Questions – Chapter 03

1- What force(s) do(es) apply in electrophoresis?

□ Gravitational force □ Electrostatic force □ Friction force □ Retardation forces

2- For polyacrylamide gel polymerization, what do you need?

□ Acrylamide □ Ammonium persulfate and TEMED □ Bisacrylamide □ Styrene

3- What percentage of acrylamide would you recommend to separate proteins of 4-40 kDa?

□ 10% □ 12.5% □ 20% □ 30%

4- In PAGE, what is the effect on the pore size when the percentage of acrylamide increases?

□ The pore size increases □ The pore size decreases □ The pore size is not affected □ None of the those

5- What is the effect of SDS on proteins?

□ Protein conformation is affected □ Protein charge is affected □ Proteins become positively charges □ Disulfide bridges are broken

6- What does PAGE stand for?

□ Polymer aggregated gel electrophoresis □ Polyacrylamide gel electrophoresis □ Polyamine gel electrophoresis □ None of those

7- In proteomics, how 1D SDS PAGE can be use with mass spectrometry?

□ After in-solution digestion □ With in-gel digestion □ Both are not compatible □ In the procedure, bands are cut after staining

8- What amino-acid(s) do(es) present positively charged lateral chains?

□ Arginine □ Glycine □ Lysine □ Aspartic acid

9- Glutamic acid has pK_1 (-COOH) = 2.1, pK_2 (-NH_2) = 9.47 and pK_R (-R) = 4.07. What is the net electric charge of Glu at pH = 3?

□ Positive □ Negative □ Zero

10- What is the approximate p*I* of Glu?

□ 3.1 □ 5.8 □ 6.8 □ 2.1

11- During isoelectric focusing, in which direction do positively charged ions move?

□ Toward the anode □ Toward the cathode □ They do not move

12- What property(ies) do(es) present carrier ampholytes?

□ Amphoteric □ Acidic □ "Carrier" of the current □ Buffering

13- In 2D gel electrophoresis, what is the principle of the first dimension of the separation?

□ PAGE □ IEF □ Size-based □ Liquid chromatography

14- What advantage(s) do(es) off-gel electrophoresis present with respect to classical IEF?

□ Diffusion is absent □ Focusing is much faster □ Separated analytes are recovered in solution □ Both proteins and peptides can be separated

15- What can explain an analyte did not efficiently focus during IEF?

□ The slope of the titration curve at p*I* for this analyte is steep □ Too many salts were present in the sample □ The analyte is a protein □ Voltage was stopped for 30 minutes before sample recovery

16- For what reason(s) can information on the p*I* be valuable?

□ MS data validating/filtering □ Optimizing protein digestion conditions □ Phosphopeptide selection □ Mass of peptide/protein is not anymore needed for their identification

17- What is necessary involved in chromatography?

□ An analyte □ A mobile phase □ A stationary phase □ A liquid

18- What was M.S. Tswett able to separate using chromatography?

□ The components of serum □ Some chlorophylls □ Some carotenoids □ Caffeine

19- In chromatography, what can explain band broadening?

□ Multiple path of the analyte | □ Perpendicular diffusion | □ Mass transfer between phases | □ High plate number

20- What factor(s) can affect the chromatographic resolution?

□ The column length | □ The flow rate | □ The pore size of the packing material | □ None of those

21- What type of chromatography(ies) would you recommend to separate proteins?

□ Size exclusion | □ Reversed-phase | □ Affinity | □ Strong-anion exchange

22- For what type of chromatography is hydrophobicity of the analytes relevant?

□ Size exclusion | □ Strong-cation exchange | □ Partition | □ Reversed-phase

23- Why HPLC was developed?

□ To speed up the separation process | □ To cope with smaller particle sizes | □ To separate more sample | □ To accommodate nano-flow rate

24- What type of chromatography is usually coupled to mass spectrometry?

□ Size exclusion | □ Strong-cation exchange | □ Affinity | □ Reversed-phase

25- What separation techniques may be complementary to RP-LC to separate peptide mixtures?

□ IEF | □ SCX | □ SEC | □ RP