _____.

(A) Anthracite (B) Bituminous

(C) Sodium hydroxide (D) None

(16) _____ is used as enamels.

(A) Drying oil (B) Stand oil

(C) Both (A) & (B) (D) None

(17) Oxo method, Alfol method and Welse method are used to prepare _____ for detergents.

(A) Primary long chain aldehydes

(B) Primary long chain alcohols

(C) (A) & (B) both

(D) None

(18) Soaps are _____ and detergents are _____.

(A) cheaper, costly

(B) bio degradable, non biodegradable

(C) (A) & (B) both

(D) None

(19) _____ has higher value of GWP than _____.

(A) Co_2, CFC (B) Co_2, CH_4

(C) CH_4, Co_2 (D) CH_4, N_2O

(20) _____ is the mist formed in atmosphere by temperature inversion.

(A) Smog (B) Fog

(C) Polluted air (D) None

2 (a) Answer any three. **6**

(1) State the spin selection rule for electronic transitions.

(2) Calculate micro states for d^2 system.

(3) Give reason - $CoCl_4^{2-}$ is darken than $\left[Co(H_2O)_6\right]^{2+}$.

(4) Derive Russell - Saunders term for Mn^{+2}.

(5) Explailn Neel temperature.

(6) Define magnetic permeability.

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

(1) Give characteristics of paramagnetism.

(2) Explain magnetic susceptibility and gram susceptibility.

(3) Give vector representation of L-5 coupling for p^2 system.

(4) Draw only the Orgel diagram for D and F state in weak ligand field.

(5) Calculate S, M_s, L, M_L, J and M_J for ^4F state.

(6) Discuss about relaxation of selection rules.

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

(1) Give pigeon hole diagram for d^2 system to derive all allowed spectral states.

(2) State Jahn-Teller theorem and explain tetragonal distortion with example.

(3) Discuss about absorption spectrum of $[Ti(H_2O)_6]^{3+}$.

(4) Explain diamagnetisn and derive the equation of diamagnetic momentum.

(5) Write short note :

(1) Effect of temperature of magnetic behaviour of substance **3**

(2) $\ell - \ell$ copuling. **2**

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

(1) Define glass chemically.

(2) What is saponification ?

(3) What is Iodine value ?

(4) Give reaction involved in Welse method for manufacturing of long chain alcohol.

(5) Explain the term 'acid rain'.

(6) What is winterisation ?

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

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

(2) Define Water pollution and list the sources of it.

(3) Give classification of Surfactants and explain any one.

(4) Give Acid value determination method.

(5) What is high silica glass ?

(6) Classify the raw materials of glass on the basis of its utility.

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

(1) List different type of Glass. Discuss about pyrex glass and soft glass.

(2) Distinguish between Oils and fats. Give classification of oils according to its utility.

(3) Discuss manufacturing of soap by Hot process.

(4) What is COD and BOD ? Discuss method for the determination of any one.

(5) What is pollution ? Discuss about Air pollution.
