CBSE | DEPARTMENT OF SKILL EDUCATION

DESIGN THINKING & INNOVATION (SUBJECT CODE - 848)

MARKING SCHEME FOR CLASS XII (SESSION 2024-2025)

Max. Time: 2 Hours **Max. Marks: 50**

General Instructions:

1. Please read the instructions carefully.
2. This Question Paper consists of **22 questions** in two sections – Section A & Section B.
3. Section A has Objective type questions whereas Section B contains Subjective type questions.
4. **Out of the given (5 + 17 =) 22 questions, a candidate has to answer (5 + 10 =) 15 questions in the allotted (maximum) time of 2 hours.**
5. All questions of a particular section must be attempted in the correct order.
6. **SECTION A - OBJECTIVE TYPE QUESTIONS (24 MARKS):**
   - **i.** This section has 05 questions.
   - **ii.** There is no negative marking.
   - **iii.** Do as per the instructions given.
   - **iv.** Marks allotted are mentioned against each question/part.
7. **SECTION B – SUBJECTIVE TYPE QUESTIONS (26 MARKS):**
   - **i.** This section contains 17 questions.
   - **ii.** A candidate has to do 10 questions.
   - **iii.** Do as per the instructions given.
   - **iv.** Marks allotted are mentioned against each question/part.

SECTION A: OBJECTIVE TYPE QUESTIONS

Q. No.	QUESTION	Source Material (NCERT/PSSCIVE/ CBSE Study Material)	Unit/ Chap. No.	Page no. of source material	Marks
Q. 1	**Answer any 4 out of the given 6 questions on Employability Skills (1 x 4 = 4 marks)**				
i.	d) All of the above				**1**
ii.	b) An opportunity				**1**
iii.	b) CTRL + A				**1**
iv.	d) All of the above				**1**
v.	d) Language barriers				**1**
vi.	c) To address environmental challenges sustainably				**1**
Q. 2	**Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)**				
i.	b) Test	**CBSE Study Material**	**1**	**7**	**1**
ii.	b) False	**CBSE Study Material**	**5**	**48**	**1**
iii.	a) Incorporating ergonomic furniture, soundproofing, and adjustable lighting	**CBSE Study Material**	**2**	**17**	**1**
iv.	a) Researching materials and prototyping solutions that minimize waste.	**CBSE Study Material**	**3**	**26**	**1**
v.	c) Develop stage	**CBSE Study Material**	**8**	**55**	**1**
vi.	b) Ideate	**CBSE Study Material**	**4**	**35**	**1**
Q. 3	**Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)**				

i.	a) Hear, Create, Deliver	**CBSE Study Material**	**1**	**7**	**1**
ii.	a) Understand - Improve – Apply	**CBSE Study Material**	**2**	**17**	**1**
iii.	a) Prototyping	**CBSE Study Material**	**6**	**51**	**1**
iv.	d) Everything to do with products that succeed.	**CBSE Study Material**	**4**	**35**	**1**
v.	a) Convergent thinking	**CBSE Study Material**	**7**	**53**	**1**
vi.	C) Both of them		**8**	**55**	**1**
Q. 4	**Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)**				
i.	b) Empathize > Define > Ideate > Prototype > Test	**CBSE Study Material**	**8**	**55**	**1**
ii.	e) a & d	**CBSE Study Material**	**3**	**26**	**1**
iii.	C) Information about courses	**CBSE Study Material**	**5**	**48**	**1**
iv.	c) It will not be comfortable for the user.	**CBSE Study Material**	**6**	**51**	**1**
v.	b) How much space is needed per person?	**CBSE Study Material**	**7**	**48**	**1**
vi.	a) To derive the power of design thinking, individuals, teams, and organizations must have a leap of faith about the existence of a solution.	**CBSE Study Material**	**4**	**35**	**1**
Q. 5	**Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)**				
i.	b) False	**CBSE Study Material**	**3**	**26**	**1**
ii.	b) Experience Strategy	**CBSE Study Material**	**5**	**48**	**1**
iii.	d) All of above	**CBSE Study Material**	**6**	**51**	**1**
iv.	b) Contextual inquiry	**CBSE Study Material**	**7**	**53**	**1**
v.	b) Ideate	**CBSE Study Material**	**8**	**55**	**1**
vi.	c) Collect feedback from the testers to evaluate his idea.	**CBSE Study Material**	**4**	**35**	**1**

