 جامعة طنطا	Tanta University Faculty of Pharmacy Department of Pharmaceutical Analytical Chemistry		
	Final exam For 2 nd Level PharmD Students		
	Course Title: Pharmaceutical Analytical Chemistry- 3		Course Code: PA303
	Date: 4/03/2021	Term : first	Marks: 50 Total pages: 9
		Time Allowed hours: 2 hours	

Your exam includes 9 pages. You MUST select the Letter of ONE best answer and mark it in the answer sheet paper

- 1- Ce(IV) is a powerful oxidizing agent in
 a-neutral medium b-acidic medium c-alkaline medium d-no effect of pH
- 2-Dichromate can be used for the determination of
 a-oxidizing agents b-reducing agents c-a & b d- iodate
- 3-Organic compounds can be determined rapidly at room temperature by Ce(IV) in
 a-dilute H₂SO₄ b-conc. H₂SO₄ c- dilute NaOH d- perchloric acid
- 4-Ce (IV) oxidizes the compound $\text{CH}_3 - \overset{\text{O}}{\parallel} \text{C} - \overset{\text{O}}{\parallel} \text{C} - \text{CH}_3$ to
 a- 2HCOOH b- 2CH₃COOH c- 2CO₂ d- CH₃OH
- 5- Oxidizing agents can be determined by treating with an excess of
 a- I⁻ b- I₂ c- KIO₃ d- conc. Acid
- 6- The method in the former point is known as
 a-iodimetry b-iodometry c-back titration d-complex titration
- 7-Starch is a specific indicator for
 a- acid-base titration b- Mohr method c-Iodine d- dichromate
- 8-Starch cannot be used in
 a-highly alkaline solutions b- highly acidic solutions
 c- neutral solutions d- water
- 9- Potassium dichromate is stronger oxidizing agent than potassium permanganate
 a- True b- False
- 10- The reaction between KIO₃ and a reducing agent such I⁻ in moderately acidic solutions proceeds according to the following equation
 a- $\text{IO}_3^- + 5\text{I}^- + 6\text{H}^+ = 3\text{I}_2 + 3\text{H}_2\text{O}$ b- $\text{IO}_3^- + 2\text{I}^- + 6\text{H}^+ = 3\text{I}^- + 3\text{H}_2\text{O}$
 c- $\text{IO}_3^- + 2\text{I}^- + 6\text{H}^+ + 3\text{Cl}^- = 3\text{ICl} + 3\text{H}_2\text{O}$

11- Lang's modification for Andrews method involves the addition of solution of
 a-dilute ammonia b- KI c-KCN d-H₂O₂

12- Lang's modification for Andrews method allows the use of
 a- conc HCl b- dilute HCl c- perchloric acid d- nitric acid

13- Sodium thiosulfate is used as
 a- oxidizing agent b- reducing agent c-indicator

14- Sodium thiosulfate reacts with iodine solution according to the following equation
 a- $2 \text{S}_2\text{O}_3^{2-} + \text{I}_2 = 2 \text{I}^- + \text{SO}_4^{2-}$ b- $2 \text{S}_2\text{O}_3^{2-} + \text{I}_2 = 2 \text{I}^- + \text{SO}_3^{2-}$
 c- $2 \text{S}_2\text{O}_3^{2-} + \text{I}_2 = 2 \text{I}^- + \text{S}_4\text{O}_6^{2-}$

15-Nernst equation can be expressed as
 a- $E = E^\circ - 0.0591/n \log [\text{Ox}] / [\text{Red}]$ b- $E = E^\circ + 0.0591/n \log [\text{Red}] / [\text{Ox}]$
 c- $E = E^\circ + 0.0591/n \log [\text{Ox}] / [\text{Red}]$

16- Mixture of I⁻ and I₂ can be analyzed by
 a-determination of I₂ content by titration against S₂O₃²⁻ and Andrews method for total
 b-determination of I⁻ content by Fajan's method and I₂ content by Iodimetric method
 c- determination of I⁻ content by titration against KIO₃ and I₂ content by S₂O₃²⁻
 d- none of these

