



Sample Exam Questions

The following questions are examples of multiple-choice questions across the core competencies, similar to the questions in the BCPE exam. These sample questions are statistically validated and © BCPE.

Answers to the sample questions are on pages following the questions. Please refer to the [exam reference list](#) for sources of these questions.

| Number | Question |
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| 1 | <p>Where should design limits be set if the target user population is unknown?</p> <ol style="list-style-type: none"> To limits that accommodate all users as to not be discriminatory. To limits that accommodate only the smallest and largest of the characteristic being dealt with. To limits that accommodate below the 10th and above the 90th percentile of the target population. To limits that accommodate about 90% of the target population. |
| 2 | <p>A chemical operator picks up 18.14 kg (40 lb) bags of sodium chloride from a pallet located on the floor, twists his body, and pours the bags into a hopper that is 91.44 cm (36 in) high. The plant ergonomist has been asked to determine whether this job is acceptable. Using the 1991 National Institute for Occupational Safety and Health (NIOSH) lifting guideline, the following results were obtained:</p> <p>RWL = LC x HM x VM x DM x AM x FM x CM RWL = 51 x .56 x .89 x .91 x .86 x 1.0 x .95 (US) RWL = 23 x .55 x .90 x .91 x .86 x 1.0 x .95 (metric)</p> <p>What is the FIRST modification the ergonomist should recommend in redesigning this job?</p> <ol style="list-style-type: none"> Bring the bag closer to the operator. Raise the height of the pallet above the floor. Reduce the travel distance of the lift. Reduce the amount of back twisting. |
| 3 | <p>The butchers at XYZ grocery are known for being very fast and cutting excellent cuts of meat. One butcher visited a physician after developing pain in his lateral epicondyle after many years of cutting meat for eight hours per day, using awkward wrist and neck postures, and moving in and out of the freezer all day. The company hired an ergonomist to analyze the work system in order to reduce butchers' discomfort. The ergonomist recommended ergonomic knives, weekly sharpening of knives, and the use of gloves. The ergonomist's recommendations slowed down the butchers, but decreased the forces required to cut meat and improved their wrist position. However, the butchers did not adopt the changes. Which of the following reasons is the MOST likely explanation for this lack of adoption?</p> <ol style="list-style-type: none"> The recommendations did not allow the butchers to meet the job demands. The butchers valued speed and precision; the recommendations interfered with their ability to execute tasks to their expectations and reputation. The butchers were resigned to the fact that they would work in pain. The butchers found the new changes to be an inconvenience as it changed their routines and use of favorite knives. |

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| 4 | <p>Which of following is NOT an appropriate method for gaining employee input into job improvements?</p> <ul style="list-style-type: none"> a. Videotaped analysis b. Informal discussion at job c. Formal written survey d. Supervisor-led brainstorming session |
| 5 | <p>In determining seat height adjustability, which of the following anthropometric measurements would be MOST useful?</p> <ul style="list-style-type: none"> a. Knee height b. Popliteal height c. Sitting height d. Thigh clearance |
| 6 | <p>Which of the following describes the MOST important benefit of personas?</p> <ul style="list-style-type: none"> a. They provide an exhaustive description of the anticipated user population. b. They describe the scenarios and requirements being implemented. c. They make assumptions about the users explicit. d. They engage the development team. |
| 7 | <p>What is the relationship between short-term memory (STM) and perception in human sensory input?</p> <ul style="list-style-type: none"> a. There is no relationship between STM and perception. b. STM affects the duration of the sensory memory. c. Perception of sensory input is placed into STM for encoding. d. STM helps expand bandwidth for unrelated perceptual inputs. |
| 8 | <p>For which industry did Occupational Safety and Health Administration (OSHA) develop its first written ergonomics guidelines?</p> <ul style="list-style-type: none"> a. Meatpacking b. Automotive c. Aeronautics (for cockpit design) d. Service industry (for computer work) |
| 9 | <p>A user experience professional must estimate how many participants are needed to test a new computer device. Previous research has shown differences between users based on age (users under 18, young adult users, and older adult users) and computer experience (high or low). There are three prototypes to test. Assuming the tester can test each prototype with each user, testing five participants per condition, how many participants are needed for this study?</p> <ul style="list-style-type: none"> a. 8 b. 18 c. 30 d. 90 |