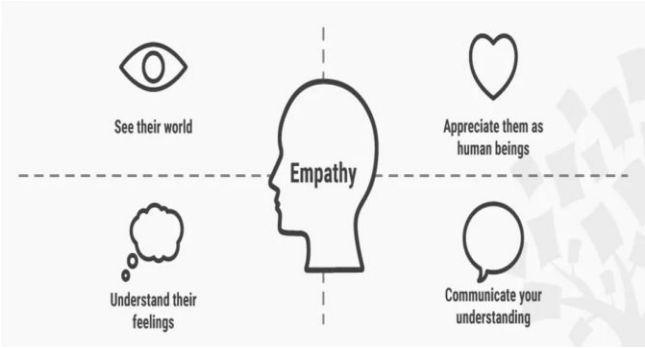
SECTION B: SUBJECTIVE TYPE QUESTIONS

Q. No.	**QUESTION**	**Source Material (NCERT/PSSCIVE/ CBSE Study Material)**	**Unit/ Chap. No.**	**Page no. of source material**	**Marks**
Answer any 3 out of the given 5 questions on Employability Skills in 20 – 30 words each (2 x 3 = 6 marks)					
Q. 6	1) A Slide Master is a slide which contains information about the whole theme. It is the top slide which contains information about the background, fonts, colors, placeholders, etc. 2) The Animations tab in PowerPoint contains a number of animations that you can apply to your slides. The easiest way to add one is to select a slide element, go to the Animations tab and select an animation effect from the given menu. 3) Transitions: The difference between animations and transitions is that the latter loads a slide with an effect and the former is used to load slide elements. 4) PowerPoint has introduced a revolutionary transition effect called Morph. This transition enables presenters to animate multiple parts of a slide which animate as you switch to the slide.				**2**
Q. 7	1) It increases individual's energy and activity. 2) It directs an individual towards specific goals				**2**
Q. 8	1) Strong leadership qualities. 2) Highly self-motivated.				**2**

	3) Strong sense of basic ethics and integrity. 4) Willingness to fail. 5) Serial innovators. 6) Know what you don't know. 7) Competitive spirit. 8) Understand the value of a strong peer network.				
Q. 9	A long-term goal is something you want to do in the future. Long-term goals are important for a successful career. A long-term goal is something you want to accomplish in the future. Long-term goals require time and planning. They are not something you can do this week or even this year.				**2**
Q. 10	1) On the Home tab, under Insert, click Text. 2) On the pop-up menu, click Text Box. 3) On the slide, click the location where you want to add the text box. 4) Type or paste your text in the text box.				**2**
Answer any 4 out of the given 6 questions in 20 – 30 words each (2 x 4 = 8 marks)					
Q. 11	A capstone project is a project where students must research a topic independently to find a deep understanding of the subject matter. It gives an opportunity for the student to integrate all their knowledge and demonstrate it through a comprehensive project.	**CBSE Study Material**	**5**	**43**	**2**
Q. 12	A journey map is a diagram or other visual representation of the process an individual goes through to complete a goal. This tool can be helpful to identify barriers or process inefficiencies in consumer purchasing.	**CBSE Study Material**	**4**	**36**	**2**
Q. 13	In the initial stages, you should start with low-fidelity prototypes. These could include paper sketches, cardboard models, or basic digital wireframes. The focus is on quickly exploring and testing ideas without investing heavily in high-cost materials or detailed designs.	**CBSE Study Material**	**7**	**53**	**2**
Q. 14	Design thinking is a human-centric approach in which problems are defined and resolved by empathizing with users, understanding how problems affect them, generating ideas, creating prototypes, and testing them on the intended end users. Within project management, it can facilitate greater creativity and innovation.	**CBSE Study Material**	**8**	**55**	**2**
Q. 15	COMPETITIVE ANALYSIS: Know your competitors! What else is out there? What is working? What isn't? What features do the competitors have that our users will expect? What features are missing in the marketplace? MAP POSITIONNING: These tools help you to determine your market positioning strategy in comparison to your competitor strategy.	**CBSE Study Material**	**3**	**26**	**2**
Q. 16	Brainstorming is a way to generate lots of ideas to solve a problem, find opportunities for improvement and spark innovation. Principles of brainstorming I: Generate as many ideas as possible.	**CBSE Study Material**	**6**	**51**	**2**

