

M501: MEASUREMENT OF HAZARDOUS SUBSTANCES INCLUDING RISK ASSESSMENT

OVERNIGHT REVISION QUESTIONS – DAY 3

1. Complete the following table

Contaminant	Filter	Sampling Head	Flow Rate
Total Inhalable Dust			
Respirable Dust			
Quartz Dust			
Rosin Based Solder Flue Fume			
Asbestos Fibres			
Welding Fumes			

2. Why is automatic flow control important when sampling with a miniature cyclone?
3. What are three factors, when using sampling pumps, which must be considered and appropriately managed if accurate results are to be obtained?
4. What are the ISO deposition conventions and how are they linked?
5. When calibrating sampling pumps, what are considered to be “primary standards” and how do they differ from “secondary standards”?
6. A sample result of 5 mg/m³ total inhalable dust was obtained using a sampling pump calibrated at 2.0 L/min. Following the survey, you discover that the pump was actually running at 1.8 L/min. What was the correct dust concentration?
7. A worker is only exposed to lead 3 times during his 8 hour shift. The results from the air samples taken during these periods were as follows:
- 0.1 mg/m³ for 1 hour
- 0.2 mg/m³ for 2 hours
- 0.15 mg/m³ for 3 hours

What is his 8 hour TWA exposure (assuming that there was no exposure during the remainder of the shift)?

8. Why has direct reading instrumentation for aerosols only attracted limited use in occupational hygiene sampling?
9. What is a simple approach (albeit one that requires some skill) that can be used to highlight the presence of dust particles in a workplace?
10. Why is a conductive cowl necessary when sampling for asbestos fibres?
11. Describe in detail the step-by-step method of calibrating a mechanical pump as part of a sampling train for respirable dust using a soap film bubble meter (ensuring you name each part). You may draw the equipment set-up as part of your answer.
12. An employee has presented to the company doctor showing signs of metal fume fever as a result of exposure to zinc fumes from the welding of galvanised steel.

You are the Occupational Hygienist at this plant and have been asked by the chairman of the site OH&S Committee to investigate and provide assistance. Describe in detail how you would sample for zinc. Apart from zinc, would you consider other analysis of the samples you collect?

13. What are the two key factors which are of importance when assessing exposure to dusts, fumes or fibres?
14. How is it possible to collect respirable dust which has an ISO defined 50% cut point of 4 μm with PVC filters of 5 μm pore size without major losses through the filter?
15. In some countries, standard sampling methods require that when sampling welding fume the sampling head must be positioned under the welder's protective face shield. What are the reasons for this approach?