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| 10 | <p>At which development stage is summative usability testing MOST likely performed?</p> <ul style="list-style-type: none"> a. After the product has been developed b. Before the product has been designed c. At the conceptual stage of product development d. At the prototype stage of product design |
| 11 | <p>Based on Rohmert's work, general guidelines have emerged regarding the percent of maximum voluntary force that should be exerted in repetitive work tasks. For endurance times of several minutes, which percentage of maximum voluntary force is MOST appropriate as a limit?</p> <ul style="list-style-type: none"> a. 15% b. 30% c. 50% d. 70% |
| 12 | <p>Which of the following components does the National Institute for Occupational Safety and Health (NIOSH) lifting equation NOT take into account?</p> <ul style="list-style-type: none"> a. Twisting b. Acceleration c. Coupling d. Load lifted |
| 13 | <p>Which of the following environments would NOT be subject to an external environment macroergonomic analysis?</p> <ul style="list-style-type: none"> a. Political environment b. Cultural environment c. Ambient environment d. Socioeconomic environment |
| 14 | <p>Which of the following steps comes FIRST in designing workstations?</p> <ul style="list-style-type: none"> a. Conduct an anthropometric study. b. Set specific design goals. c. Conduct a feasibility study. d. Decide on resources and high level requirements of the stake holders. |
| 15 | <p>Which one of following is NOT a factor that affects energy consumption of a human operator?</p> <ul style="list-style-type: none"> a. Methods of work b. Work posture c. Training d. Acoustic environment |
| 16 | <p>What type of analysis can be described as the evaluation of software completed by looking at the interface and trying to arrive at opinions of what is good and bad?</p> <ul style="list-style-type: none"> a. Heuristic evaluation b. Retrospective testing c. Focus groups d. Thinking aloud |

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| 17 | <p>Which of the following is an index of environmental heat widely used to evaluate industrial heat stress?</p> <ul style="list-style-type: none"> a. Dry bulb temperature b. Globe temperature and humidity c. Globe temperature d. Wet bulb globe temperature |
| 18 | <p>When the macroergonomics design of a system is poor, this often requires a large investment in:</p> <ul style="list-style-type: none"> a. Recruitment efforts and/or technology. b. Joint-optimization efforts. c. Promotion systems and training. d. Recruitment efforts and/or training. |
| 19 | <p>Which of the following changes is MOST effective in increasing performance in highly repetitive physical jobs?</p> <ul style="list-style-type: none"> a. Job rotation b. Improved lighting c. Pay raise d. Self-pacing |
| 20 | <p>Which of the following options BEST describes “Kaizen”?</p> <ul style="list-style-type: none"> a. Long term research project focused on workplace usability b. Education and training related to optimal work methods c. Focused effort of multiple personnel to solve a specific problem* d. Product design using Japanese concepts of simplicity. |
| 21 | <p>How should an ergonomist design an automated system for a car that will automatically follow the car in front of it?</p> <ul style="list-style-type: none"> a. The automation should always be engaged so as to prevent human error. b. A warning light should be provided that will tell the driver when to take control in cases where the automation does not know what to do. c. Provide the operator with alternative tasks so that they will not get bored during the drive. d. Provide a manual override and clear presentation of the state of the tasks the automation is performing compared to the goal state. |
| 22 | <p>In which of the following situations would an ergonomist NOT expect “contact stress”?</p> <ul style="list-style-type: none"> a. Competitive swimming b. Rowing in a lake c. Jogging in a city d. Watching high school basketball. |
| 23 | <p>Which of the following approaches is part of Taylor’s “principles of scientific management”?</p> <ul style="list-style-type: none"> a. Suggestion and argument as a means of influencing people b. Division of work between labor and management |

