

1. Please define and compare following paired terminologies (20%)
  - (1) White noise vs. Pink noise
  - (2) Ionized radiation vs. Non-ionized radiation
  - (3) Total aerosols vs. Inhalable aerosols
  - (4) Absorption vs. Adsorption
  - (5) Local exhaust ventilation vs. General exhaust ventilation
2. A ventilation duct (inner diameter 100cm) is found with a total pressure (Pt) of 100 mmH<sub>2</sub>O and a static pressure (Ps) of 64 mmH<sub>2</sub>O. What is the velocity pressure (Pv), air velocity (m/s), and flow rate (m<sup>3</sup>/min) of the duct? (10%)
3. What are nano-particles? What are exposure metrics which can be used for characterizing nano-particle exposures? Which exposure metric is considered the most feasible one in the occupational hygiene field? Why? (10%)
4. What is biological monitoring and what are its limitations? (10%)
5. Please identify at least 5 considerations that one should pay attention to when designing an “environmental monitoring” or “biological monitoring” program, respectively? (10%)
6. Please list the 3 most recognized “biological hazards” in the occupational settings over the recent decades. Please specify (1) what kind of the occupational environment this hazard occurred (2) type of the hazards (3) the agent directly associated with the hazards, if there is any (4) the outcomes of the hazards (5) the effective control strategy, if any. (15%)
7. Please list and compare the 4 most suitable sampling methods to collect solvent vapors in the working environment. (12%)
8. Please define and classify the respiratory hazards (6%), and briefly describe the respirator selection guide. (7%)