

**\*\*\* EXAMINATION \*\*\***

**TECHNIQUES FOR SURFACE CHEMICAL COMPOSITION**

1. **Electron spectroscopy uses**
  - a) electrons as incident or detected particles
  - b) atoms as incident or detected particles
  - c) protons as incident or detected particles
  - d) All of the above
  
2. **Electron spectroscopy exploits surface sensitivity of**
  - a) high energy electrons
  - b) low energy electrons
  - c) high energy atoms
  - d) low energy atoms
  
3. **When a distance electron can travel in solid depends on**
  - a) the material and the composition
  - b) the material and the kinetic energy
  - c) the specific gravity and the composition
  - d) the specific gravity and the kinetic energy
  
4. **Loss processes is also known as**
  - a) elastic scattering
  - b) active scattering
  - c) inelastic scattering
  - d) None of the above
  
5. **The collective excitation of atoms in a unit cell is**
  - a) phonon excitation
  - b) plasmon excitation
  - c) phonon escape
  - d) plasmon escape
  
6. **Collective excitation of electrons is**
  - a) phonon excitation
  - b) plasmon excitation
  - c) phonon escape
  - d) plasmon escape

7. **Inelastic mean free path is**
- a) the average distance between inelastic collisions
  - b) the average distance between elastic collisions
  - c) the longest distance between inelastic collisions
  - d) the longest distance between elastic collisions
8. **The XPS technique is used by the**
- a) photoemission method
  - b) auger method
  - c) inverse photoemission method
  - d) electron energy loss method
9. **The EELS technique is used by the**
- a) photoemission method
  - b) auger method
  - c) inverse photoemission method
  - d) electron energy loss method
10. **The AES technique is used by the**
- a) photoemission method
  - b) auger method
  - c) inverse photoemission method
  - d) electron energy loss method
11. **The IPES technique is used by the**
- a) photoemission method
  - b) auger method
  - c) inverse photoemission method
  - d) electron energy loss method
12. **X-ray photoelectron spectroscopy is also known as**
- a) electron spectroscopy for chemical analysis
  - b) electron spectroscopy for structural analysis
  - c) electron spectroscopy for lattice analysis
  - d) None of the above
13. **During the photoemission process the kinetic energy of the photoelectron**
- a) increases as the binding energy increases
  - b) decreases as the core energy increases
  - c) increases as the binding energy decreases
  - d) increases as the core energy decreases
14. **In order to observe sharp photoemission lines in XPS, x-ray sources**
- a) must be panochromatic
  - b) must be fluorochromatic
  - c) must be rayochromatic
  - d) must be monochromatic

15. **Extrinsic satellites occur during transport of**
- a) the electron to the interior
  - b) the electron to the surface
  - c) the atom to the interior
  - d) the atom to the surface
16. **The most common type of electrostatic deflection-type analyzer is**
- a) the concentric hemispherical analyzer
  - b) the oblique hemispherical analyzer
  - c) the spherical electron analyzer
  - d) None of the above
17. **Sensitivity could also be described as**
- a) the minimum detectable concentration
  - b) the maximum detectable concentration
  - c) the minimum detectable dispersion
  - d) the maximum detectable dispersion
18. **Empirical calibration constants are also known as**
- a) electron sensitivity factors
  - b) electron quantity factors
  - c) atomic sensitivity factors
  - d) atomic quantity factors
19. **Chemical shifts give information about**
- a) oxidation states only
  - b) chemical environment only
  - c) both a and b
  - d) Neither a nor b
20. **The spectra is complicated by secondary features such as**
- a) x-ray satellites
  - b) extrinsic losses
  - c) final state effects
  - d) all of the above

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<b>*** ANSWER SHEET *** U285</b>  <b>TECHNIQUES FOR SURFACE CHEMICAL COMPOSITION</b>	<u>STATE BOARD</u>	<u>COURSE NO.</u>	<u>VALUE</u>
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