

## School of Computer Science and Applications

### Question Bank

**Course Name:** Human Computer Interaction

**Program :** MCA

**Course Code :** M23DES212

**Semester :** II

**Faculty Name:** Dr. Ambili P S

#### **2-Marks Questions**

1. Define human I/O channels.
2. What is short-term memory?
3. Mention two examples of haptic feedback in devices.
4. What is the significance of reasoning in HCI?
5. Give an example of visual I/O in human-computer interaction.
6. Differentiate between recognition and recall.
7. State one limitation of human memory.
8. Name two devices using auditory output effectively.
9. What is the typical span of short-term memory?
10. Define problem-solving in the context of HCI.
11. Mention one reason why understanding human memory is critical in interface design.
12. What is sensory memory?
13. Define 'slip' in terms of human error.
14. How does size affect the visual detection of on-screen objects?
15. What is the visual field, and how is it relevant to screen layout design?
16. What is volatile memory?
17. List different styles of user interaction with one example for each.

**Answer Key:**

Command-Line Interface (CLI) – e.g., Linux terminal

Menu-Based Interaction – e.g., Mobile app navigation menus

Form-Fill Interface – e.g., Online registration forms

Direct Manipulation – e.g., Drag-and-drop in file managers

Natural Language Interaction – e.g., Siri, ChatGPT

Gesture-Based Interaction – e.g., Swiping in photo galleries

Voice-Based Interaction – e.g., Amazon Alexa

Touch-Based Interaction – e.g., Smartphone apps

Graphical User Interface (GUI) – e.g., Windows OS

Augmented/Virtual Reality Interaction – e.g., VR games with motion controllers

18. Define time-sharing in computing.

19. Name any two ergonomic input devices and specify the function.

Answer key: Ergonomic keyboard – designed to reduce wrist strain by promoting a natural hand position.

Vertical mouse – allows a handshake grip, reducing forearm twisting and wrist pressure.

20. Define ergonomics in the context of HCI.
21. What is Interaction design?
22. What are the possible reasons for pitfalls in design?
23. List the Typical psychological responses to poor design.
24. Define task analysis in HCI.
25. State two key principles of contextual design.
26. What is the main goal of grounded theory in HCI research?
27. Define Computer Supported Cooperative Work (CSCW).
28. Mention two benefits of using contextual design in interface development.
29. What is meant by “task decomposition” in task analysis?
30. State one difference between CSCW and traditional group work.
31. Give one example of a data collection method used in grounded theory studies.
32. What is a “work model” in contextual design?
33. Name one software example that supports CSCW.
34. Define a user persona.
35. Name one prototyping tool used for mobile app UI design.
36. What is scenario-based design?
37. State one key feature of participatory design.
38. Give an example of a domain-specific design in healthcare.
39. What is meant by low-fidelity prototyping?
40. Name one challenge in designing interfaces for aerospace systems.
41. Give one example of a user persona for a children’s educational game. What is the main purpose of prototyping in interface design?
42. Define the Grounded Theory Method (GTM) in HCI research.
43. Give one example of data collection methods used in GTM for HCI studies.
44. Define Computer Supported Cooperative Work (CSCW) in one sentence.
45. State one advantage of using participatory design in product development.

### **5 Marks Questions**

1. Explain how auditory and visual I/O channels are used in modern vehicles.
2. Illustrate how ATM interface design accounts for limitations in human memory.
3. Explain Fitt's Law and its relevance to HCI.
4. Describe a real-world case where poor memory consideration led to system failure.
5. Differentiate between cognitive and physical reasoning with examples.
6. Discuss the use of haptic I/O in gaming systems.
7. How does multi-modal input improve user experience? Give two real-time examples.
8. Compare and contrast short-term and long-term memory.
9. Explain how reasoning models influence user interface workflows.
10. Describe a practical example of a system that uses working memory effectively.
11. List types of human memory and their relevance in designing user interfaces.
12. How does color coding support human memory in interface design?
13. Discuss a mobile app interface in terms of input/output channel efficiency.
14. Illustrate how decision-making is influenced by user memory and reasoning.
15. How does voice interface leverage human auditory memory?
16. Analyze the role of icon design and size in supporting users with visual impairments.
17. Compare the effectiveness of icon-based vs. text-based interfaces for quick visual recognition.

