

Hall Ticket Number:

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Code No. : 16136 K

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD**

*Accredited by NAAC with A++ Grade*

**B.E. VI-Semester Main & Backlog Examinations, June-2022**


**Design Thinking (OE-IV)**

Time: 3 hours

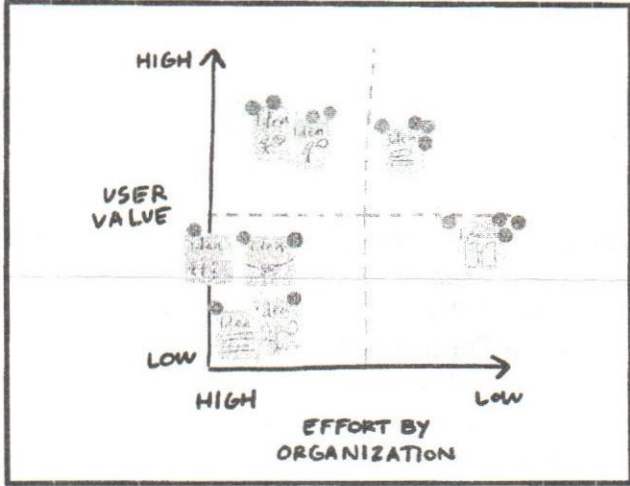
Max. Marks: 60

*Note: Answer all questions from Part-A and any FIVE from Part-B*

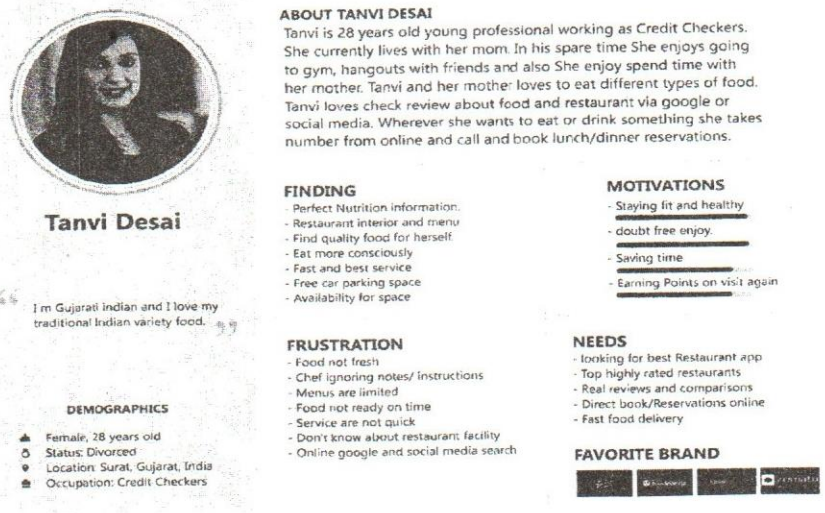
**Part-A (10 × 2 = 20 Marks)**

| Q. No. | Stem of the question  | M     | L                                  | CO     | PO                       |      |                               |      |                           |   |   |   |   |
|--------|---|-------|------------------------------------|--------|--------------------------|------|-------------------------------|------|---------------------------|---|---|---|---|
| 1.     | <p>Write two lines expressing your opinion on the picture given below. Why is it a bad design example?</p>   | 2     | 4                                  | 1      | 10                       |      |                               |      |                           |   |   |   |   |
| 2.     | <p>Studies show that only 20% of the student population can identify a singular passion. The other 80% of the population is either passionate about many different things, or there's no one thing that rises to the level of "that's what I want to do for the rest of my life". For that 80%, passion isn't something that they have or find, but something that they work into. Can we apply design thinking to the "wicked problem" of designing your job, your career, and even your life? Write your opinion in two or three sentences.</p> | 2     | 3                                  | 1      | 10                       |      |                               |      |                           |   |   |   |   |
| 3.     | <p>How can you become a more empathic designer? What are some key methods for building empathy?</p>   | 2     | 1                                  | 2      | 3                        |      |                               |      |                           |   |   |   |   |
| 4.     | <p>Empathy Maps generally consist of four quadrants.<br/>For example, if rolling out a new system for employees, the response might be as follows:<br/>Match the following responses</p> <table border="1" data-bbox="443 1644 1024 1910"> <tbody> <tr> <td>Feels</td> <td>their action and actual behaviour.</td> </tr> <tr> <td>Thinks</td> <td>what they share out loud</td> </tr> <tr> <td>Says</td> <td>their inner, unfiltered voice</td> </tr> <tr> <td>Does</td> <td>their emotional response.</td> </tr> </tbody> </table>               | Feels | their action and actual behaviour. | Thinks | what they share out loud | Says | their inner, unfiltered voice | Does | their emotional response. | 2 | 2 | 2 | 3 |
| Feels  | their action and actual behaviour.  |       |                                    |        |                          |      |                               |      |                           |   |   |   |   |
| Thinks | what they share out loud  |       |                                    |        |                          |      |                               |      |                           |   |   |   |   |
| Says   | their inner, unfiltered voice   |       |                                    |        |                          |      |                               |      |                           |   |   |   |   |
| Does   | their emotional response.   |       |                                    |        |                          |      |                               |      |                           |   |   |   |   |
| 5.     | <p>The context mapping procedure involves three stages, mention them.</p>   | 2     | 2                                  | 3      | 2                        |      |                               |      |                           |   |   |   |   |

Contd... 2

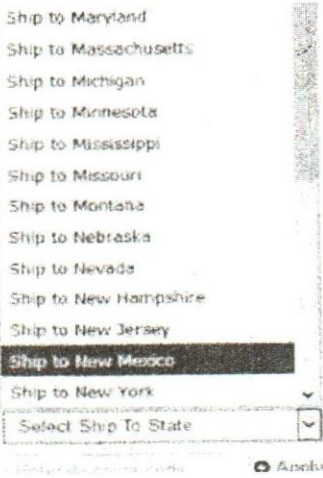
| <p>6.</p>      | <p>Tip: Remember that your “How Might We” question should not be so broad or narrow. A well-framed “HMW” question will contain the right amount of inspiration for you to quickly start brainstorming potential solutions.</p> <p>An Example of a Well-Framed How Might We Question<br/>                 “How might we design a product that makes our users feel confident and secure during their online financial transactions?”</p> <p>Create a HMW statement for the following?</p> <ol style="list-style-type: none"> <li>1. How might we (people pay taxes before deadline)</li> <li>2. How might we (employees, health, productivity, work from home)</li> </ol>   | <p>2</p>                                       | <p>3</p>   | <p>3</p>     | <p>2</p>        |        |               |   |                           |  |              |          |                                   |  |   |              |           |                                       |   |  |              |          |          |          |          |
