

注意：請於答案卷上作答；本份試卷共四大部分，合計題數：43 題

※注意：選擇題請於試卷之「選擇題作答區」依序作答。

I. 單選題：每題 2 分，29 題，共 58% (請於答案卷上作答)

1. Which of the following chemicals is the most toxic? Chemical A: LD50 of 50 mg/kg; Chemical B: LD50 of 100 mg/kg; Chemical C: LD50 of 200 mg/kg. (A) Chemical A; (B) Chemical B; (C) Chemical C
2. In toxicology, which of the following terms describes the situation where the combined effect is greater than the sum? (A) additive; (B) synergistic; (C) potentiation; (D) antagonism
3. "Minamata disease" was originally identified from which type of exposures? (A) ingestion; (B) inhalation; (C) dermal
4. Which of the following compounds is not one of the criteria air pollutants? (A) ozone; (B) carbon monoxide; (C) carbon dioxide; (D) nitrogen dioxide
5. Does DDT belong to which of the following types of pesticides? (A) carbamates; (B) pheromones; (C) organochlorine; (D) organophosphate
6. Photoionization detectors (PID) are usually used to measure which of the following indoor air pollutants? (A) carbon monoxide; (B) particulate matters; (C) formaldehyde; (D) total volatile organic compounds
7. Does the radiation from mobile phones belong to which of the following categories? (A) radio frequency; (B) extreme low frequency; (C) microwave radio; (D) very low frequency
8. Which of the following pollutants are commonly removed by the "electrostatic precipitators"? (A) particulate matters; (B) volatile organic compounds; (C) inorganic gaseous compounds; (D) formaldehyde
9. Chlorine is one of the most effective agents for water treatment. What is the common relationship between its disinfection efficiency and the pH value? (A) not affected by pH value; (B) improved when having higher pH value; (C) improved when having lower pH value
10. Which of the following treatment techniques of hazardous wastes best describe the 'physical movement of a solvent across the membrane boundary, where external pressure is applied to the side of less solvent concentration'? (A) dialysis; (B) reverse osmosis; (C) filtration
11. "Impactors" are usually used to measure which of the following parameters of airborne particulate matters? (A) mass concentration; (B) number concentration; (C) surface area; (D) electrical charge
12. Which type of agents are mainly responsible for the "Legionnaires' disease"? (A) gaseous pollutants; (B) radiation; (C) virus; (D) bacteria
13. Regarding the atmospheric stability, usually how we call the condition when the actual air temperature profile decreases more rapidly with altitude than the adiabatic rate? (A) stable; (B) neutral; (C) unstable
14. Which type of pollutants is mainly measured by the inductively coupled plasma mass spectrometry? (A) volatile organic compounds; (B) metals; (C) bioaerosols; (D) ozone
15. Which of the following radiation has the least penetration ability? (A) x ray; (B) gamma ray; (C) beta particles; (D) alpha particles
16. Which of the following gases has the least global warming potential (GWP)? (A) nitrous oxide; (B) methane; (C) carbon dioxide; (D) CF₄
17. Which of the following statement is least accurate for most persistent organic pollutants (POPs)? (A) POPs are typically semi-volatile compounds; (B) POPs with lower molecular weights are more toxic; (C) POPs have the ability to bioaccumulate and biomagnify
18. A rotameter is put in front of a sampling train to: (A) Reduce the pressure drop; (B) Increase collection efficiency; (C) Measure flow rate at atmospheric pressure; (D) Increase the pressure drop