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| | <ul style="list-style-type: none"> c. Process Kaizen d. Unionization schemes |
| 24 | <p>Which of the following risk assessment tools only evaluates the risk for developing a disorder of the hand, wrist, forearm, or elbow?</p> <ul style="list-style-type: none"> a. Strain Index b. Rapid Upper Limb Assessment c. NIOSH Lifting Equation d. Liberty Mutual Manual Materials Handling Tables |
| 25 | <p>A version of a shareware computer application is designed to ask the user to purchase it before the application runs but allows the user to use the application without paying. The possible options on this start-up message are “Yes” and “No;” however, the location of these two buttons is reversed each time the application is opened. Which of the following BEST describes the probability of selecting an incorrect option (i.e., selecting “Yes” when “No” was the intended response)?</p> <ul style="list-style-type: none"> a. The probability would remain the same over time. b. The probability would increase over time. c. The probability would decrease over time as the users gain experience and learn the pattern of the button locations. d. The probability would vary depending on the level of attention afforded at each use of the product. |
| 26 | <p>When accidents occur, the human operator is often a contributing factor. However, more often than not, this person may be only the final trigger at the end of a series of earlier events. Factors such as poor interface design, inappropriate sleep schedules and fatigue, management attitudes that overemphasize productivity, and concerns about consequences of self-reporting of incidents represent accidents waiting to happen. These are prevalent in healthcare. These factors could be considered characteristics of which of the following?</p> <ul style="list-style-type: none"> a. Safety culture b. Employee characteristics c. Written warning and warning labels d. Hazard identification |
| 27 | <p>The majority of users using a multi-line office telephone with call waiting, hold, and forwarding functions and a voice-mail system, cannot properly operate most of these features. Ignoring the cost of redesign, where would human factors make the MOST significant contribution to the ultimate usability of the system?</p> <ul style="list-style-type: none"> a. In the initial stages of the system’s design, investigate the users’ expectations and experiences to provide natural mappings between the telephone system’s functions and users’ control actions. b. In the redesign of the telephone interface, provide the users with labels for each of the telephone’s buttons and functions to aid their memory. c. In the creation of an instruction manual with clearly tabbed sections for each of the telephone’s functions and step-by-step instructions for users, provide instructions for the most commonly used functions on a separate “quick reference” card. d. In the creation of a short, online training module, explain the telephone system’s features and their operation. |

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| 28 | <p>A job that has been previously redesigned appears to remain physiologically stressful and may need to be redesigned yet again. What is the single best measure to use to determine whether this job is within the energy expenditure capabilities of the operator?</p> <ul style="list-style-type: none"> a. Breaths/minute b. Blood pressure c. Heart rate d. Borg - RPE |
| 29 | <p>Elderly drivers (65 years +) tend to have a higher number of motor vehicle accidents than drivers aged 25-64 years. Failure in which one of the following attention indices would be most logical to explain this difference?</p> <ul style="list-style-type: none"> a. Focused attention b. Divided attention c. Selective attention d. Sustained attention |
| 30 | <p>Which of the following NIOSH Lifting Equation (LE) multiplier factors has the highest potential impact on the overall Recommended Weight Limit (RWL).</p> <ul style="list-style-type: none"> a. Vertical Multiplier (VM) b. Distance Multiplier (DM) c. Asymmetric Multiplier (AM) d. Horizontal Multiplier (HM) |
| 31 | <p>What type of information should be used with breadcrumb navigation?</p> <ul style="list-style-type: none"> a. Hierarchical information b. Heterogeneous information c. Short lists of any information type as long as it doesn't exceed seven items d. Contextual categories of information |
| 32 | <p>There is concern that a worker might experience carpal tunnel syndrome. Which strategy will provide the LEAST benefit?</p> <ul style="list-style-type: none"> a. Provide gloves to reduce the concentration of force. b. Redesign the job the reduce wrist deviation. c. Decrease the hand forces to move, push, or pull objects. d. Decrease the number of times per day the job is performed. |
| 33 | <p>How should a warning system be designed to notify workers on an assembly line to evacuate the building?</p> <ul style="list-style-type: none"> a. Have blinking red text on a white background positioned next to exit doors. b. Have a speech signal using an emotional female voice speaking at a fast rate followed by five second alarm tone and blinking lights. c. Have a speech signal using a monotone male voice speaking at a slow, deliberate rate delivering a concise message followed by a ten second alarm tone and blinking lights. d. Have a minimum ten second alarm tone followed by verbal evacuation message and blinking lights. |