|----------------|--|--|--|--------------|-----------------|--------|---------------|---|---------------------------|--|--------------|----------|-----------------------------------|--|---|--------------|-----------|---------------------------------------|---|--|--------------|----------|----------|----------|----------|
| <p>7.</p>      | <p>How does this tool help us in making informed decisions? Explain two benefits? What is it called?</p>    | <p>2</p>                                       | <p>2</p>   | <p>4</p>     | <p>3</p>        |        |               |   |                           |  |              |          |                                   |  |   |              |           |                                       |   |  |              |          |          |          |          |
| <p>8.</p>      | <p>Expand SCAMPER. How does it help teams innovate?</p>  | <p>2</p>                                       | <p>2</p>   | <p>4</p>     | <p>3</p>        |        |               |   |                           |  |              |          |                                   |  |   |              |           |                                       |   |  |              |          |          |          |          |
| <p>9.</p>      | <p>What is this picture an example of?</p> <table border="1" data-bbox="217 1509 1091 1890"> <thead> <tr> <th>Test Case Type</th> <th>Description</th> <th>Test Step</th> <th>Expected Result</th> <th>Status</th> </tr> </thead> <tbody> <tr> <td>Functionality</td> <td>Area should accommodate up to 20 characters</td> <td>Input up to 20 characters</td> <td>All 20 characters in the request should be appropriate</td> <td>Pass or Fail</td> </tr> <tr> <td>Security</td> <td>Verify password rules are working</td> <td>Create a new password in accordance with rules</td> <td>The user's password will be accepted if it adheres to the rules</td> <td>Pass or Fail</td> </tr> <tr> <td>Usability</td> <td>Ensure all links are working properly</td> <td>Have users click on various links on the page</td> <td>Links will take users to another web page according to the on-page URL</td> <td>Pass or Fail</td> </tr> </tbody> </table> | Test Case Type                                 | Description  | Test Step    | Expected Result | Status | Functionality | Area should accommodate up to 20 characters | Input up to 20 characters | All 20 characters in the request should be appropriate | Pass or Fail | Security | Verify password rules are working | Create a new password in accordance with rules | The user's password will be accepted if it adheres to the rules | Pass or Fail | Usability | Ensure all links are working properly | Have users click on various links on the page | Links will take users to another web page according to the on-page URL | Pass or Fail | <p>2</p> | <p>2</p> | <p>5</p> | <p>5</p> |
| Test Case Type | Description  | Test Step                                      | Expected Result  | Status       |                 |        |               |   |                           |  |              |          |                                   |  |   |              |           |                                       |   |  |              |          |          |          |          |
| Functionality  | Area should accommodate up to 20 characters  | Input up to 20 characters                      | All 20 characters in the request should be appropriate                 | Pass or Fail |                 |        |               |   |                           |  |              |          |                                   |  |   |              |           |                                       |   |  |              |          |          |          |          |
| Security       | Verify password rules are working  | Create a new password in accordance with rules | The user's password will be accepted if it adheres to the rules        | Pass or Fail |                 |        |               |   |                           |  |              |          |                                   |  |   |              |           |                                       |   |  |              |          |          |          |          |
| Usability      | Ensure all links are working properly  | Have users click on various links on the page  | Links will take users to another web page according to the on-page URL | Pass or Fail |                 |        |               |   |                           |  |              |          |                                   |  |   |              |           |                                       |   |  |              |          |          |          |          |