18. Discuss how emotional design enhances user engagement with interactive systems.  
Give examples.
19. Explain with a real-world example how interface design can minimize user slips and mistakes.
20. Discuss the impact of poor ergonomics on user productivity.
21. Discuss how interaction frameworks improve system usability.
22. How does usability differ across different computing paradigms?
23. Explain the significance of feedback loops in interactive systems.
24. Compare and contrast cache memory and main memory.
25. Describe the ergonomic challenges in laptop design.
26. Explain with examples the role of networks in distributed HCI systems.
27. Describe how input/output devices influence user performance in e-learning systems.
28. Trace the evolution of HCI paradigms and their role in enhancing the usability of interactive systems.

**Answer Key:** Paradigm shifts - Batch processing, Timesharing, Networking, Graphical display, Microprocessor, WWW, Ubiquitous Computing. **Elaborate on these paradigms and their role in enhancing the usability of interactive systems.**

29. Develop a comparative analysis of interaction styles for differently-abled users.  
**Answer Key:** No single interaction style suits all differently- abled users.  
A unified, multi-modal interface that adapts to the user's abilities— **Include points on : offering voice, touch, gesture, and keyboard options**—is essential for ensuring accessibility, usability, and inclusivity in modern interactive systems.
30. How does multi-modal input improve user experience? Give two real-time examples.  
**Answer Key:** multi-modal input leads to a more natural, adaptive, and inclusive user experience.

**Real-time Examples:**

Smartphones: Users can type a message, dictate using voice input, or use gestures (like swiping) to navigate—enhancing convenience and accessibility.  
Virtual Assistants (e.g., Google Assistant, Alexa): Users can speak commands, tap on-screen suggestions, or use integrated smart devices with gesture or touch—enabling hands-free, context-aware control.

31. Discuss the goal of design.  
**Answer Key:** achieving goals within constraints, understanding the raw materials: computer and human, accepting limitations of humans and of design.
32. “Good design requires living in a sea of changes”. Demonstrate with a real-life example.
33. Explain the common pitfalls in design process.
34. Diagrammatically represent the process of Design.
35. Compare behavioral design goals and performance design goals with an example.
36. Explain how task analysis could help improve a hospital's online appointment booking system.
37. For a food delivery app, describe how contextual design could capture customer needs effectively.
38. Using a collaborative coding platform as an example, analyze how grounded theory could identify team workflow challenges.
39. Compare contextual design and grounded theory in gathering user requirements for a mobile banking app.
40. Discuss the role of CSCW in improving productivity for remote academic research teams.
41. Explain how a user persona could guide the design of a telemedicine application.
42. Compare paper prototyping and digital prototyping in terms of speed and user feedback quality.

43. Describe a real-life scenario for a voice-controlled cockpit assistant in an aerospace application.
44. Discuss how participatory design can improve the usability of a hospital patient monitoring system.
45. For a math-learning app for kids aged 6–8, outline the key user persona characteristics.

### **8 or 10 Marks Questions**

1. Analyze the role of memory in user authentication systems (e.g., PIN vs biometrics).
2. Discuss how reasoning errors (like confirmation bias) affect interface usability.
3. Design a prototype interaction for an elderly-friendly healthcare app using human I/O considerations.
4. Examine the use of augmented reality (AR) in training, focusing on memory and reasoning.
5. Discuss how different memory types are supported in e-learning interfaces.
6. Analyze a smart home system in terms of multi-sensory input and reasoning-based interaction.
7. Evaluate the role of memory models in designing intuitive navigation menus.
8. Compare how human reasoning is modeled in GPS systems versus search engines.
9. Analyze a common failure in user reasoning when using social media platforms.
10. Suggest design strategies for minimizing cognitive load in control panels.
11. Explain how error-tolerant design supports human memory limitations with examples.
12. Assess the human I/O challenges in designing voice assistants like Alexa or Siri.
13. Compare gesture-based and touch-based input modes for user memory efficiency.
14. How does human memory impact the effectiveness of dashboard designs in cars?
15. Propose improvements to a real-life app by analyzing memory and reasoning gaps.
16. Critically evaluate the cognitive challenges users face in an online exam interface and suggest design solutions.
17. Design a user-friendly smart kitchen interface based on human problem-solving behavior.
18. Discuss in detail how a cognitive walkthrough can help in evaluating problem-solving effectiveness in an interface.
19. Compare the effectiveness of speech-based input vs. text-based input for differently-abled users.
20. Compare different usability paradigms used in designing wearable devices.
21. Analyze ergonomic considerations in gaming setups.
22. Illustrate how computer memory influences interaction responsiveness.
23. Discuss three real-time interaction elements used in mobile apps.

