

National Exams May 2016
98-Ind-B6 - Workplace Design
3 hours duration

Notes:

1. If doubt exists as to the interpretation of any question, the candidate is urged to submit with the answer paper, a clear statement of any assumptions made.
2. This is a Closed Book exam. Candidates may use one of two calculators, the Casio or Sharp approved models.
3. Any five questions constitute a complete paper. Only the first five questions as they appear in your answer book will be marked.
4. All questions are of equal value.
5. Write your answers in point-form whenever possible, but fully. Show all the calculations.

Marking Scheme (marks)

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|----|--------|---------|---------|
| 1. | (i) 6, | (ii) 7, | (iii) 7 |
| 2. | (i) 7, | (ii) 8, | (iii) 5 |
| 3. | (i) 7, | (ii) 6, | (iii) 7 |
| 4. | (i) 6, | (ii) 8, | (iii) 6 |
| 5. | (i) 7, | (ii) 6, | (iii) 7 |
| 6. | (i) 7, | (ii) 6 | (iii) 7 |
| 7. | (i) 6, | (ii) 7, | (iii) 7 |

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1. (i) Explain the types of compatibility in the context of human information processing.
(ii) Explain when to use auditory or visual display form of presentation of information or message.
(iii) Explain the concept of signal detection theory (SDT) by means of a diagram.
2. (i) State the “task characteristics” that should be considered in designing manual materials handling job or task to minimize industrial hazard.
(ii) State the guidelines that should be followed to reduce the risk of performing manual materials handling job or task.
(iii) What are the most promising engineering solutions to minimize industrial hazards arising from performing manual materials handling job or task?
3. (i) State the factors affecting the level of energy consumption on a particular task.
(ii) Explain the means by which energy expenditure can be maintained within reasonable limits for human work activities.
(iii) Define human strength. How are the static (isometric) and dynamic (isokinetic) strengths measured?
4. (i) What are the three distinct approaches to assessing manual materials handling or MMH capabilities? Explain.
(ii) State the factors responsible for back injuries in lifting tasks.
(iii) Explain the means by which the risk of MMH can be reduced.
5. (i) State the factors affecting the level of energy consumption on a particular task.
(ii) Explain the means by which energy expenditure can be maintained within reasonable limits for human work activities.
(iii) Define human strength. How are the static (isometric) and dynamic (isokinetic) strengths measured?
6. (i) State the general principles used in the application of anthropometric data.
(ii) Explain the concepts of: (a) horizontal work surface area, and (b) work surface height, in the context of workspace/workplace design.
(iii) State the general principles of seat design.
7. (i) What are the guiding principles of arranging components to facilitate performance of activities in the workspace.
(ii) Explain the types of links used in dealing with relationships between components.
(iii) State the general guidelines for designing workspaces that involve displays and controls.