|                                  |   |   |   |   |       |
|----------------------------------|---|---|---|---|-------|
| 10.                              | You've got to be specific—your goal can change virtually every characteristic of your test. A good survey goal answers 3 main questions: Mention what they are.   | 2 | 2 | 5 | 5     |
| <b>Part-B (5 × 8 = 40 Marks)</b> |   |   |   |   |       |
| 11. a)                           | <p><b>HOW DO YOU KNOW YOU HAVE A GREAT DESIGN?</b></p> <p>Great design meets three essential criteria.</p> <p>1. Desirability: Is this what people want?</p> <p>2. Feasibility: How easily can we do this? Is this affordable? Do we have personnel? Do we have enough time?</p> <p>3. Viability: Is this sustainable? Can we keep it going for a long time? Who will keep it going?</p> <p>Check and justify if the solution your team has identified meets the following criteria?</p>  | 3 | 3 | 1 | 10,12 |
| b)                               | What are the five phases of design thinking and what are the deliverables in each phase?  | 5 | 2 | 1 | 10,12 |
| 12. a)                           | <p>"Creative confidence is an inherently optimistic way of looking at what's possible."</p> <p>At GE Healthcare empathy was needed to understand how children experience CT, X-Ray and MRI scanning procedures.</p> <p>"Doug's story illustrates the way human-centred design can lead to breakthrough innovations."</p> <p>Doug was prepared to come away patting himself on the back for a job well done. But then the technician asked him to step out into the hall for a moment because a patient needed to get a scan. When he did, he saw a frail young girl walking toward him, tightly holding her parents' hands. The parents looked worried, and their young daughter was clearly scared, all in anticipation of what lay ahead—Doug's MRI machine. The girl started to sniffle, and Doug himself got choked up telling us her story. As the family passed by, Doug could hear their hushed conversation: "We've talked about this. You can be brave," urged the dad, the strain showing in his own voice.</p> <p>As Doug watched, the little girl's tears rolled down her cheeks. To Doug's alarm, the technician picked up the phone to call for an anesthesiologist. And that was when Doug learned that hospitals routinely sedate pediatric patients for their scans because they are so scared that they can't lie still long enough. As many as 80 per cent of pediatric patients have to be sedated. And if an anesthesiologist isn't available, the scan has to be postponed, causing families to go through their cycle of worry all over again.</p> | 3 | 3 | 2 | 3     |