17- In redox titration the potential up to the End Point is governed by
 a- The titrant b- the system to be titrated c- both systems

18-Redox indicators are substances which change color by change in
 a- pH b- Solvent c- temperature d-the potential of the system

19- Ferrous iron can be directly titrated in presence of HCl by standard KMnO₄ solution
 a- True b- False

20- KMnO₄ oxidizes H₂O₂ according to the following equation
 a- $2\text{MnO}_4^- + \text{H}_2\text{O}_2 + 4\text{H}^+ = 2\text{Mn}^{2+} + 4\text{O}_2 + 3\text{H}_2\text{O}$
 b- $2\text{MnO}_4^- + 3\text{H}_2\text{O}_2 + 6\text{H}^+ = 2\text{Mn}^{2+} + 4\text{O}_2 + 6\text{H}_2\text{O}$
 c- $2\text{MnO}_4^- + 5\text{H}_2\text{O}_2 + 6\text{H}^+ = 2\text{Mn}^{2+} + 5\text{O}_2 + 8\text{H}_2\text{O}$
 d-None of these

21- Zimmerman reagent consists of
 a- $\text{MnSO}_4 + \text{H}_2\text{SO}_4 + \text{H}_3\text{PO}_4$ b- $\text{KMnO}_4 + \text{H}_2\text{SO}_4 + \text{H}_3\text{PO}_4$
 c- $\text{K}_2\text{Cr}_2\text{O}_7 + \text{H}_2\text{SO}_4 + \text{H}_3\text{PO}_4$ d- none of these

22- Zimmerman reagent is used in case of
 a- determination of glycerol with KMnO₄ b- redox determination of Arsenite
 c- Andrews method d- determination of ferrous in presence of HCl

23- KMnO_4 can be used for determination of organic compounds in

- a- acid medium b- alkaline medium c- neutral medium
d- a & c

24- In alkaline medium and suitable reducing agent KMnO_4 is reduced into

- a- Mn^{2+} b- Mn^{3+} c- MnO_2 d- H_2O

25- When metals are arranged in the order of their standard electrode potentials the so called

- a- periodic table is obtained b- oxidation numbers of the metals is obtained
c- electrochemical series of the metals is obtained d- pKa values is known

26- The greater the negative value of the potential, the greater is the tendency of the metal to pass into the

- a- ionic state b- solid state c- volatile state d- complex state

27- A metal will normally displace any other metal

- a- above it in the electrochemical series from solutions of its salts
b- below it in the electrochemical series from solutions of its salts.
c- above it in the periodic table from solutions of its salts.
d- below it in the periodic table from solutions of its salts.

28- The standard electrode potential is a quantitative measure of the readiness of the element to

- a- gain electrons b- loss electrons c- dissolve in water d- form complex ions

29- the more negative the potential of the element, the more powerful is its action as

- a- a complexing agent b- an oxidant c- a reductant d- ionizing agent

30- It must be emphasized that standard electrode potential values relates to an equilibrium condition between the

- a- metal ions and oxidizing agents b- metal ions and reducing agents
c- metal electrode and the cell potential d- metal electrode and the solution.

31- The equivalent weight in redox reactions is the weight of the substance which will

- a- neutralize the solution b- precipitate the unknown substance
c- furnish, react with or be chemically equivalent to one gram-atom or mole of electrons transferred in the reactions.

32- Oxidation is the gain of electrons by an atom, molecule or ion while reduction is the loss of electrons by such particles.

- a- True b- False

33- Oxidation numbers are arbitrary numbers assigned to atoms to indicate their

- a- oxidation states b- atomic number c- valency d- number of atoms

34- Any uncombined atom or any atom in a molecule of an element is assigned an oxidation number of

a- one b-zero c-number of charges d-number of protons

35- The oxidation number of a simple, monoatomic ion is the same as the charge on the ion

a-True b-False

36-Redox indicators are typical

a-acid-base couple b-redox systems c-pM indicator d-organic dyes

37-An electrochemical cell is a system in which chemical energy is transformed into

a-magnetic energy b-radiation energy c-atomic energy d-electrical energy.

