Quiz – TEM Series

Part A: True/False Questions

1. High pressure freezing is one kind of chemical fixation.
2. With the use of liquid nitrogen and high pressure, sample can be frozen with a slow and stable speed.
3. In freeze substitution, organic solvent is added to dissolve the frozen water.
4. Ultraviolet light is applied to the sample to warm up the sample.
5. We should always start trimming with the sample blocks located behind the glass knife.
6. The main purpose of cutting extremely thin slices of sample is for better observation of intracellular components instead of extracellular components.
7. Both light microscopes and TEMs form images on our retina.
8. TEM cannot be used to examine live specimen.
9. We should turn off the light before examination of sample using the fluorescent screen.
10. We need to do the alignment of the electron gun, beam and rotation center every time we use the TEM.

Part B: Multiple Choice Questions

1. Which of the following is **NOT** an advantage of using high pressure freezing?
   A. It can minimize artifacts prompted
   B. It can reduce ice-crystal damage
   C. Better preservation of antigens for immune-cytochemical studies can be achieved
   D. Large samples can be prepared

2. Which of the following is the correct sequence of sample preparation before using the Transmission Electron Microscope?
   A. High pressure freezing→photo-polymerization→freeze substitution
   B. High pressure freezing→freeze substitution→photo-polymerization
   C. Photo-polymerization→high pressure freezing→freeze substitution
   D. Freeze substitution→high pressure freezing→photo-polymerization

3. When using ultramicrotome for sectioning, what is the purpose of using glass knife?
   A. To trim the cutting edge of sample blocks so as to make it flat
   B. To section the specimens into thin slices
   C. To hold the sample blocks
   D. It allows us to monitor the process of sectioning

4. With the use of ultramicrotome, we can section our sample into thickness of…
   A. 1 nm

B. 10 nm
C. 100 nm
D. 1000 nm

5. Why should we add water to the diamond cutting boat before sectioning?
   A. To remove dust from the boat
   B. To sharpen the diamond knife
   C. To prevent dehydration of sample after sectioning
   D. To facilitate the collection of sample slices

6. Why TEM images have much higher resolution than images from light microscopes?
   A. TEM is much greater in size than light microscope
   B. Electrons traveling as waves have wavelengths much shorter than visible light
   C. TEM can achieve greater magnification
   D. The fluorescent screen of TEM can generate high resolution images

7. Which of the following is the correct pathway of electrons in the TEM?
   A. Anode → electromagnetic lens system → sample → fluorescent screen
   B. Anode → electromagnetic lens system → sample → electromagnetic lens system → fluorescent screen
   C. Cathode → electromagnetic lens system → sample → electromagnetic lens system → fluorescent screen
   D. Cathode → electromagnetic lens system → sample → fluorescent screen

8. What should be done right after the TEM colume is shown to be evacuated?
   A. Insert the sample holder
   B. Further insert the sample holder
   C. Remove the dummy holder
   D. Shift the beam

9. Before loading the sample, the following softwares have to be turned on, except...
   A. Electron gun tilt/shift
   B. TEM imaging and analysis
   C. Microscope user interface
   D. Digital micrograph

10. For viewing which of the following would a TEM not be a good choice?
    A. Antigen
    B. Actin filament
    C. 3D external surface of mitochondria
    D. Ribosomes