HKIOEH

Registration of Professional Occupational Hygienist

Examination Information

Examination Board of HKIOEH

For more information or application materials, contact:

Chairman
Examination Board
HKIOEH

GENERAL

To assist candidates who are preparing for the examination for Registration of Professional Occupational Hygienist, the Examination Board of HKIOEH provides the following information. The information is intended to supplement, not replace, the information provided in the Regulations of the Board of Registration of HKIOEH.

The examination consists of two parts and each part contains 240 multiple choice type questions. Part 1 will be given on the first day of the examinations. It will cover basic principles and facts that every occupational hygienist should know, regardless of the aspect in which he or she may specialize. Part 2 will be given on the second day of the examinations. It will extend in depth and breadth over the entire area covered by Part 1 Examination.

The Part 1 Examination and the Part 2 Examination are designed to test an individual's knowledge across the broad general practice of occupational hygiene. Questions may be expected in all technical areas. In addition to the technical areas, the Part 2 examination will contain questions in a management area. .

EXAMINATION PROCEDURES

1. Each examination will be conducted in two sessions.
2. The morning session starts at 9AM and ends at 12 Noon
3. The afternoon session starts at 2 PM and ends at 5 PM.
4. Candidates are expected to arrive the examination room 10 minutes before the commencement of each session.
5. No candidate will be admitted after the examination has been started for half and hour.
6. Candidates arrived after the start of the examination will not be given additional time.
7. No candidate can leave the examination area in the first half hour of the examination.
8. No candidate can leave the examination area in the last fifteen minutes.
9. Candidates must bring along their Hong Kong Identity Card or Passport and the letter of admission from the Board for verification by the invigilator.
10. All questions will be of multiple choice type
11. The Board will provide all examination books and answer sheets for each session and pencils.
12. Examinees may use a non-programmed calculator and may bring spare calculator batteries.
13. The Board is not responsible for the supply of electrical power at the examination room.
14. Personal computers are not permitted in the examinations
15. Candidates are required to use only the pencils which are provided by the Board.
16. Books, manuals, notes or other reference materials are not allowed in the examination room..
17. The Examination Board may change the rules when required. However candidates will be advised at least two months before the date of the examination.

INSTRUCTIONS TO CANDIDATES

Instructions are given on the first page of the examination paper.

SCORING OF EXAMINATIONS

1. 1 mark will be awarded for each correct answer.
2. No mark will be deducted for wrong or unattempted question.
3. All questions carry equal mark.
4. The passing mark for each part of the examination is 70%

USEFUL REFERENCES IN OCCUPATIONAL HYGIENE

HKIOEH Examination questions are taken from a variety of sources in the literature to reflect the underlying purposes and principles of occupational hygiene as well as the current knowledge which is expected of the occupational hygienist. The following abbreviated list includes references which are considered valuable by individual Board members and other Registered Professional Occupational hygienists. The list is not a complete bibliography of the occupational hygiene literature, nor does it include the sources of all questions in the examinations.

Texts

1. Bioaerosols: Assessment and Control, ACGIH. Cincinnati, OH: ACGIH, 1999.
2. Casarette and Doull's Toxicology: The Basic Science of Poisons, Fifth edition.
3. C.D.Klaassen, M.O. Amdur, and J. Doull, Editors. New York: McGraw Hill, 1995.
4. Design of Industrial Ventilation Systems, Fifth Edition. J.L. Alden and J.M. Kane. New York: Industrial Press, 1982.
5. Engineering Control of Workplace Hazards. R.A. Wadden and P.A. Scheff. New York: McGraw Hill Book Co., 1987.
6. Ergonomic Design for People at Work. Eastman Kodak Company Staff, New York: Van Nostrand Reinhold. Volume I. 1983. Volume II. (Subtitled The Design of Jobs). 1986.
7. Part 1s of Epidemiology, Third Edition. D.E. Lillienfeld and A.M. Lillienfeld. New York: Oxford University Press, 1994.
8. Fundamentals of Occupational hygiene, Fourth Edition. B.A. Plog, J. Niland, and P.J. Quinlan, Editors. Chicago: National Safety Council, 1996.
9. Hamilton and Hardy's Industrial Toxicology, Fourth Revised Edition. A.J. Finkel, Editor. Littleton, MA: PSG Publishing, 1991.
10. Handbook of Ventilation for Contaminant Control, Second Edition. H.J. McDermott. Stoneham, MA: Butterworth, 1985.
11. Indoor Air Quality, Second Edition. P.J. Walsh, C.S. Dudney, and E.L. Copenhaver. Boca Raton, FL: CRC Press, 1993.
12. In-Plant Practices for Job-Related Health Hazards Control, L.V. Cralley and L.J. Cralley, Editors. New York: John Wiley & Sons, 1989. Volume I, Production Processes, 1989. Volume II, Engineering Aspects, 1989.
13. Indoor Air and Human Health, Second Edition. R.B. Gammage and B.A. Berven. Boca Raton, FL: CRC/Lewis Publishers, 1996.
14. Occupational hygiene Management. J.T. Garrett, L.J. Cralley and L.V. Cralley, Editors. New York: John Wiley & Sons, 1988.
15. Introduction to Health Physics, Second Edition. H. Cember. Elmsford, NY: Pergamon Press, 1983.