|               |  |          |          |          |          |
|---------------|--|----------|----------|----------|----------|
|               | <p>When Doug witnessed the anxiety and fear his machine caused among the most vulnerable patients, the experience triggered a personal crisis for him that forever changed his perspective.</p> <p>What did he do to make this painful experience exciting?</p>  |          |          |          |          |
| <p>b)</p>     |  <p>Create a persona for your problem statement that you and your team have chosen.</p>  | <p>5</p> | <p>6</p> | <p>2</p> | <p>3</p> |
| <p>13. a)</p> | <p>Let's say you are a small, family-owned restaurant in Chennai that wants to attract more business from tourists. Here's a possible customer journey map for your little restaurant called Gossip Bistro.</p> <p>Persona - Surabhi Sehgal</p> <p>Age - 32</p> <p>Lives in - Jakarta</p> <p>Income - 25 lacs (In Indian Rupees)</p> <p>Occupation - Senior Manager in an MNC</p> <p>Story - Surabhi is a foodie and wants to explore new cuisines. She and her family have long planned this trip to Chennai to visit the land of temples. This is her first trip to India after her wedding and she and Ashish are super excited. She wants an authentic South Indian experience. She has spent a great deal of money on this trip already and wants to avoid spending on things she doesn't need/could get in Indonesia. She is willing to pay for a unique experience, though. She also secretly cherishes the idea of being able to brag about it once she comes back home.</p> | <p>5</p> | <p>6</p> | <p>3</p> | <p>2</p> |