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19. What is the least likely method of sampling for dust which will produce a sample that can be analyzed by using x-ray analysis? (A) Impingers; (B) Charcoal tube; (C) MCE Filters; (D) PVC Filters
20. Ergonomists should have the following knowledge and skills to practice professionally: (A) Identify knowns and unknowns in conjunction with problem-solution opportunities and constraints; (B) Model the system with respect to design, training, and personnel selection implication using simulations and mock-ups; (C) Design human-equipment-environment interfaces, job performance aids, training/selection procedures, materials, and facilities; (D) All of the above
21. Evidence suggests that short term occupational exposure to vibration causes: (A) Severe physiological effects on the body; (B) Moderate physiological effects on the body; (C) Increased risk to the spine and the peripheral nervous system, the digestive system, and the reproductive system; (D) Only small physiological effects which are reversible
22. Effective temperature is an empirically determined index of the degree of warmth perceived on exposure to different combinations of: (A) Temperature, humidity, and air movement; (B) Temperature, humidity, and clothing; (C) Temperature and humidity; (D) Wet bulb, dry bulb, and radiant heat
23. Which respirator is an air-purifying type? (A) Abrasive blasting helmet; (B) Particulate filter; (C) Gas mask; (D) B and C above
24. Blood and urine samples for lead analysis are ashed in order to: (A) Volatilize lead; (B) Concentrate the lead; (C) Destroy interfering organics; (D) Both B) and C)
25. Benzene is metabolized by the body to form which metabolite? (A) Urea; (B) Phenol; (C) Cyclohexane; (D) Hexane
26. The assessment of adverse effects on health through biological functioning evaluation is: (A) Environmental assessment; (B) Biological monitoring; (C) Medical monitoring; (D) Biochemical evaluation
27. Dilution ventilation is: (A) Used to control a contaminant at its source; (B) Used for controlling vapors having low toxicity; (C) More economical than local exhaust ventilation; (D) Is the first consideration for hazard control
28. The sample extraction protocol for purposes of the Toxicity Characteristic is: (A) Extraction Procedure (EP) Toxicity; (B) Toxicity Characteristic Leaching Procedure; (C) Paint filter liquids test; (D) Gas Chromatography/Mass Spectrophotometry (GC/MS)
29. The biological effects of exposure to a laser are dependent on all of the following except: (A) The beam temperature; (B) Beam characteristics; (C) Wavelength of laser light; (D) Angle

II. 填空題，兩題，每空格 2%，共 6% (請於答案卷上作答)

30. The major components of risk analysis are risk assessment, _____ (請於答案卷上作答), and _____ (請於答案卷上作答).
31. The equation for calculating cancer risks from exposures to air pollutants are usually given as exposure concentration \times _____ (請於答案卷上作答).

III. 簡答題，兩題，共 16% (請於答案卷上作答)

32. A group of community residents complains about the odorous air pollutants from the nearby industrial complex. Please design a study to help them identifying the responsible emission sources. (10%)
33. What is the major exposure route of acrylamide? What are the possible health effects from the exposures of acrylamide? (6%)

IV 配合題：請自下列右方的選項中選擇最合適的答案；單選；選取兩個或以上者不給分。(每題 2 分，共 20%) (請於答案卷上作答)

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| 34) Respirable particle | A) The noise scale discriminates against higher frequencies |
| | B) A general term denoting the quantity of radiation or energy absorbed by a specified mass |
| 35) dBC | C) Unit of absorbed radiation dose equal to one joule of absorbed energy per kilogram of matter. |
| | D) A disease of the lungs caused by the inhalation of silica dust |
| 36) Cumulative trauma disorder | E) The potential velocity exerted in all directions by a fluid at rest |
| | F) Deposited in the gas-exchange region of the human respiratory tract |
| 37) Curie | G) Occupational Safety and Health Administration |
| | H) National Institute for Occupational Safety and Health |
| 38) Permissible exposure limit, PEL | I) The noise scale discriminates little against low frequencies |
| | J) A measure of the rate at which a radioactive material emits particles |
| 39) Anemometer | K) American Conference of Governmental Industrial Hygienists |
| | L) A device for measuring the wind speed |
| 40) Heat cramps | M) Deposited anywhere in the human respiratory tract |
| | N) A sharp burst of sound |
| 41) Frostbite | O) Globe bulb temperature |
| | P) Intermixing of different substances to produce uniformity of concentration |
| 42) Molecular diffusion | Q) A device to measure pressures near to atmospheric |
| | R) Electrolyte imbalance caused by prolonged sweating without adequate fluid and salt intake |
| 43) Silicosis | S) The irregular movement of particles suspended in a fluid as a result of bombardment by atoms and molecules. |
| | T) A disorder of a musculoskeletal or nervous system caused by forceful movements of the same musculoskeletal systems |
| | U) A disease of the lungs caused by inhalation of fine airborne fibers. |
| | V) Net transport of molecules in a concentration gradient |
| | W) Exposure to cold; vascular disease |
| | X) A hydrated magnesium silicate in fibrous form |

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