16. Management of People and Programs in Occupational hygiene. F.M. Toca and D. Woodhull. Fairfax, VA: AIHA Press, 1996.
17. Modern Occupational hygiene, Vol.1 - Recognition and Evaluation of Chemical Agents. J.L Perkins. New York: Van Nostrand Reinhold, 1997.
18. Occupational Biomechanics, Second Edition. D.B. Chaffin and G.B. Anderson. New York: John Wiley & Sons, 1991.
19. The Occupational Environment: Its Evaluation and Control. S.R. DiNardi, Editor. Fairfax, VA: AIHA Press, 1997.
20. Occupational Safety and Health Guidance Manual For Hazardous Waste Site Activities, NIOSH, the OSHA, the US Coast Guard, and EPA. Cincinnati, OH: NIOSH. 1985.
21. Patty's Occupational hygiene and Toxicology. G.D. Clayton and F.E. Clayton, Editors. New York: John Wiley and Sons, 1991-1994.
22. Plant and Process Ventilation, Third Edition, W.C.L. Hemeon, D.J. Burton. Boca Raton, FL: Lewis Publishers, 1998.
23. Practitioner's Approach to Indoor Air Quality Investigations, AIHA. Fairfax, VA: AIHA Press, 1989.
24. Proctor and Hughes' Chemical Hazards of the Workplace, Fourth Edition. G. Hathaway, N.H. Proctor, J.P. Hughes. New York: Van Nostrand Reinhold, 1996.
25. Protecting Personnel at Hazardous Waste Sites, Second Edition. S.P. Levine and W.F. Martin, Editors. Stoneham, MA: Butterworth, 1994.
26. Radiation Protection: A Guide for Scientists and Physicians, Third Edition. J. Shapiro. Cambridge, MA: Harvard University Press, 1990.
27. Research Methods in Occupational Epidemiology, H. Checkoway, N.E. Pearce, and D.J. Crawford-Brown. New York: Oxford University Press, 1989.
28. Recognition of Health Hazards in Industry: A Review of Materials and Processes, Second Edition. W. A. Burgess. New York: Wiley-Interscience, 1995.
29. Safety with Lasers and Other Optical Sources: A Comprehensive Handbook. D.H. Sliney and M.L. Wolbarsht. New York: Plenum Publishing Corp., 1980.
30. Work Design: Industrial Ergonomics, Fourth Edition. S.A. Konz. Scottsdale, AZ: Holcomb Hathaway, 1995.

HANDBOOKS AND MANUALS

1. Air Sampling Instruments Handbook, Eighth Edition. Cincinnati, OH: ACGIH, 1995.
2. Encyclopedia of Occupational Health and Safety, Fourth Edition. J. Mager Stellman, Editor. Four Volumes. Geneva: International Labour Office, 1997.
3. Guidelines for the Selection of Protective Clothing, Third Edition. A.D. Schwope, P.P. Costas, J.O. Jackson, J.O. Stull, E.J. Weitzman. Cincinnati, OH: ACGIH, 1987.

