DW-003-001203 Seat No. _____

B. Sc. (Sem. - II) (CBCS) Examination

April / May - 2015

C-201 : Chemistry (New Course)

Faculty Code : 003
Subject Code : 001203

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

Instructions:

(1) Questions one contains 20 MCQ type questions of one mark each. All are compulsory.
(2) Question 2 and 3 carry 25 marks each with internal option.
(3) Write answer of all questions in main answer sheet.

SECTION-I

[1] Select the correct answer: 20

[1] The isomer which rotates the plane of polarized light to the right is called .....rotatory.
(a) Laevo (b) Dextro
(c) (+) and (-) (d) All of these

[2] Which of the following is bidentate ligand?
(a) Glycinato (b) Ethylene amine
(c) Ammonia (d) EDTA

[3] According to VBT, O_2 molecule is .....in nature.
(a) Diamagnetic (b) Paramagnetic
(c) Both (a) and (b) (d) None of these

[4] Delocalization of electrons in a molecule can only be explained by .....
(a) Theory of hybridization (b) MOT
(c) VBT (d) Hund's rule

[5] Ionic solids are generally.....
(a) Quite brittle (b) Good conductor of electricity
(c) Volatile (d) Soft

[6] The crystal is generally colored when associated with.....defect.
(a) Metal excess (b) Frenkel
(c) Metal deficiency (d) Schottky

[7] Which of the following has the highest boiling point?
(a) $CH_3CH_2CH_2CH_2Cl$ (b) $HOCH_2CH_2CH_2CH_2OH$
(c) $CH_3\ CH_2CH_2CH_2OH$ (d) $CH_3CH_2OCH_2CH_3$

[8] Which of the following reagents will replace –OH group by a halogen atom?
(a) NOCl (b) $SOCl_2$
(c) Br_2 (d) I_2

[9] Ethyl bromide reacts with sodium methoxide to form.....
(a) Diethyl ether (b) Ethyl methyl ether
(c) Dimethyl ether (d) n-Propyl alcohol

[10] Hinsberg's reagent is .....
(a) Sn + HCl (b) p-Toluenesulphonic acid
(c) N_2H_4 + KOH (d) Benzenesulphonyl chloride

[11] The pH of drinking water is .....

(a) 8 to 9 (b) 1 to 7

(c) 7 to 14 (d) 7

[12] Permanent hardness are responsible for the .....of calcium and magnesium.

(a) Sulphide and nitrate (b) chloride and bromide

(c) Sulphate and chloride (d) sulphate and iodide

[13] In a galvanic cell, $Cu^{2+} + 2e^- \rightarrow Cu$, reaction takes place at;

(a) Anode (b) Anode and cathode

(c) Cathode (d) none of these

[14] Quinhydrone electrode is an example of .....electrode.

(a) Amalgam (b) Gas

(c) Redox (d) Metal-Metal ion

[15] Borex powder is .....

(a) B_2O_3 (b) $Na_2B_4O_7\,10H_2O$

(c) $NaBO_2$ (d) $Na_2B_4O_7\,8H_2O$

[16]] Which metal gives violet colour in flame test?

(a) Na (b) Co

(c) K (d) Ba

[17] The enzyme, which can catalyse the conversion of glucose to ethanol, is.....

(a) Maltase (b) Diatase

(c) Invertase (d) Zymase

[18] A catalyst .....

(a) May be in same phase with the reactants or a different phase (b) may accelerate a reaction

(c) Affects a reaction without being consumed in the process (d) all of the above

[19] Calculate the solubility of Ag_2CrO_4, if its solubility product is 1.9×10^{-12} at 300 K.

(a) 8.7×10^{-5} mol/lit (b) 7.8×10^{-5} mol/lit

(c) 8.7×10^{-4} mol/lit (d) 8.7×10^{-4} mol/lit

[20] One Einstein is given by (N is Avogadro's number)

(a) $E = \frac{Nhc^2}{\lambda}$ (b) $E = \frac{Nhc}{\lambda^2}$

(c) $E = \frac{Nhc}{\lambda}$ (d) $E = \frac{Nh}{\lambda}$

SECTION-II

[2] (A) Answer any three questions: **[06]**

(1) Give IUPAC names and structure of following compounds.

(a) Phloroglucinol (b) Quinol

(2) Derive the value of r^+/r^- for square planar lattice.

(3) Explain with example Hydration Isomerism.

(4) Draw the structure of Cesium chloride.

(5) Why aliphatic amines are more basic than ammonia?

(6) Complete the following reactions.

(a) Aniline $\xrightarrow[O^0C]{Br_2 / CS_2}$

(b) Nitroethane + 6[H] $\xrightarrow[\text{Ether}]{LiAlH_4}$

(B) Answer any three questions: **[09]**

(1) Explain any three characteristics of Ionic solid.

(2) Give the difference between BMO and ABMO.

(3) Give only reaction of Ethanol with (a) Acetyl chloride (b) PCl_5 (c) $SOCl_2$.

(4) Give chemical properties of primary alkyl amine.

(5) Derive Max-Born equation for the calculation of lattice energy.

(6) Give example of Cis-trans and meridional-facial isomer in six-coordinate complex compound.

(C) Answer any two questions: **[10]**

(1) Calculate bond order and magnetic properties of NO molecule using MOT.
(2) Explain Fries Reaction with mechanism (Fries Migration).
(3) Explain Geometrical isomerism in 4-coordinate complex compounds
(4) Explain Diazotization of aniline and Sandmeyer reaction.
(5) What is semiconductor? Explain n-type and p-type semiconductor.

[3] (A) Answer any three questions: **[06]**

(1) Write the oxidation and reduction reaction of following cell.
$Mg_{(s)} / Mg^{+2}_{(aq)} // Ag^{+}_{(aq)} / Ag_{(s)}$
(2) Give two example of Enzymes catalysis.
(3) Explain Beer's law with formula.
(4) Explain types of hardness of water.
(5) Give relation of solubility and solubility product of $Ca_3(PO_4)_2$.
(6) Calculate the solubility of $PbCl_2$ when its solubility product is 1.0×10^{-6} at 298K temperature.

(B) Answer any three questions: **[09]**

(1) What is catalyst? Give types of catalysis.
(2) What is Photosensitization? Explain with any one example.
(3) Write short note on "Borex-bead test".
(4) Discuss reversible and irreversible cell.
(5) How can measured total suspended solids in water?
(6) The solubility of AgCl is 1.5×10^{-10}. Predict whether there will be any precipitation by mixing 50 ml of 0.01 M NaCl and 50 ml of 0.01 M $AgNO_3$ solution.

(C) Answer any two questions: **[10]**

(1) What is quantum efficiency? Give reasons for high and low quantum efficiency.
(2) Discuss with example 'Acid-Base Catalysis'.
(3) Explain Complexometric method for determination of hardness of water.
(4) What is common ion effect? Explain with NH_4OH and NH_4Cl example.
(5) Derive the following relation in EMF.
  (a) Gibbs free energy (G) and Enthalpy (H)
  (b) Gibbs free energy (G) and Equilibrium constant (K)