

# Unit 5 - Week 3 : Human Factors in Product Design and Innovation

## Course outline

How does an NPTEL online course work?

Week 0 : Prerequisite

Week 1 : Design and Innovation

Week 2 : User Study and Contextual Enquiry

Week 3 : Human Factors in Product Design and Innovation

Quiz : Assignment 3

Lec 1 : Importance and Overview of Human Factors/Ergonomics in Product Design

Lec 2 : Physical Ergonomics Principles and Issues (Part 1) - Anthropometry

Lec 3 : Physical Ergonomics Principles and Issues (Part 2) - Biomechanics

Lec 4 : Cognitive and Emotional aspects of Human Factors with respect to Product Design and Innovation

Feedback form

Week 4: Concept Generation, Prototyping and Evaluation

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## Assignment 3

The due date for submitting this assignment has passed.  
As per our records you have not submitted this assignment.

**Due on 2020-02-19, 23:59 IST.**

- 1) Work-related musculoskeletal disorders are defined as 1 point
- Disorders in work only  
 Disorders in work and workplace  
 Disorders in musculoskeletal structures  
 Disorders in musculoskeletal structures and work
- No, the answer is incorrect.**  
**Score: 0**  
**Accepted Answers:**  
*Disorders in musculoskeletal structures and work*
- 2) What are the ergonomic risk factors that normally cause injuries at work? 1 point
1. Repetitive injuries 2. Awkward postures 3. Sudden collisions 4. Forceful exertion
- 1,2,3  
 2,3,4  
 3,4,1  
 4,1,2
- No, the answer is incorrect.**  
**Score: 0**  
**Accepted Answers:**  
*4,1,2*
- 3) Physical ergonomics is not concerned with \_\_\_\_\_ characteristic? 1 point
- Physiological  
 Psychological  
 Anatomical  
 Biomechanical
- No, the answer is incorrect.**  
**Score: 0**  
**Accepted Answers:**  
*Psychological*
- 4) Which of the following ergonomics principles reduce the biomechanical load on the human body? 1 point
- Ensure neutral body joints at work  
 Ensure work closer to the body  
 Ensure gradual lifting of materials  
 All of the above
- No, the answer is incorrect.**  
**Score: 0**  
**Accepted Answers:**  
*All of the above*
- 5) Which of the design principle is not suitable for the application of anthropometric data? 1 point
- Design for optimum  
 Design for average range  
 Design for extreme individuals  
 Design for adjustable range
- No, the answer is incorrect.**  
**Score: 0**  
**Accepted Answers:**  
*Design for optimum*
- 6) Which of the following is in accordance with ergonomics principles? 1 point
- The monitors should be kept outside the peripheral zone  
 Visual systems are preferable than auditory systems in noisy conditions  
 Dial needles made up of light reflective substance are preferable in dark conditions  
 None of the above
- No, the answer is incorrect.**  
**Score: 0**  
**Accepted Answers:**  
*Visual systems are preferable than auditory systems in noisy conditions*
- 7) Cognitive ergonomics is concerned with\_\_\_\_\_ 1 point
- Working posture  
 Physical process  
 Mental process  
 Working environment
- No, the answer is incorrect.**  
**Score: 0**  
**Accepted Answers:**  
*Mental process*
- 8) The requirements which the designer must fulfill to design a user centered workstation is 1 point
- Visual and temporal  
 Postural and aesthetic  
 Visual, postural and temporal  
 Visual, postural and aesthetic
- No, the answer is incorrect.**  
**Score: 0**  
**Accepted Answers:**  
*Visual, postural and temporal*
- 9) Which of the following includes the major domains of ergonomics 1 point
- Physical and cognitive  
 Cognitive and organisational  
 Organisational and physical  
 Physical, cognitive and organisational
- No, the answer is incorrect.**  
**Score: 0**  
**Accepted Answers:**  
*Physical, cognitive and organisational*
- 10) Ergonomics defines as 1 point
- The study of inventing new products  
 The study of customising products  
 The study of redesigning or modifying exiting products  