4. Industrial Ventilation, A Manual of Recommended Practice, Twenty-third Edition. Committee on Industrial Ventilation. Cincinnati, OH: ACGIH. 1998.
5. NIOSH Guide to Industrial Respiratory Protection, N.J. Bollinger and R.H. Schutz. NIOSH Publication No. 87-116. Cincinnati, OH: NIOSH, 1987.
6. NIOSH Manual of Analytical Methods, Fourth Edition. Cincinnati, OH: NIOSH, 1997.
7. Noise and Hearing Conservation Manual, Fourth Edition. E.H. Berger, W.D. Ward, J.C. Morrill, and L.H. Royster, Editors. Fairfax, VA: AIHA Press, 1986.
8. OSHA Analytical Methods Manual, OSHA Analytical Laboratories. Salt Lake City, UT. 1985, Supplements 1991 and 1993.
9. Respiratory Protection: A Manual and Guidelines, Second Edition. Fairfax, VA: AIHA, 1991.

REGULATIONS, STANDARDS, GUIDELINES

1. Factories and Industrial Undertakings Ordinance and Regulations
2. Occupational Safety and Health Ordinance and Regulations
3. Code of Practice on Control of Air Impurities (Chemical Substances) in the Work Place (published by the Labour Department)
4. Code of Practice for Working with Display Screen Equipment (published by the Labour Department)
5. Guidance on Diagnosis of Occupational Disease (published by the Labour Department)
6. Guidance and Codes of Practice relating to Occupational Health and Occupational Hygiene (Published by the Labour Department)
7. Dangerous Goods Ordinance
8. Radiation Ordinance and Regulations
9. Air Pollution Control Ordinace & Regulations
10. Chemical Waste Ordinacne & Regulations
11. Noise Pollution Control Ordinace & Regualtions
12. Criteria for a Recommended Standard: ...(various topics). Cincinnati, OH: National Institute for Occupational Safety and Health.
13. The Documentation of TLVs and BEIs, Sixth edition. Cincinnati, OH: ACGIH. 1993-1997
14. NIOSH/OSHA Occupational Safety and Health Guidelines for Chemical Hazards, NIOSH and OSHA. Washington, DC: U.S. Government Printing Office.
15. TLVs: Threshold Limit Values and Biological Exposure Indices, (Includes threshold limit values for chemical substances and for physical agents). Cincinnati, OH: ACGIH (Issued annually).
16. Workplace Environmental Exposure Level Guides, AIHA WEEL Committee. Fairfax, VA: AIHA Press, 1980-1998.

TEST SPECIFICATIONS

Part 1 and Part 2

Recognizer of Health Stressors

- Foresee health stressors in plants and operations
- Identify potential workplace health stressors
- Recognize existing exposures to health stressors
- Set priorities by recording/organizing/analyzing data

Evaluator of Health Stressors

- Develop data collection plan
- Obtain samples/make observations of environmental factors
- Analyze biological and environmental specimens
- Analyze/interpret results of observations

Controller of Health Stressors

- Educate people about health and environmental stressors
- Prescribe appropriate personal protective equipment (PPE)
- Design and/or prescribe engineering controls
- Design and/or prescribe administrative measures
- Communicate recommendations to appropriate people
- Verify efficiency of control measures

Ethics

- Standards of ethical and professional conduct

Part 2 also include

Manager of Occupational hygiene Program +

- Develop, implement, and evaluate the industrial hygiene program

AREAS DEFINITIONS

Examination questions are categorized generally in the following areas.

Areas of Occupational hygiene Knowledge

Air Sampling and Instrumentation

Selection, use and limitations of field air-sampling instruments, full shift and grab samples, including direct reading instruments. Included are the set-up, calibration and use (including quality assurance practices) of air-sampling apparatus and direct reading instruments. Sampling strategy considerations are included. Calculations related to sampling and calibration are included. Measurement of exposures to noise, ionizing radiation, non-ionizing radiation, and thermal stressors are included in the areas dealing with those specific subject areas.

Analytical Chemistry

Laboratory analytical procedures for work place environmental samples and related calculations. Included are gas chromatography, infrared, visible and ultraviolet spectrophotometry, high performance liquid chromatography, mass spectroscopy, atomic absorption spectrophotometry, wet chemical methods, and microscopy and laboratory quality assurance and chain of custody.

Basic Science

General scientific concepts, chemistry, biochemistry, biology, anatomy and physiology, general physics and mathematics. Properties of flammable, combustible and reactive materials (compatibility) are included. Included are calculations such as those relative to gas laws, airborne concentrations, and unit-of-measure conversions and conditions of non-standard pressure.