|                  |  |                  |   |                 |  |                 |   |                 |   |          |          |          |          |
|------------------|--|------------------|---|-----------------|--|-----------------|---|-----------------|---|----------|----------|----------|----------|
|                  | <p>Likes - Good food and wine.</p> <p>Leisure - Cooking, writing blogs, hanging out with friends and family. She also reads print newspapers and is relatively comfortable using Technology.</p> <p>Create a Customer Journey map for Surabhi, for all the stages Awareness, Research, making a reservation, dining in, writing a review, coming back / recommending</p>   |                  |   |                 |  |                 |   |                 |   |          |          |          |          |
| <p>b)</p>        | <p>Let us practice writing good HMWs (How Might We)</p> <p>While writing HMW questions seems straightforward, there's slightly more than meets the eye. The better you write them, the better the ideas that they prompt.</p> <p>#1 Start with the Problems (or Insights) You've Uncovered<br/>         Problem: Users aren't aware of the full product offerings.<br/>         HMW - _____</p> <p>#2 Avoid Suggesting a Solution in Your HMW Question<br/>         Insight: Users are often unsure about which form to complete when they file their taxes.<br/>         HMW (poor) How might we tell users which form to complete to file their taxes?<br/>         HMW (good) _____</p> <p>#3 Keep Your HMWs Broad<br/>         Insight: Users often spend a long time checking their submissions for mistakes.<br/>         HMW (good) How might we make it quick and easy for users to check their work for mistakes?<br/>         HMW (better) _____</p> | <p>3</p>         | <p>5</p>  | <p>3</p>        | <p>2</p>   |                 |   |                 |   |          |          |          |          |
| <p>14. a)</p>    | <p>Match the following ideation techniques.</p> <table border="1" data-bbox="216 1603 1190 1966"> <tr> <td data-bbox="216 1603 467 1704">1. Brainstorming</td> <td data-bbox="467 1603 1190 1704">A. This is like brainwriting, but members walk about the room, adding to others' ideas.</td> </tr> <tr> <td data-bbox="216 1704 467 1845">2. Braindumping</td> <td data-bbox="467 1704 1190 1845">B. This is like brainstorming, but everyone writes down and passes ideas for others to add to before discussing these.</td> </tr> <tr> <td data-bbox="216 1845 467 1912">3. Brainwriting</td> <td data-bbox="467 1845 1190 1912">C. This is like brainstorming, but done individually.</td> </tr> <tr> <td data-bbox="216 1912 467 1966">4. Brainwalking</td> <td data-bbox="467 1912 1190 1966">D. You build good ideas from each other's wild ideas.</td> </tr> </table>   | 1. Brainstorming | A. This is like brainwriting, but members walk about the room, adding to others' ideas. | 2. Braindumping | B. This is like brainstorming, but everyone writes down and passes ideas for others to add to before discussing these. | 3. Brainwriting | C. This is like brainstorming, but done individually. | 4. Brainwalking | D. You build good ideas from each other's wild ideas. | <p>4</p> | <p>2</p> | <p>4</p> | <p>3</p> |
| 1. Brainstorming | A. This is like brainwriting, but members walk about the room, adding to others' ideas.  |                  |   |                 |  |                 |   |                 |   |          |          |          |          |
| 2. Braindumping  | B. This is like brainstorming, but everyone writes down and passes ideas for others to add to before discussing these.   |                  |   |                 |  |                 |   |                 |   |          |          |          |          |
| 3. Brainwriting  | C. This is like brainstorming, but done individually.  |                  |   |                 |  |                 |   |                 |   |          |          |          |          |
| 4. Brainwalking  | D. You build good ideas from each other's wild ideas.  |                  |   |                 |  |                 |   |                 |   |          |          |          |          |

