

M501: MEASUREMENT OF HAZARDOUS SUBSTANCES INCLUDING RISK ASSESSMENT

ANSWERS TO OVERNIGHT REVISION QUESTIONS – DAY 1

1. Lungs and airways.
2. In the deep reaches of the lungs called “alveoli”.
3. Inhalation, skin absorption, ingestion and the eyes (to a lesser extent).
4. Refer to section 2.4 of the Student Manual for a full discussion on this important topic.
5. The term “threshold” is used in toxicology to describe the dividing line between no-effect and effect levels of exposure.
6. See section 3.1 of the Student Manual.
7. See section 3.2.1 of the Student Manual.
8. See section 3.2.4 of the Student Manual.
9. The questions ask you to describe the risk assessment process as indicated in section 3 of the Student Manual. If the risk was established as being significant then application of hierarchy of control would be appropriate.
10. Fast acting substances that give rise to irritation, chronic or irreversible tissue damage, dose-rate dependent toxic effects, narcosis likely to increase the risk of accident or injury.
11. Do not exceed an excursion limit of 3 (UK) or 5 (USA) times the TWA exposure limit.
12. Should apply principles of good occupational hygiene practice and identify appropriate control measures.
13. Indicates the possibility of direct skin absorption which could make a significant contribution to exposure.

$$14. \quad C_1/TLV_1 + C_2/TLV_2 + \dots C_n/TLV_n \leq 1$$

$$15. \quad \begin{aligned} \text{TWA 8 hour exposure} &= \frac{(1350 \times 1) + (220 \times 2) + (50 \times 5)}{8} \\ &= 255 \text{ ppm} \end{aligned}$$

$$16. \quad \begin{aligned} \text{TWA exposure} &= \frac{12 \times 10}{8} \\ &= 15 \text{ ppm} \end{aligned}$$

The recovery time between potential exposures is reduced and depending on the biological half life of the compound, accumulation of the compound in the body may occur.

$$17. \quad \begin{aligned} \text{TWA (8 hours)} &= \frac{6 \times 10 + 6 \times 0}{8} \\ &= 7.5 \text{ mg/m}^3 \end{aligned}$$

$$18. \quad \begin{aligned} \text{TLV mg/m}^3 &= \text{TLV (ppm)} \times \frac{\text{MOL WT}}{24.45} \\ &= 0.5 \times \frac{78.11}{24.45} \\ &= 1.6 \text{ mg/m}^3 \end{aligned}$$

19. Occupational Exposure Limits (OELs), Threshold Limit Values (TLVs), Exposure Standards (ES), Workplace Exposure Limits (WEL).

20. Because the legislation governing NIOSH requires it to propose exposure standards that protect all persons in the workplace, whereas other bodies project "nearly all workers".