	Quantity of ideas is favored over quality. Encourage people to keep thinking of ideas during the session. II: Equal opportunity to participate. By having each person give one idea at a time as you go around ensures equal participation. If someone has no further ideas, they can say pass but can continue to contribute when it comes to their turn again. III: Freewheeling is encouraged. The only bad ideas are those that are withheld. You must encourage everyone to share whatever comes to mind. This is how some of the best ideas get generated. IV: No criticism is allowed. Neither positive or negative criticism is allowed during brainstorming as it could cause people to hold back, especially when you have different levels of leadership in the session. V: Record all ideas. Appoint a scribe, someone to write down the ideas on a flip chart. Use paper so the list can be left in view or posted to the wall. Once again, no criticism or editorializing is permitted. VI: Let the ideas incubate. Don't rush into analysis or other problem-solving techniques. Leave the list on display so people can reflect on it and new ideas might be generated or suggestions for combining items.				
Answer any 3 out of the given 6 questions in 50– 80 words each (4 x 3 = 12 marks)					
Q. 17	**1. Simple Coconut Shell Plant Pot** The first, easiest and simplest idea to consider is simply using half coconut shells as plant pots. These can look attractive, and allow you to avoid the use of plastic plant pots in your home or garden. The shell is fully biodegradable. Simply make a few holes in the bottom of each one for drainage, then place these in your garden or in another shell half to catch water if growing indoors. Coconut shell plant pots are ideal for seedlings to be potted on, and can also make attractive holders for microgreens, succulents, smaller herbs or perhaps even air plants indoors. 	**CBSE Study Material**	**2**	**17**	**4**

	2. Bird Feeder You can also use a coconut shell half to make a simple bird feeder for your garden. Simply make holes in the half shell so you can hang it somewhere suitable for feeding wild garden birds, then fill it with a mixture of lard, bird seeds and other foods birds will enjoy. 				
Q. 18	A mind map helps the team visually organize all possible ideas and features, starting from core aspects like battery life, design, and comfort to advanced ones like stress tracking and device integration. By branching out these features into sub-categories (e.g., comfort could include material, fit, and weight), the team can address multiple considerations simultaneously. Mind maps also allow for the easy identification of dependencies, such as how battery life may affect the choice of features like GPS or continuous heart rate monitoring. These connections help in identifying trade-offs and prioritizing which features are most important. 1. In the design thinking process, the first phase is **empathy**, which the mind map helps with by including insights from users regarding comfort and functionality. This user-centric approach ensures that every feature is aligned with user needs. 2. Moving to **define**, the mind map helps the team clearly outline the main challenges, such as balancing health-tracking accuracy with battery life. The team can then ideate around those challenges using mind mapping, ensuring solutions are both creative and feasible. 3. Prototyping and testing follow, where features identified through the mind map can be developed into low-fidelity models and tested iteratively, ensuring the smartwatch meets user expectations before a full-scale launch. Overall, mind mapping serves as a visual blueprint for innovation, while design thinking ensures the features are developed in a way that is both user-centered and technologically feasible.	**CBSE Study Material**	**4**	**39**	**4**