| b)  | <p>Affinity Mapping is probably the most simple and adaptable. Affinity Mapping (or Clustering, as it's sometimes called) is merely a fancy name for grouping or putting like ideas together—an “apples go with oranges and carrots go with cucumbers” kind of thing.</p>  | 4   | 5 | 4   | 2  |  |  |  |  |  |
|---|--|---|---|---|--|--|--|--|--|--|
| <table border="1" style="width: 100%;"> <thead> <tr> <th colspan="2">Possible Performance Measures</th> </tr> </thead> <tbody> <tr> <td style="width: 50%;">                     % purity<br/>                     % trace metals<br/>                     Maintenance costs<br/>                     # of emergency jobs<br/>                     lbs. produced<br/>                     Environmental accidents<br/>                     Material costs<br/>                     Overtime costs<br/>                     # of pump seal failures<br/>                     Viscosity<br/>                     Cp<sub>x</sub> values<br/>                     Safety<br/>                     Days since last lost-time<br/>                     % rework or reject<br/>                     Hours downtime<br/>                     % uptime                 </td> <td style="width: 50%;">                     # of OSHA recordables<br/>                     # of customer returns<br/>                     Customer complaints<br/>                     Overtime/total hours worked<br/>                     \$/lb. produced<br/>                     Raw material utilization<br/>                     Yield<br/>                     Utility cost<br/>                     ppm water<br/>                     Color<br/>                     Service factor<br/>                     Time between turnarounds<br/>                     Hours worked/employee<br/>                     lbs. waste<br/>                     Housekeeping score<br/>                     % capacity filled                 </td> </tr> </tbody> </table> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="text-align: center;"> <p><b>PROPOSED PERFORMANCE MEASURES</b></p> </div> </div> |  | Possible Performance Measures   |   | % purity<br>% trace metals<br>Maintenance costs<br># of emergency jobs<br>lbs. produced<br>Environmental accidents<br>Material costs<br>Overtime costs<br># of pump seal failures<br>Viscosity<br>Cp <sub>x</sub> values<br>Safety<br>Days since last lost-time<br>% rework or reject<br>Hours downtime<br>% uptime | # of OSHA recordables<br># of customer returns<br>Customer complaints<br>Overtime/total hours worked<br>\$/lb. produced<br>Raw material utilization<br>Yield<br>Utility cost<br>ppm water<br>Color<br>Service factor<br>Time between turnarounds<br>Hours worked/employee<br>lbs. waste<br>Housekeeping score<br>% capacity filled | <p>Generate 10 to 12 ideas for your project/ concept and create an affinity map.</p> |  |  |  |  |
| Possible Performance Measures   |  |   |   |   |  |  |  |  |  |  |
| % purity<br>% trace metals<br>Maintenance costs<br># of emergency jobs<br>lbs. produced<br>Environmental accidents<br>Material costs<br>Overtime costs<br># of pump seal failures<br>Viscosity<br>Cp <sub>x</sub> values<br>Safety<br>Days since last lost-time<br>% rework or reject<br>Hours downtime<br>% uptime   | # of OSHA recordables<br># of customer returns<br>Customer complaints<br>Overtime/total hours worked<br>\$/lb. produced<br>Raw material utilization<br>Yield<br>Utility cost<br>ppm water<br>Color<br>Service factor<br>Time between turnarounds<br>Hours worked/employee<br>lbs. waste<br>Housekeeping score<br>% capacity filled |   |   |   |  |  |  |  |  |  |
| 15. a)  | <p>During those priceless, time-sensitive moments that deserve to be captured on camera so that they can be cherished forever more—like your child walking for the first time, or spotting your favourite celebrity in your local coffee shop—there’s nothing worse than being confronted with this message:</p>                   | 4   | 5 | 5   | 5  |  |  |  |  |  |
| <div style="text-align: center;"> </div>  |  | <p>What would you do if you saw this in the user acceptance testing phase</p> |   |   |  |  |  |  |  |  |
| b)  | <p>A good designer knows how to get into the mindset of his users, and turns their needs into a meaningful, desirable, and easy-to-use product or service. “Good design is actually a lot harder to notice than poor design, in part because good designs fit our needs so well that the design is invisible.”- Don Norman.</p>    | 4   | 4 | 5   | 5  |  |  |  |  |  |
| <p>Why is this dropdown irritating? What should be done if this came to your notice in the testing stage?</p>   |  |   |   |   |  |  |  |  |  |  |

|        |   |   |   |   |    |
|--------|---|---|---|---|----|
|        |    |   |   |   |    |
| 16. a) | Mention one Design thinking success story in detail. Use the structure given below.<br>OVERVIEW<br>CHALLENGE<br>REALIZATION<br>SOLUTION<br>OUTCOME  | 4 | 2 | 1 | 10 |
| b)     | How do you create an empathy map? Explain in detail?  | 4 | 2 | 2 | 3  |
| 17.    | Answer any <i>two</i> of the following:   |   |   |   |    |
| a)     | Based on the given user perception/ feedback create a design brief using the following template.<br>User perception/feedback<br>1. Shyam often forgets to complete his assignments and is in need of an efficient way to track his to-do list<br>2. Shyam also needs a tool/planner to help him perform to his true potential in his exams<br><br>Problem statement<br>Design goal/objective<br>Design requirements | 4 | 4 | 3 | 2  |
| b)     | Take a product of your choice and using the M in SCAMPER modify it. Compare your drawing and explain the difference.  | 4 | 6 | 4 | 3  |
| c)     | Draw a simple sketch of your concept/idea to help your team understand your idea better   | 4 | 6 | 4 | 3  |

M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

|      |                               |     |
|------|-------------------------------|-----|
| i)   | Blooms Taxonomy Level – 1     | 20% |
| ii)  | Blooms Taxonomy Level – 2     | 38% |
| iii) | Blooms Taxonomy Level – 3 & 4 | 42% |

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