38- In an electrochemical cell; the liquid-junction potential depends upon

a-salt concentration b-type of metals c-the applied volt
d-the relative mobilities of the cation and anion diffusing across the boundary.

39-Some redox substance have more than one equivalent weight

a-True b-False

40- The reason for your answer is, some redox substances

a- react in more than one way b-have different oxidation numbers
c- thermally unstable d- highly reactive

41- The oxidation number of hydrogen ion in metallic hydrides e.g. NaH

a)1- b)1+ c)zero d) 2+

42- The oxidation number of oxygen is always 2-; except in peroxides e.g. Na_2O_2 in which oxygen has an oxidation number of

a)1- b)1+ c)zero d) 2+

43- In a neutral molecule, the algebraic sum of oxidation numbers of the constituent atoms must add up to

a-one b)10 c- zero d-number of atoms

44- When a metal is immersed in a solution containing its own ions, say, zinc in zinc sulfate solution, a potential difference is established between the metal and the

a- electrode b-solution c-salt bridge d-reference electrode

45-If a strong oxidizing agent is treated in neutral or (more usually) acid solution with a large excess of iodide ion, an equivalent amount of

a-tri iodide complex is formed b-iodine is consumed c- iodine is liberated
d-iodine is oxidized

46-The normal reduction potential of the iodine-iodide system is independent of the pH of the solution so long as the latter is

a-more than 8 b-less than 8 c-more than 12 d-less than 12

47- Iodine is the standard solution in

- a-iodate process d-the determination of oxidizing agents c-iodometric process
d-iodimetric process

48-Potassium iodate is a powerful

- a-complexing agent b-reducing agent c-oxidizing agent d-ionisable agent

49-Since the absolute potential of a single electrode cannot be measured an arbitrary potential may assigned by combining the half-cell in question in a cell with a so-called

- a-salt bridge b-standard solution c-reference electrode d-voltameter

50-The standard hydrogen electrode consists of

- a-a copper electrode immersed in a solution containing hydrogen ions at unit activity.
b-a zinc electrode immersed in a solution containing hydrogen ions at unit activity.
c-a platinum electrode immersed in a solution containing hydrogen ions at unit activity.
d-a Silver electrode immersed in a solution containing hydrogen ions at unit activity.

51-..... is/are considered as classical analytical method(s).

- a- MS b- HPLC c- Voltammetry d-none of them

52- Titrimetry is more sensitive than UV spectrophotometry.

- a- True b- False

53- Classical analytical methods measure some physical properties of the analyte.

- a- True b- False

54-..... is/are considered as separation technique(s).

- a-Gas chromatography b-Potentiometry c-Electrophoresis d-both a&c

55- Electromagnetic radiation is not usually involved in MS.

- a- True b- False

56- Molecular fluorescence is considered asorder technique.

- a- first b-zero c- second d-none of them

57- Measurement of UV absorbance of paracetamol at 244 nm is considered as single channel method of analysis.

- a- True b- False

58- Classical methods are not suitable for forensic analysis.

- a- True b- False

59- Mohr method used for determination of chloride by precipitation titration represents an absolute analytical method.

- a- True b- False

60-method(s) can give more accurate results when sample matrix causes severe interference during analysis.

- a- Calibration curve b-Standard addition c- both of them d- both b &c

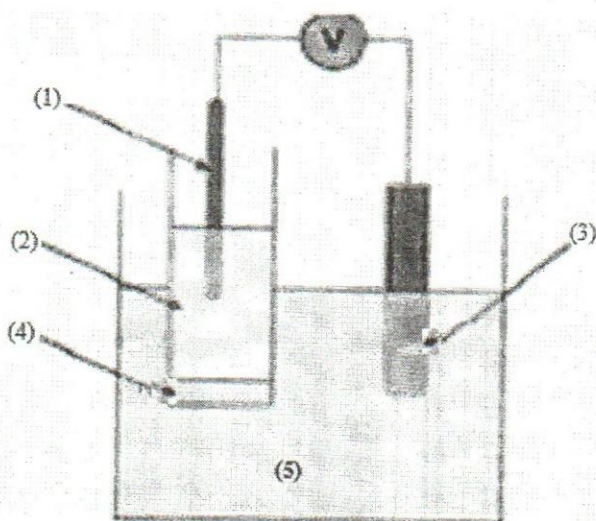
61- Gravimetry is considered asorder technique.