Q. 19	Five key steps make up the design thinking methodology: empathy, define, ideate, prototype, and test. **Stage 1: Empathy** The first stage of the design thinking process is empathy. During this stage, design teams set aside their own biases and work to gain a deeper understanding of real users and their needs—often through direct observation and engagement.  Example: Imagine you are the owner of a boutique gym, and you want to improve membership retention. In the empathy phase, you would talk to a range of current and past members. You would solicit feedback on what they liked or disliked. You might observe how different members interacted with the equipment or different facilities. You would look for areas of encouragement or discouragement: what makes them happy? What seems to frustrate them? You would keep at these observations until you could truly understand and empathize with your members and their needs. **Stage 2: Define** The second step is to define the problem. In this phase, designers analyze the data gathered during the previous stage to identify and define the issue with a clear and concise problem statement.  Example: Let's continue to use the gym scenario mentioned above. During the define stage, we'll take all our user feedback and observational data and analyze it to determine why some members keep their membership and others don't. We look for common complaints and try to identify possible pain points or unmet user needs. Based on our analysis, we create a	**CBSE Study Material**	**6**	**51**	**4**

problem statement that defines the issue that has the greatest impact on member retention.

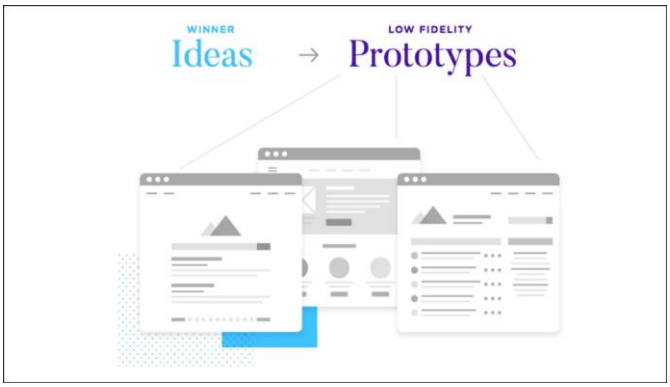
Stage 3: Ideate

The ideation stage is where designers start to explore solutions. Ideas in this stage will ultimately become prototypes that can be tested with your target audience.

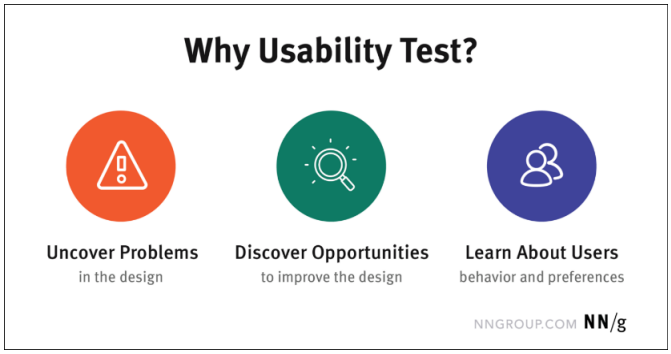
Example: Based on user feedback, you were able to identify the number-one issue keeping members from renewing their membership is that there aren't enough open exercise machines. During the ideate phase, you gather your team together and brainstorm ideas. Nothing is off the table. Any idea to resolve this issue is worth considering.

Stage 4: Prototype

During this phase of design thinking, teams will create prototypes of the ideas they generated in the previous stage. Prototypes don't need to be finished products. They are meant to convey a possible solution, not deliver it. Sketches, models, and digital renders are all examples of prototypes: scaled-down versions of the product created during the ideation stage.



