Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.PHARM/SEM-1/PT-101/2011-12

2011

PHARMACEUTICAL ANALYSIS

Time Allotted : 3 Hours *Full Marks* : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A
(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : $10 \times 1 = 10$

   i) Chloroform is a
      a) amphiprotic solvent b) protogenic solvent
      c) protophylic solvent d) aprotic solvent.

   ii) How many significant digits are present in 1·0050 ?
      a) 2 b) 4
      c) 5 d) 6.

   iii) During iodometric titration in presence of concentrated hydrochloric acid, which of the following will be used as indicator ?
      a) Starch solution b) Diphenyl amine
      c) Amaranth dye d) Ferroin.

   iv) The colour change of Redox indicator is due to
      a) change in H^+ ion concentration
      b) change in OH^- ion concentration
      c) change in potential of solution
      d) all of these.

v) The instrument used to study TGA is
   a) Furnace b) Balance
   c) Thermobalance d) Thermometer.

vi) For the preparation of 250 ml of a standard 0·1 N succinic acid solution, succinic acid requirement is
   a) 2·42 g b) 1·48 g
   c) 2·6 g d) 1·26 g.

vii) Substance used as self-indicator is
   a) Cerium (IV) sulphate b) $KMnO_4$
   c) $K_2Cr_2O_7$ d) both (a) and (b).

viii) Heterogenous trapping of foreign ions and solvent within the crystal is called
   a) co-precipitation b) digestion
   c) occlusion d) all of these.

ix) The equivalent weight of Iodine in the following reaction is

$$2S_2O_3^{-2} + I_2 \longrightarrow S_4O_6^{-2} + 2I^-$$

   a) molecular weight b) molecular weight/2
   c) molecular weight/4 d) none of these.

x) Blank determination is done by omitting
   a) solvent b) reagent
   c) unknown compound d) all of these.

xi) The expression of solubility product for a non-symmetric salt such as Ag_2CrO_4 is

   a) $K_{sp} = 2[Ag^+][CrO_4^{2-}]$

   b) $K_{sp} = [Ag^+]^2[CrO_4^{2-}]$

   c) $K_{sp} = [Ag^+]^2[CrO_4^{2-}]^2$

   d) $K_{sp} = 2[Ag^+] \cdot 2[CrO_4^{2-}]$.

xii) The oxidation number of an element in free state is taken as
   a) 1 b) 3
   c) 0 d) 2.

GROUP – B
(Short Answer Type Questions)

Answer any *three* of the following $3 \times 5 = 15$

2. What is post-precipitation ? Explain Volhard's method for estimation of silver. 2 + 3
3. Write a short note on levelling effects.
4. Describe the ways in which the end points of redox titrations may be detected visually.
5. a) Calculate the equivalent weight of $KMnO_4$ in acidic, neutral and alkaline media ?
   b) Why is $KMnO_4$ acidified with dilute sulphuric acid but not with HCl or HNO_3 ? 3 + 2
6. a) Calculate the volume of HCl (specific gravity = 0·6 & percentage purity = 60·07) required to prepare a litre of 0·1 N HCl acid solution.
   b) Define Primary and Secondary standards with examples. 3 + 2

GROUP – C
(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. a) Explain Nernst equation for electrode potential.
   b) What is standard potential ?
   c) What is the function of salt bridge in an electrochemical cell ?
   d) Using the given data, calculate the standard potential for the following cell & also write the half-cell reactions.

   $E^0_{Mg^{+2}/Mg} = -2 \cdot 363\ V;\ E^0_{Cu^{+2}/Cu} = +0 \cdot 337\ V$

   For $Mg \mid Mg^{+2}(1M) \mid\mid Cu^{+2}(1M) \mid Cu$

   e) Write down some common oxidizing agents used in Redox titrations. 3 + 2 + 2 + 5 + 3
8. What is meant by quantitative analysis ? How will you differentiate it from qualitative analysis ? Describe the steps involved in Gravimetric analysis with a suitable example. What is T.G.A. ? 2 + 2 + 10 + 1

9. a) Describe the various types of Errors in analytical chemistry.
   b) Write down the effect of systemic errors on analytical results.
   c) What are Relative standard deviation and coefficient of variation ? 8 + 5 + 2

10. a) Define Titration curve in Neutralization titration. Discuss titration curves for the neutralization of (any *two*) :
      i) Strong acid with strong base
      ii) Weak acid with weak base
      iii) Strong acid with weak base
      iv) Weak acid with strong base.
   b) What is the pH of a solution ? Can a solution have zero & negative pH ? Justify your answer.
   c) Calculate the amount of NaOH in 1 litre of solution when the pH of the solution will be 12 ?
   1 + (3 × 2) + (1 + 2 + 2) + 3

11. a) What is the difference between iodometry and iodimetry ?
   b) What are the advantages and disadvantages of starch as an indicator ?
   c) What primary standard is used in iodometric titration ?
   d) How do you standardize the iodine solution ?
   e) Define back titration. 3 + 4 + 1 + 5 + 2

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