- a- first b-second c- zero d-none of them

62-has $E = 0$ at all temperatures.

- a- HE b- SCE c- DME d- none of these

Regarding the composition of ion exchange electrode, answer questions (63-67):



63- No. (1) represents.....

- a- internal filling solution b- external reference electrode
c- ion selective membrane d- internal reference electrode

64- No. (2) represents.....

- a- internal filling solution b- external reference electrode
c- ion selective membrane d- analyte solution

65- No. (3) represents.....

- a- internal filling solution b- external reference electrode
c- ion selective membrane d- internal reference electrode

66- No. (4) represents.....

- a- internal filling solution b- external reference electrode
c- ion selective membrane d- analyte solution

67- No. (5) represents.....

- a- internal filling solution b- external reference electrode
c- ion selective membrane d- analyte solution

68- The electrode potential of $Zn^0/Zn SO_4$ is dependent on:

- a- sulphate ion concentration as it is electrode of first kind.
- b- zinc ion concentration as it is electrode of second kind.
- c- zinc ion concentration as it is electrode of first kind.
- d- sulphate ion concentration as it is electrode of second kind.

69- pH responsive electrodes of second kind such as:

- a-GE b-Hydrogen electrode c- Quinhydrone electrode d- none of these

70- The electrode of $Cl_2(g)/2Cl^-$ redox couple is of.....

- a-first kind b- second kind c- inert kind d- reference kind

71- Quartz has a good electrode function.

- a- True b- False

72-has a membrane contains valinomycin in diphenyl ether.

- a) Ca-ISE b) K-ISE c) NO_3^- - ISE d) F-ISE

73- generates a comparatively small junction potential (E_j) at the two salt-bridge solution interfaces.

- a- $Ag^0/AgCl(s), KCl(1M)$ b- SCE c- SHE d- none of these

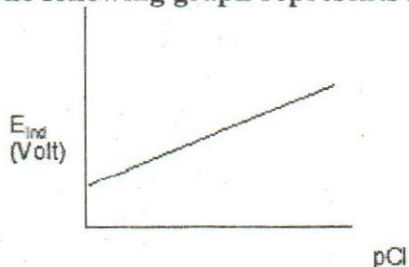
74- All the following electrodes are reference electrodes EXCEPT:

- a- HE b- SCE c- $Ag^0/AgCl(s), KCl(1M)$ d- none of these

75- $Hg^0/Hg_2Cl_2(satd), KCl(0.1M)$ is an example of:

- a- primary reference electrode. b- secondary reference electrode.
- c- electrode of first kind. d- none of these.

76- The following graph represents Nernst equation of $Ag/AgCl$ electrode:



- a-The intercept equals E^0 of the electrode b-The slope equals E^0 of the electrode
- c-The intercept equals 0.0591 d- none of these

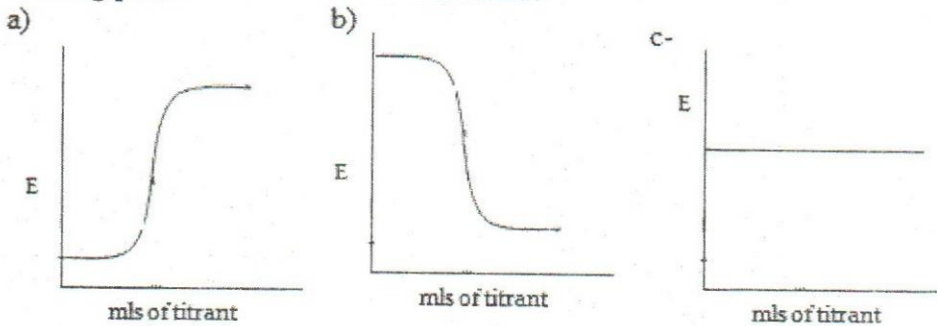
77- $Mg(s) /Mg^{+2}(1M) // Ag^+(1M)/ Ag(s)$ is an ECC, When it operates, observations include:

- a- increase in the mass of magnesium electrode & decrease in conc. of Ag^+
- b- increase in the mass of magnesium electrode & increase in conc. of Ag^+
- c- decrease in the mass of magnesium electrode & decrease in conc. of Ag^+
- d- decrease in the mass of magnesium electrode & increase in conc. of Ag^+

78- The electrode potential of $\text{Ag}^0/\text{AgCl}(\text{s}), \text{KCl}(\text{aq})$ is dependent on:

- a- chloride ion concentration as it is electrode of first kind.
- b- silver ion concentration as it is electrode of second kind.
- c- silver ion concentration as it is electrode of first kind.
- d- chloride ion concentration as it is electrode of second kind.

79- Which curve of the following represents potentiometric titration curve of Fe^{2+} with Ce^{4+} using platinum as indicator electrode?



80- Hydrogen electrode can be used to measure pH of H_2CO_3

- a- True
- b- False

81- Potentiometric titrations can be applied for all types of volumetric analysis.

- a- True
- b- False

82- Regarding quinhydrone electrode, all the following are true EXCEPT:

- a- It can be used for determination of pH of volatile acids.
- b- It can be used in presence of oxidizing or reducing agents.
- c- It is not affected by catalytic poisoning
- d- It comes to equilibrium rapidly.

83-can be used for measuring pH in presence of oxidizing agents.

- a- HE
- b- GE
- c- Antimony electrode
- d- all of them

84- pH ion exchange electrode type includes:

- a- pH-GE
- b- NAS (11-18)
- c- quinhydrone electrode
- d- none of them

85- Antimony electrode used for measuring pH is:

- a- inert electrode
- b- electrode of first kind
- c- electrode of second kind
- d- none of these

86-is a property of each GE.

- a- E_j
- b- E_b
- c- E_{asym}
- d- all of them

87- Hygroscopic glass has a good electrode function.

- a- True
- b- False

88- $E_b = L' - 0.059 \text{ pH}$, L' constant represents:

- a- asymmetry potential
 b- E of internal reference electrode
 c- pH of the internal solution
 d- all of these

89- Alkaline error can be overcome by:

- a- Croning 015 (soda-lime type) glass.
 b- NAS (11-18) glass.
 c- Lithia Silica glass.
 d- both a & c

90- Hydroxyl ion shows interference to:

- a- Ca- ISE b- Cl- ISE c- K-ISE d- F-ISE

91-can be used as Na-ISE:

- a- Croning 015 (soda-lime type) glass.
 b- NAS (11-18) glass.
 c- Lithia Silica glass.
 d- none of these

92- Internal filling solution in Ca-ISE contains:

- a- 0.1M CaBr_2 b- 0.1M CaCl_2 c- 0.1M HCl d- 0.1M CaSO_4

93- Incorporation of into PVC organic membrane for manufacturing of K-ISE.

- a- erythromycin b- KCl c- valinomycin d- didecyl phosphate

94- Transport of ions towards electrode due to agitation and temperature gradient is known as

- a-migration
 b-convection
 c-radiation
 d- diffusion

95- In polarography, Faradic current due to electrolysis of impurities is a component of

- a-Migration current
 b-convection current
 c- residual current
 d- none of them

96- Supporting electrolyte is used to

- a-eliminate oxygen
 b-eliminate migration current
 c-minimize the residual current
 d- none of them

97- In pilot ion method both the standard and analyte ion

- a-should have the same half wave potential
 b-should give the same diffusion current
 c-should have different half wave potential
 d-should have the same concentration

98- If the potential applied is plotted versus $\log i/i_d - i$ the relationship is a straight line with a slope of

- a. $E_{1/2}$
 b. $-0.059/n$
 c. i_d
 d. $n/0.059$

99- Transport of ions towards electrode due to concentration gradient is known as

- a-migration
 b-convection
 c-radiation
 d- diffusion

100- In polarography, is quantitative parameter.

- a. $E_{1/2}$
 b. i_d
 c. both of them
 d. none of them

Good Luck