Examples: Believing that neighboring pieces of equipment are being used simultaneously by users performing "super sets," your idea is to relocate those machines to opposite sides of the gym. This should prohibit users from occupying multiple machines at once. Your first prototype is a rough sketch of what the new floor layout would be and where the machines would go. Based on feedback from staff members, you

	prototype it again as many times as necessary. **Stage 5: Test** The testing phase of the design thinking process involves real users and real user feedback. During this phase, prototypes are given to participants to try out. Design teams observe how participants interact with the prototype and gather feedback about the experience.  Example: Rearrange the exercise machines and see how customers respond. Does the new arrangement solve the users' problem? Does it create new issues for different users? Solicit feedback from gym members: are they happy with the new arrangement? Based on user feedback, revisit the design thinking stages as necessary.				
Q. 20	The testing phase of the design thinking process involves real users and real user feedback. During this phase, prototypes are given to participants to try out. Design teams observe how participants interact with the prototype and gather feedback about the experience. Testing reveals what is or isn't working. Don't forget: design thinking is an iterative and non-linear process—that goes for testing, too. Depending on user feedback, changes to the product might be required. These changes might require you to restart the testing phase or revisit past stages. Feedback from user testing might also inspire new potential solutions or actionable insights. Commonly used testing tools include: Usability Testing: A testing tool that gauges the usability of a design with a group of target users. Beta Launch: Releasing your prototype to a limited pool of users to determine usability, detect bugs, and test whether your product addresses users' needs.	**CBSE Study Material**	**7**	**53**	**4**
Q. 21	Design thinking is a problem-solving approach that can be incredibly useful when designing focused tablets for school pupils. Here are the general steps of design thinking, tailored to your specific scenario: **1. Empathize:** Understand the Users: Talk to teachers, students, and parents to understand their needs, challenges, and	**CBSE Study Material**	**5**	**45**	**4**

	expectations regarding educational tablets. Observe: Spend time in classrooms to observe how students and teachers interact with technology and identify pain points. **2. Define:** Define the Problem: Based on your research, clearly define the challenges and issues faced by students and teachers regarding tablets in the classroom. Develop Insights: Identify patterns in the data collected during the empathize phase. What are the common problems? What are the key needs? **3. Ideate:** Brainstorm Solutions: Gather a diverse team and brainstorm potential solutions. Encourage wild and creative ideas without any criticism. Prototype Ideas: Create rough prototypes or mock-ups of the focused tablets. These could be simple sketches or digital prototypes to visualize the concepts. **4. Prototype:** Build Prototypes: Develop functional prototypes of the tablets based on the most promising ideas generated during the ideation phase. Iterate: Test the prototypes with a small group of students and teachers. Gather feedback and iterate on the design to improve functionality and user experience. **5. Test:** Gather Feedback: Distribute the prototypes to a larger group of users within the school. Collect feedback on the usability, performance, and overall experience. Refine the Design: Use the feedback to make necessary changes and refinements to the tablet design. This might involve hardware adjustments, software updates, or user interface enhancements. **6. Implement:** Production: Once the design is finalized, move into full-scale production of the tablets. Training: Provide training sessions for teachers and students on how to effectively use the tablets for educational purposes. **7. Evaluate:** Assess Impact: Monitor the use of tablets in classrooms. Gather data on academic performance, engagement levels, and any other relevant metrics to evaluate the impact of the focused tablets. Collect Long-term Feedback: Continuously collect feedback from teachers, students, and parents to make ongoing improvements to the tablets based on their real-world usage. **8. Iterate:** Continuous Improvement: Use the feedback and data collected to make iterative improvements to the tablets. Technology and educational needs evolve, so the design should be flexible and adaptable.				

Q. 22	Every aspect of a design thinking plan is created with customers in mind. Design thinkers develop a product that appeals to the customers because with the help of automated tools. Here are some of the standard tools used across various stages of design thinking: 1) Analysis and synthesis: It helps consolidate data collected through various sources, also assisting in converting data into actionable results. There are many tools for visualization, assumption testing, and others. 2) Ideation: There are many tools that design thinkers use for facilitating brainstorming or ideation sessions, such as rapid concept development, mind mapping, storytelling, etc. 3) Prototyping: Tools like rapid prototyping, journey mapping, etc., are used by design thinkers during prototyping to test the product or service's usability and the experience it creates. 4) Immersion: There are many tools that design thinkers use to determine the customer's problem and offer solutions to it.	**CBSE Study Material**	**8**	**55**	**4**