#### **Answer Key:**

Can include points:

**Push Notifications** - Provide instant alerts about messages, updates, or reminders.

Example: WhatsApp notifies users immediately when a message is received, even when the app is closed.

**Live Chat or Messaging Interfaces** - Enable real-time text, voice, or video communication. Example: Customer support chat in apps like Amazon or Swiggy allows users to resolve issues instantly.

**Real-Time Data Feeds or Updates:** Continuously update content without manual refresh. Example: Stock market apps (like Zerodha) or sports apps (like Cricbuzz) show live data updates.

24. Describe the memory hierarchy in a modern computer.
25. Propose a complete interaction system for a smart campus network.

### **Answer Key:**

**Users and Roles:** Students (timetables, attendance), faculty (course and evaluation), administrators (scheduling), visitors (navigation), and security (surveillance).

**Input/Output Devices:** Inputs: Touchscreens, voice, biometrics, QR scanners.

Outputs: Dashboards, mobile notifications, kiosks, audio alerts.

**Interaction Styles:** Touch and gesture-based controls, voice commands, form filling, and direct manipulation for ease of access.

**Key Features:** Role-based dashboards, real-time alerts, context-aware services, remote access, and multi-device compatibility.

**Usability and Feedback:** Visual and haptic feedback, error handling, accessibility support like screen readers and large icons.

**Network and Security:** Secure Wi-Fi, encrypted data, single sign-on, biometric authentication, and activity monitoring.

**Note:** For all the interaction system designs can include the titles **Users and Roles**, **Input/Output Devices** , **Interaction Styles** , **Key Features**, **Usability and Feedback**, **Network and Security** and change content according to the cases.

26. Elaborate on the Obstacles in the development path in Design process.
27. Explain the important human characteristics to be considered in design.
28. Write notes on Visual acuity and perception and its influence in design.
29. Describe the process of screen planning and its purpose, using the example of a mobile banking application.
30. Propose a strategy for organizing screen elements in a healthcare monitoring dashboard to ensure efficient information retrieval.
31. Discuss how the ordering of screen data and content impacts user task completion in an e-commerce checkout process.
32. Explain the principles of screen navigation and flow, and illustrate how they improve usability in a public transport ticket booking kiosk.
33. Describe techniques to create a visually pleasing screen composition while maintaining clarity and usability in a mobile app.
34. Evaluate the effect of the amount of information, focus, and emphasis on the usability of a learning management system interface.
35. You are designing a patient monitoring dashboard for ICU doctors. Create a task analysis to determine key interface requirements.
36. Propose a contextual design approach for developing an e-learning platform that supports both teachers and students.
37. Evaluate the challenges of applying grounded theory to study the adoption of virtual whiteboards in global teams.
38. Design a CSCW-based solution for a multinational company to coordinate product launches across time zones, explaining interface and workflow considerations.
39. Compare the effectiveness of task analysis, contextual design, and grounded theory when used together in the early phases of designing a disaster management coordination tool.
40. Develop a set of user personas for an international airline's passenger entertainment system and explain how they would influence design decisions.

41. Propose a complete prototyping workflow (from low-fidelity to high-fidelity) for a wearable heart monitoring device in healthcare.
42. Create a scenario-based design plan for an aerospace mission control dashboard that supports quick decision-making in emergencies.
43. For an e-learning platform for children with special needs, design a participatory design strategy involving teachers, parents, and students.
44. Evaluate the differences in application-/domain-specific design approaches between a healthcare diagnostic app and an interactive educational tool for kids.
45. You are tasked with improving a collaborative project management tool for a multinational company. Propose a grounded theory-based research plan to identify user needs across different cultures.