Biohazards

Principles of sanitation, personal hygiene, the recognition, evaluation and control of biological agents or materials having the capacity to produce deleterious effects upon other biological organisms, particularly humans (virus, bacteria, fungi, molds, allergens, toxins, recombinant products, bloodborne pathogens, etc.) and infectious diseases that appear in workplaces including industry, agriculture, offices and health care facilities.

Biostatistics & Epidemiology

Principles of epidemiology, techniques used to study the distribution of occupationally induced diseases and physiological conditions in workplaces and factors that influence their frequency. It includes concepts of prospective and retrospective studies, morbidity and mortality and animal experimental studies, data and distribution of data. Also included are basic biostatistics and statistical and non-statistical interpretation of data in the evaluation of hazards.

Community Exposure

Air pollution, air cleaning technology, ambient air quality considerations, emission source sampling, atmospheric dispersion of pollutants, ambient air monitoring, health and environmental effects of air pollutants and related calculations. This also includes other environmental subjects such as chemical emergency planning and response.

Engineering Controls/Ventilation

Control of chemical and physical exposures through engineering measures. Included are local exhaust ventilation, dilution ventilation, isolation, containment and process change. Also included are mechanics of airflow, ventilation measurements, design principles and related calculations. This rubric also covers in-plant recirculation air-cleaning technology. Engineering control of ionizing and non-ionizing radiation, thermal stressors, and noise and vibration sources including principles of isolation, enclosure, absorption and damping are included in the areas dealing with those specific subject areas.

Ergonomics

Application of principles from anthropometry, human factors engineering, biomechanics, work physiology, human anatomy, occupational medicine and facilities engineering to the design and organization of the workplace for the purpose of preventing injuries and illnesses.

Health Risk Analysis and Hazard Communication

Understanding of principles and requirements for the interpretation and use of guidelines for the assessment of health hazards, including:-

a. Hong Kong Labour Department Occupational Exposure Limits (OEL)
b. American Conference of Governmental Occupational hygienists (ACGIH) Threshold Limit Values (TLVs), Biological Exposure Indices (BEIs)
c. Health and Safety Executive EH40
d. Industrial ventilation guidelines,
e. American Society for Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) guidelines,
f. American Industrial Hygiene Association (AIHA) Workplace Environmental Exposure Level (WEEL) guides,
g. National Institute for Occupational Safety and Health (NIOSH) Criteria Documents and recommendations.
h. Hazard communication and training of employees
i. Communication of recommendations by appropriate techniques to implement control actions

Management and Ethics
Acquisition, allocation and control of resources to accomplish industrial hygiene anticipation, recognition, evaluation and control objectives in an effective and timely manner. Included are such topics as establishment of policy, planning and budgeting, delegation of authority, productivity, accountability, communication, staff versus line authority, organizational structure, performance evaluation and decision making. This rubric also includes ethics.

Noise & Vibration
Health effects resulting from exposure to noise and vibration. Computations related to combining noise sources and octave band measurements are included as are audiometric testing programs. Includes exposure measurement, evaluation, and control.

Non-Engineering Controls
Personal protective equipment, including the principles governing selection, use and limitations of respirators and protective clothing. Included are respirator fit testing, breathing air specifications, glove permeability, eye protection and the use of administrative controls.

Radiation/Ionizing
Physical characteristics and health and biological effects associated with alpha, beta, gamma, neutron and x-radiation, including source characteristics. Includes exposure measurement, evaluation, and control.

Radiation/Non-ionizing
Physical characteristics and health effects associated with electromagnetic fields, static electric and magnetic fields, lasers, radio frequency, microwaves, ultraviolet, visible, infrared radiation and illumination. Includes exposure measurement, evaluation, and control.

Thermal Stressors
Adverse health effects associated with heat and cold, symptoms of temperature-related health effects, exposure control techniques, and first-aid/medical response.

Toxicology
Health effects resulting from exposure to chemical substances. Included are symptomatology, pharmacokinetics, mode of action, additive, synergistic and antagonistic effects, routes of entry, absorption, metabolism, excretion, target organs, toxicity testing protocols and aerosol deposition and clearance in the respiratory tract. Also included are carcinogenic, mutagenic, teratogenic and reproductive hazards

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Work Environments and Industrial Processes

Included are the hazards associated with specific industrial or manufacturing processes. Topics include, but are not limited to confined space entry, spray-painting, welding, abrasive-blasting, vapour-degreasing, foundry operations, and hazardous waste site remediations, as well as general indoor environmental issues.