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| 34 | <p>Which of the following would LEAST likely be encountered on a long airplane ride?</p> <ul style="list-style-type: none"> a. Metabolic load b. Static load c. Inadequate clearance d. Pressure points |
| 35 | <p>The NIOSH Lifting equation is intended to analyze jobs involving:</p> <ul style="list-style-type: none"> a. Static manual material handling b. Carrying loads c. Pushing loads d. Lifting materials with chain hoists |
| 36 | <p>If you design for a population of 500,000 office workers and design a chair that adjusts between the 5th and 95th percentile, approximately how many people will be uncomfortable in your chair?</p> <ul style="list-style-type: none"> a. 20,000 b. 50,000 c. 100,000 d. 150,000 |
| 37 | <p>A manufacturing company uses an indexing conveyor that stops in front of each operator for a specific time (cycle time) for an assembly operation. The management has asked an ergonomist to predict the effects of reducing the time allocated to the task. Which of the following results is NOT likely to occur?</p> <ul style="list-style-type: none"> a. Increased productivity with reduced quality b. Increased productivity with higher occupational safety and health costs c. Increased productivity at higher payroll costs d. Increased productivity with increased worker morale |
| 38 | <p>A recent study of exercise levels involved in golf was undertaken to see if, from a physiological perspective, golf should be considered a sport. Four conditions were tested: carrying one's own golf bag and walking the course, having a caddie carry the bag for the player and walking the course, using a push cart for the golf bag and walking the course, and carrying the golf bag and riding in a golf cart between shots. The study had four groups of the same golfers play on the same course but varied the order of conditions in which they played (caddie, walking, pushing, and riding). What is this technique is known as?</p> <ul style="list-style-type: none"> a. Counterstressor b. Countermeasure c. Counterindication d. Counterbalancing |

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| 39 | <p>An operator is lifting 23kg (50lb) bags from a conveyor which is 51cm (20in) from the edge of the line at a hand working height of 76cm (30in). The operator places the bag on a table which is 38cm (15in) away, with a hand working height of 102cm (40in). The operator lifts 5 bags every minute for 2 hours, with 45 degrees of twisting at the end of the lift. If frequency and time on task cannot be changed due to production requirements, what change would most impact the NIOSH Lifting Equation analysis to reduce the NIOSH Recommended Weight Limit and Lifting Index results?</p> <ol style="list-style-type: none"> Reducing the Horizontal Distance at the start and end of the lift. Raising the Vertical Location. Reducing the Angle of Asymmetry (Twisting) Changing the bag to a tote with handles |
| 40 | <p>One problem with increased reliance on automation in complex system operation is skill loss. Which of the following skill types degenerates most quickly?</p> <ol style="list-style-type: none"> Cognitive skills Visual skills Perceptual motor skills Recognition skills |
| 41 | <p>The incidence rate of carpal tunnel syndrome differs between three different departments where department A is 3 times higher than either department B or C. The ergonomist can best compare the incident rates by using:</p> <ol style="list-style-type: none"> IR median IR average IR Chi-square IR standard deviation |
| 42 | <p>A manager in the data entry department is trying to determine if a new software program should be purchased. She knows that employees across the industry make an average of 25 data entry errors per day when using the legacy program. The manager is permitted to test the new program for 30 days. After 30 days, the manager finds that the employees committed an average of 20 errors per day with a standard deviation of 2. The manager has approval to purchase the new program, but only if she finds the employees make significantly less errors with the new program when compared with the legacy program (p must be less than .05). Based on this information, what should the manager conclude about the new program?</p> <ol style="list-style-type: none"> Employees commit significantly fewer errors with the new program when compared to the legacy program. Employees commit fewer errors with the new program, but the difference is not significant when compared to the legacy program. Because the standard deviation is small, the manager concludes that the difference between the errors made with the new program compared with the legacy program is statistically equal. Not enough information is provided. |

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| 43 | <p>An Ergonomics Professional uses the Rapid Upper Limb Assessment (RULA) method to evaluate a worker pulling rejects from an assembly line. The calculated RULA score is 5. What is concluded about the posture-related risk of the injury?</p> <ol style="list-style-type: none"> Working in best posture with no risk Working in a posture that could present some risk; investigate and correct task Working in a poor posture with a risk of injury; investigate and change task in the near future Working in the worst posture with an immediate risk; investigate and change immediately to prevent an injury |
| 44 | <p>When looking at OSHA recordable data, the incidence rate for injuries and illnesses is calculated as:</p> <ol style="list-style-type: none"> (number of new cases per year x 200,000 work hours) divided by (number of workers x 2,000 work hours). (number of new and existing injuries or illnesses cases) divided by (number of workers x 2,000 work hours). The running average of injuries or illnesses per 100 workers for the last quarter. The odds ratio of injuries or illnesses for each exposure group in the past 12 months. |
| 45 | <p>Which of the following describes how an ergonomist would design cutting shears to comply with the universal design principle of “flexibility in use.”</p> <ol style="list-style-type: none"> Provide a variety of sizes to accommodate users’ hand sizes. Provide handles with long levers to reduce the force required to cut materials. Design shears that can be used with either the left or right hand. Design shears that are battery or electric powered to minimize repetitive actions and force. |
| 46 | <p>According to what theory is worker learning best when the knowledge is related to their needs, draws upon their company culture, is interactive, written and has an action plan.</p> <ol style="list-style-type: none"> Universal Learning Theory Adult Learning Theory Learner Education Theory Adult Education Guidelines |
| 47 | <p>What is the MOST common rule of thumb measure for setting work height when standing?</p> <ol style="list-style-type: none"> Hip height Chest height Elbow height 100 cm (40 in) |
| 48 | <p>In the waning hours of daylight, a person falls after tripping over a decorative pot next to a walkway. The pot is made of a blue-green plastic. The person claims that the blue-green color was very difficult to see in the fading daylight. Disregarding other factors, is there a scientific basis for the claim that the color was difficult to see because of the decreased light?</p> <ol style="list-style-type: none"> Yes, all colors are difficult to see in reduced light. No, the human visual system becomes more sensitive to the blue-green part of the spectrum in diminishing light. Yes, humans aren’t very sensitive to that part of the color spectrum. No, as long as the ambient light level is above scotopic levels, all colors are equally easy to see. |

