Al-Azhar University of Gaza

College of Pharmacy

Pharmaceutics and Pharmaceutical Technology

Department

Physical Pharmacy II

Final Exam- Jan 2013

physical pharmacy II
dr hend
final 2013

Name of Student (باللغة العربية):

Student ID:

الرجاء عدم استعمال القلم الأحمر أو الرصاص في إجابة الأسئلة وتأكد أن عدد أوراق الامتحان (11) ورقة.

Midterm Exam Mark (لاستعمال المدرس فقط):

Question	Mark
Q1	
Q2	
Q3	
Total (50 M)	

Total Mark (100):

1

Q1: Please choose the one option – (A), (B), (C), or (D) – that correctly completes the sentences:

(30M)

1. The colloidal particles...
a) Pass through filter papers freely.
b) Pass through semipermeable membranes freely.
c) Can be resolved by light microscope and electronic microscope.
d) Can be homogeneous or heterogeneous in character.

2. Light scattering by colloidal particles appears under ultramicroscope is called...
a) Streaming potential.
b) Faraday-Tyndall effect.
c) Nanofiltration.
d) Dispersion.

3. An example of a lyophobic colloid...
a) Sulfur in ethanol.
b) Albumin in water.
c) Polystyrene in organic solvents.
d) Gelatin in organic solvents.

4. The fractional decrease in intensity due to scattering as the incident light passes through 1 cm of solution is called...
a) Faraday Tyndall effect.
b) Ultrafiltration.
c) Turbidity.
d) Dialysis.

5. Aggregation number of the micelle is...
a) The concentration of surfactant monomers at which micelles forms.
b) The number of monomers that condensate to form a micelle.
c) The number of micelles that forms in the dispersion medium.
d) The concentration of monomers undergoing adsorption at the air- water interface.

6. A phenomenon in which the mixture of a positively & negatively hydrocolloids will separate into two layers...
a) Condensation.
b) Coacervation.
c) Precipitation.
d) Compression.

7. Dispersions that are generally stable in the presence of small concentrations of electrolytes, but salted out by high concentrations of very soluble electrolytes...
a) Hydrophilic colloid.
b) Hydrophobic colloid.
c) Association colloid.
d) Lipophobic colloids.

8. A shape of micelles exists at concentrations relatively close to cmc...
a) Prolate.
b) Oblate.
c) Laminar.
d) Spherical.

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9. Rapid sedimentation of dispersed phase particles in a lyophilic colloid can be carried out using...
a) Gravity's acceleration.
b) Angular acceleration of a centrifuge.
c) Addition of electrolyte that increases the zeta potential.
d) A semipermeable membrane which allow the passage of dispersion medium only.

10. The rate of sedimentation of colloidal particles is expected to be high if...
a) The diameter of the dispersed phase particles was small.
b) The difference in density between dispersed phase and dispersion medium was small.
c) The viscosity of the medium was high.
d) The colloidal system was subjected to a strong force accomplished by centrifugation.

11. Ostwald viscometer...
a) Multiple rate of shear instrument.
b) Newtonian systems instrument.
c) Non- Newtonian systems instrument.
d) Measures the time required by a ball to pass between two marks.

12. The higher the viscosity of a liquid...
a) The greater shear work is required to produce a certain rate of shear.
b) The greater shear rate is required to produce a certain shear stress.
c) The higher the resistance of the liquid to flow.
d) The higher the fluidity of the liquid.

13. The slope of a plastic system rheogram is equal to...
a) The fluidity.
b) The elasticity.
c) The mobility.
d) The plasticity.

14. The absolute viscosity divided by the density of the liquid at a definite temperature...
a) Absolute viscosity.
b) Kinamatic viscosity.
c) Intrinsic viscosity.
d) Specific viscosity.

15. Dilatant flow behavior can be explained by...
a) The presence of open packed particles.
b) Small void volume.
c) Sufficient vehicle.
d) The presence of relatively low consistency.

16. Antithixotropy is defined as...
a) Slow recovery on a standing of a material of a consistency lost through shearing.
b) If the sample is subjected to cycles of increasing then decreasing rates of shear, the system is continuously thickened but at a decreasing rate.
c) Slow recovery on a standing of a material of a consistency gained through shearing.
d) Fast recovery on a standing of a material of a consistency lost through shearing.

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17. If the rate of shear was reduced once the maximum rate had been reached, and the down curve is displaced to the left of the up curve, this is a...
a) Plastic system.
b) Rheopectic system.
c) Thixotropic system.
d) Negative - thixotropic system.