 The study of understanding human-machine-environment interaction
- No, the answer is incorrect.**  
**Score: 0**  
**Accepted Answers:**  
*The study of understanding human-machine-environment interaction*
- 11) It is recommended that the working table height should lie at workers' mean elbow height of \_\_\_\_\_ 1 point
- ± 5 cm  
 ± 10 cm  
 ± 15 cm  
 ± 20 cm
- No, the answer is incorrect.**  
**Score: 0**  
**Accepted Answers:**  
*± 5 cm*
- 12) The minimum stature height considered for doorway design is 1 point
- 95th percentile  
 75th percentile  
 50th percentile  
 25th percentile
- No, the answer is incorrect.**  
**Score: 0**  
**Accepted Answers:**  
*95th percentile*
- 13) The neutral position of any body joint means 1 point
- The only position when the person can work  
 The position that exerts minimum stress on the body  
 A position which is safe and protects only the back  
 The most difficult position for the body to hold
- No, the answer is incorrect.**  
**Score: 0**  
**Accepted Answers:**  
*The position that exerts minimum stress on the body*
- 14) A successful user centered product design must connect the user in all these aspects are 1 point
- Functionality and usability  
 Functionality and aesthetics  
 Functionality, aesthetics and usability  
 Aesthetics and usability
- No, the answer is incorrect.**  
**Score: 0**  
**Accepted Answers:**  
*Functionality, aesthetics and usability*
- 15) The famous pleasure model including physio-pleasure, socio- pleasure, and psycho- pleasure was introduced by 1 point
- P. W. Jordan  
 D. Norman  
 McCarthy and Wright  
 P. M. A. Desmet
- No, the answer is incorrect.**  
**Score: 0**  
**Accepted Answers:**  
*P. W. Jordan*
- 16) According to universal design principle, the design of scissors should consider 1 point
- Providing heavy handles for left handed users  
 Providing long handles to minimize force exertion  
 Providing ease of use to users both right and left handed  
 Providing electric battery to avoid force exertion
- No, the answer is incorrect.**  
**Score: 0**  
**Accepted Answers:**  
*Providing ease of use to users both right and left handed*
- 17) According to Norman's emotion model, the consumers' immediate judgment about the product related with which information processing level 1 point
- Behavioural  
 Visceral  
 Reflective  
 Selective
- No, the answer is incorrect.**  
**Score: 0**  
**Accepted Answers:**  
*Visceral*
- 18) The greater compatibility between the worker's ability and task leads to 1 point
- Greater the chance of worker injury/illness  
 Lower the chance of worker injury/illness  
 No impact on chance of worker injury/illness  
 None of the above
- No, the answer is incorrect.**  
**Score: 0**  
**Accepted Answers:**  
*Lower the chance of worker injury/illness*
- 19) Which is recognized as a safe desktop computer workstation posture from the point of biomechanics 1 point
- Standing on both feet, standing with one foot resting, reclined  
 Sitting tilted back  
 Standing forward, laying down, sitting up, sitting on knees  
 Sitting with arms supported, standing with no arm support, seated with foot support
- No, the answer is incorrect.**  
**Score: 0**  
**Accepted Answers:**  
*Sitting with arms supported, standing with no arm support, seated with foot support*
- 20) According to the man-machine-environment systems approach what are the elements of the design problem that should be considered to design of an automated in-vehicle informational system? 1 point
- Roadway surface design, audio displays, vehicle separation, tire design  
 Road capacity, vehicle density, innovative tail lighting system, reflectivity of the lane marking paint  
 Driver's age, experience, response times, roadway, lighting driver distractions  
 Demographics, vehicle design; road-rage, display visibility
- No, the answer is incorrect.**  
**Score: 0**  
**Accepted Answers:**  
*Driver's age, experience, response times, roadway, lighting driver distractions*