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| 49 | <p>A worker has a lifting related injury. Which of the following is LEAST likely to have occurred?</p> <ul style="list-style-type: none">a. Damage to the erector spinae musclesb. Compression damage to the intervertebral discc. Herniated discd. Damage to the shoulder rotator cuff |
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ANSWER KEY

| Number | Answer |
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| 1 | d. To limits that accommodate about 90% of the target population. |
| 2 | a. Bring the bag closer to the operator. |
| 3 | b. The butchers valued speed and precision; the recommendations interfered with their ability to execute tasks to their expectations and reputation. |
| 4 | a. Videotaped analysis |
| 5 | b. Popliteal height |
| 6 | c. They make assumptions about the users explicit. |
| 7 | c. Perception of sensory input is placed into STM for encoding |
| 8 | a. Meatpacking |
| 9 | c. 30 |
| 10 | a. After the product has been developed |
| 11 | a. 15% |
| 12 | b. Acceleration |
| 13 | c. Ambient environment |
| 14 | d. Decide on resources and high level requirements of the stake holders. |
| 15 | d. Acoustic environment |
| 16 | a. Heuristic evaluation |
| 17 | d. Wet bulb globe temperature |
| 18 | b. Joint-optimization efforts. |
| 19 | a. Job rotation |
| 20 | c. Focused effort of multiple personnel to solve a specific problem |
| 21 | d. Provide a manual override and clear presentation of the state of the tasks the automation is performing compared to the goal state. |
| 22 | a. Competitive swimming |
| 23 | d. Division of work between labor and management |
| 24 | a. Strain Index |

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| 25 | d. The probability would vary depending on the level of attention afforded at each use of the product. |
| 26 | a. Safety culture |
| 27 | a. In the initial stages of the system's design, investigate the users' expectations and experiences to provide natural mappings between the telephone system's functions and users' control actions. |
| 28 | c. Heart rate |
| 29 | c. Selective attention |
| 30 | d. Horizontal Multiplier (HM) |
| 31 | a. Hierarchical information |
| 32 | a. Provide gloves to reduce the concentration of force. |
| 33 | d. Have a minimum ten second alarm tone followed by verbal evacuation message and blinking lights. |
| 34 | a. Metabolic load |
| 35 | a. Static manual material handling |
| 36 | b. 50,000 |
| 37 | d. Increased productivity with increased worker morale. |
| 38 | d. Counterbalancing |
| 39 | a. Reducing the Horizontal Distance at the start and end of the lift. |
| 40 | c. Perceptual motor skills |
| 41 | c. IR Chi-square |
| 42 | a. Employees commit significantly fewer errors with the new program when compared to the legacy program. |
| 43 | c. Working in a poor posture with a risk of injury; investigate and change task in the near future |
| 44 | a. $(\text{number of new cases per year} \times 200,000 \text{ work hours}) \text{ divided by } (\text{number of workers} \times 2,000 \text{ work hours}).$ |
| 45 | c. Design shears that can be used with either the left or right hand. |

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| 46 | b. Adult Learning Theory |
| 47 | c. Elbow height |
| 48 | b. No, the human visual system becomes more sensitive to the blue-green part of the spectrum in diminishing light. |
| 49 | d. Damage to the shoulder rotator cuff |