18. An example of a pseudoplastic system...
a) Flocculated suspensions.
b) Polymerized suspensions.
c) Concentrated suspensions.
d) Deflocculated concentrated suspensions.

19. The unit (cgs) of plastic viscosity is...
a) sec^{-1}
b) Dyne cm^{-2}
c) $g\ cm^{-1}\ sec^{-1}$
d) $g^{-1}\ cm\ sec$

20. Rheology is important in the following areas _except_...
a) Production capacity of the equipment.
b) Removal from jars or extrusion from tubes.
c) Microbiological stability of disperse systems.
d) Packagability of powdered or granular solids.

21. The diffusion equation that gives the change in concentration with time at a definite location is known as...
a) Noyes-Whittneye's equation.
b) Hendreson-Hasselbalch equation.
c) Fick's first law.
d) Fick's second law.

22. When the concentration of the diffusant is maintained at very low level in the receptor compartment...
a) Quasi – stationary state is obtained.
b) Non- Steady state is present.
c) Sink condition is achieved.
d) Steady state is reached.

23. Permeability coefficient unit...
a) g/cm.
b) g/sec.
c) cm/sec^2.
d) cm/sec.

24. The amount of a substance diffusing in a time across a plane of area is directly proportional to the change of concentration with a distance traveled ...
a) Stoke's law.
b) Fick's first law.
c) Stoke's Einstein equation.
d) Vant' Hoff equation.

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25. The time required for a diffusant to establish a constant concentration gradient within the membrane separating the donor from the receptor compartment is ...
a) The lag time.
b) The diffusion time.
c) The steady state time.
d) The quasi stationary state time.

26. The rate of diffusion at unit cross sectional area in the steady state of flow is known as...
a) The Flux.
b) Fick's First law.
c) Permeability coefficient.
d) The diffusion coefficient.

27. Drugs are absorbed from the GIT by a passive diffusion depending on the fraction of unionized drug at the pH of intestines...
a) Henderson- Hasselbalch equation.
b) Fick's first law.
c) PH- partition hypothesis.
d) Noyes-Whittneye's equation.

28. The dissolution is the rate limiting step in the bioabsorption of drugs that are...
a) Highly soluble in water.
b) Slightly soluble in water.
c) Of low partition coefficient ($Kd_{o/w}$).
d) Of high acid dissociation constant.

29. The concentration of a saturated solution of the compound at the surface of a tablet and at the temperature of body is...
a) The bulk concentration.
b) The neutral region concentration.
c) The diffusion layer concentration.
d) The solubility.

30. Separation process based on unequal rates of passages of solutes and solvent through micro porous membranes using a negative pressure...
a) Dialysis.
b) Ultra-filtration.
c) Micro-filtration.
d) Reverse osmosis.

Q2: Problems   (15M)

1. An intravenous injection of ~10 ml of an aqueous 4.0 w/v% solution
   aminophylline (weak base) at 25°C was administered.
   Please, compute the percent of non-ionized aminophylline in blood, if the pk of
   the drug is 5.0, the normal pH of blood is about 7.0 and pK$_a$ is 14.

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لا ينظر لأي إجابة خارج نطاق الجدول.
في حالة عدم توضيح حرف (a) من حرف (d) سيتم إلغاء درجة السؤال.
من المفضل استعمال الأحرف بشكلها التالي A, B, C, and D

1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24
25	26	27	28	29	30		

2. A coarse powder with a true density of 2.34 g cm^{-3} and a mean diameter of 150 μm was dispersed in a 5% carboxymethylcellulose dispersion having a density of 1.23 gcm^{-3}. The viscosity of the medium at low shear rate was 25 poises. <u>Calculate the average velocity of sedimentation of the powder in cm/sec.</u>

3. The aggregation process of insulin molecules was studied at temperatures of 25°C and 40°C at pH 7.5 and ionic strength of 0.1.

The diffusion coefficients of aggregates at the two temperatures and viscosities of the solvent were listed in the following table.

Compute the hydrodynamic radii (angstroms) of the aggregates at the two temperatures.

$R = 8.3143 \times 10^7$ erg deg^{-1} mol^{-1} and $N = 6.02 \times 10^{23}$ molecule/mole

T (°C)	25	40
$D \times 10^7$ (cm^2 sec^{-1})	9.32	3.67
η (poises)	0.0094	0.0052

Q3: Please mention (with a short description) the factors that affect the rate of absorption of drugs in general. What are the equations that you depend on in your answer. (5M)

The equations are:

The factors that affect the rate of absorption of drugs:

Good luck
Dr. Hend M. Abu Amara