

***** EXAMINATION *****

INTRODUCTION TO SURFACE ANALYSIS

1. **An assumption of kinetic theory is**
 - a) gas consists of a large number of particles with random trajectories
 - b) gas consists of a small number of particles with random trajectories
 - c) gas consists of a large number of particles with fixed trajectories
 - d) gas consists of a small number of particles with fixed trajectories

2. **Another assumption of kinetic theory is the particle**
 - a) diameter is much larger than average interparticle separation
 - b) diameter is much smaller than average interparticle separation
 - c) diameter is much larger than the least interparticle separation
 - d) diameter is much larger than the highest interparticle separation

3. **An assumption of kinetic theory is:**
 - a) particles only interact through non-elastic collisions
 - b) particles only interact through kinetic collisions
 - c) particles only interact through elastic collisions
 - d) None of the above

4. **An assumption of kinetic theory is pressure results from a large number**
 - a) of collisions with walls producing a constant force per unit area
 - b) of collisions with walls producing a high force per unit area
 - c) of collisions with walls producing a variable force per unit area
 - d) None of the above

5. **Total momentum change is**
 - a) the number of collisions times the momentum change per collision
 - b) the number of collisions plus the momentum change per collision
 - c) the number of collisions minus the momentum change per collision
 - d) the number of collisions divided by the momentum change per collision

6. **Force is the**
 - a) rate of change of velocity
 - b) rate of change of acceleration
 - c) rate of change of momentum
 - d) All of the above

7. **Pressure is**
- a) the force per unit volume
 - b) the force per unit area
 - c) the force per unit length
 - d) the momentum per unit length
8. **Two colliding objects must take into account their relative speeds**
- a) not one fixed and one moving
 - b) not one fixed and one fixed
 - c) not one fixed and one stationary
 - d) None of the above
9. **If the number density increases by a factor of two, the collision**
- a) frequency increases by two
 - b) frequency decreases by two
 - c) frequency increases by the square root of two
 - d) frequency decreases by the square root of two
10. **The time a molecule spends between collisions is**
- a) the reciprocal of the collision frequency
 - b) half the collision frequency
 - c) twice the collision frequency
 - d) the square root of two times the collision frequency
11. **The distance a molecule has traveled between collisions is**
- a) the free path distance
 - b) the mean free path
 - c) the mean distance
 - d) None of the above
12. **The mean free path is represented by the Greek letter**
- a) phi
 - b) alpha
 - c) pi
 - d) lambda
13. **For experiments in a vacuum, the pathlength between the surface**
- a) and the detector must be less than 1/10,000 atm
 - b) and the detector must be less than 1/100,000 atm
 - c) and the detector must be less than 1/1,000,000 atm
 - d) and the detector must be less than 1/10,000,000 atm
14. **An absolute gauge best suited for measuring the lowest**
- a) operating pressure is a mechanical diaphragm
 - b) operating pressure is a capacitance gauge
 - c) operating pressure is a McLeod gauge
 - d) operating pressure is a Knudsen gauge

15. **A diaphragm gauge is**
- a) not an absolute gauge
 - b) complex
 - c) simple
 - d) not sensitive to vibration
16. **A mercury manometer has**
- a) one side evacuated and one side open
 - b) one side evacuated and one side closed
 - c) a complex tube
 - d) None of the above
17. **A capacitance manometer is**
- a) simple
 - b) moderately complex
 - c) slightly inaccurate compared to other manometers
 - d) All of the above
18. **A Bourdon gauge is**
- a) complex
 - b) an absolute gauge
 - c) slightly unstable
 - d) All of the above
19. **A thermocouple gauge is**
- a) inexpensive
 - b) expensive
 - c) complex
 - d) None of the above
20. **A Pirani gauge is**
- a) complex
 - b) expensive
 - c) simple
 - d) None of the above

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