VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD
Accredited by NAAC with A++ Grade
B.E. VI-Semester Advanced Supplementary Examinations, July-2023
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.	Fill in the blanks with appropriate words.	2	1	1	10
	Design Thinking is important because it provides a structured approach to problem-solving that prioritizes empathy, creativity, and experimentation. It helps teams focus on the user and their needs and encourages them to generate innovative and effective solutions. Here's an example:				
	Let's say a company wants to develop a new mobile app that helps people manage their mental health. Using design thinking, the team would start by _____ with potential users, conducting research and interviews to better understand their needs and pain points. From there, the team would move on to_____, generating a wide range of ideas for the app's features and functionality.				
	Once the team has narrowed down their ideas, they would move on to_____, creating mockups and testing the app with potential users to gather feedback and iterate on the design. Finally, the team would move on to_____, gathering feedback from users to refine the app and ensure it meets their needs.				
	By following the design thinking process, the team can create an app that truly meets the needs of its users, is easy to use, and provides real value. Without design thinking, the team may have created an app that misses the mark, fails to resonate with users, and ultimately flops in the market.				
2.	Here is a case study of an Indian company that successfully used Design Thinking:	2	3	1	10
	Company: Titan Company Limited Industry: Consumer Goods				
	Background: Titan is a leading watch and jewelry company in India. In 2013, they wanted to launch a new product - a smartwatch. They faced a significant challenge - designing a smartwatch that Indian consumers would embrace.				
	Design Thinking Approach: To address the challenge, Titan used a Design Thinking approach, which involved understanding the customer's needs and desires, prototyping, and testing the product with the target market.				

Titan's team began by conducting extensive research on Indian consumers' preferences for watches and technology. They conducted in-depth interviews, surveys, and focus groups with potential customers. Based on the insights gathered, they identified that Indian consumers valued aesthetics, battery life, and easy-to-use features in a watch.

Next, the team developed several prototypes of the smartwatch and tested them with potential customers to gather feedback. They iterated on the design based on the feedback received until they arrived at a product that met their customers' needs and expectations.

Results:

Titan launched its smartwatch, Juxt, in 2016, and it was an instant hit with Indian consumers. Juxt was designed to meet the needs of Indian consumers, and it featured a stylish design, long battery life, and easy-to-use features. Within a year, Titan had sold over 25,000 units of Juxt, and the smartwatch was considered a breakthrough product in the Indian market.

Conclusion:

Titan's success with Juxt demonstrates the power of Design Thinking in developing products that resonate with customers. By taking a customer-centric approach and iterating on their design based on customer feedback, Titan was able to create a smartwatch that met the unique needs and preferences of Indian consumers.

How did Titan use design thinking to create a successful product that disrupted the Indian watch market?

| 3. | Here's an empathy map for the persona "Kavita, the shopkeeper": | 2 | 2 | 2 | 3 |

Match the following:

1.	What they say:	a) Jots down notes on paper to remember what needs to be restocked. Constantly checks the shelves to see what needs to be refilled. Uses a calculator or phone to add up sales at the end of the day.
2.	What they do:	b) Overwhelmed and stressed out trying to keep up with everything. Worried about making mistakes in record keeping. Frustrated with the amount of time it takes to keep track of inventory.
3.	What they think and feel:	c) Customers asking for specific items that may be out of stock.

		The beep of the barcode scanner and the ringing of the cash register. Other shopkeepers complaining about the same issues.				
	4. What they see:	d) "I'm always running around the store trying to keep track of everything." "I wish there was an easier way to keep track of inventory." "I don't have time to sit and do manual record keeping."				
	5. What they hear:	e) Shelves that need restocking Paper notes and receipts scattered on the counter. A messy and disorganized store.				

4.	Problem: The coffee machine in the office is frequently breaking down.	2	2	2	3

Why did the coffee machine break down?

Because the filter was clogged with coffee grounds.

Why was the filter clogged with coffee grounds?

Because the employees are not cleaning the coffee pot and filter after use.

Why are employees not cleaning the coffee pot and filter after use?

Because they are in a rush to get back to work and do not consider it part of their responsibility.

Why do employees not consider it part of their responsibility?

Because there is no clear communication or expectation regarding cleaning the coffee pot and filter after use.

Why is there no clear communication or expectation regarding cleaning the coffee pot and filter after use?

Because it is not included in the office policies and procedures for using the coffee machine.

What is the root cause of the problem? Who developed the 5 Whys technique.

5.	Given below are two How might we statements. Create one based on the problem statement that your team and you have identified	2	4	3	2

How might we improve the ride cancellation process on cab booking apps to ensure better user experience and reduce the inconvenience caused to riders?

How might we create a system that reduces food waste in grocery stores?

6.	What is this grid ? When do we use this?	2	3	3	2

High Power/High Interest: Animal welfare organizations Local government bodies Animal rights activists Veterinary doctors	**High Power/Low Interest:** Animal rescue centers Local animal shelters NGOs working for animal welfare
Low Power/High Interest: General public Animal lovers and enthusiasts Social media influencers	**Low Power/Low Interest:** Individuals with no interest in animal welfare

7.	"What is a common method to generate a large number of ideas quickly in the ideation phase? _____ - _____ "	2	1	4	3
8.	S in the SCAMPER technique stands for "Substitute". It involves thinking about replacing a component or element of the product or service with something else to improve its function or appeal. Here's an example: Let's say you have a traditional wooden chair. You can use the "Substitute" technique to come up with ways to improve the chair. For instance, you could substitute the wooden legs with metal ones for added durability, or you could substitute the traditional seat cushion with a gel-infused one for added comfort. By substituting elements of the chair, you can create a more innovative and improved product. Give us an example of how you would modify(the M in SCAMPER) a given product to make it better?	2	3	4	3
9.	What is User Acceptance testing? What is very important?	2	2	5	5
10.	What is the importance of _____ in Structured Testing and how does it ensure the quality of the software?	2	1	5	5

	Part-B (5 × 8 = 40 Marks)				
11. a)	What will design thinking help you to compete in? Answer in not more that 50 - 75 words	3	3	1	10

b)	Fill in the blanks appropriately:
	
	   1. _____ is the first phase of Design Thinking where the focus is on gaining an understanding of the problem, user needs, and constraints.
	
	   2. In the _____ phase of Design Thinking, the aim is to generate a wide range of ideas and potential solutions to the problem at hand.
		5	1	1	10

3. During the _____ phase of Design Thinking, the design team will create one or more representations of their ideas in order to better understand and communicate them to others.

4. The _____ phase of Design Thinking is where the designs are tested and evaluated to ensure that they are effective and meet the needs of the user.

5. The _____ phase of Design Thinking involves evaluating the success of the project, gathering feedback, and identifying areas for improvement.

12. a) Here's a persona for a tribal living on a mountain: 4   3   2   3

Name: Rajesh

Age: 45

Gender: Male

Occupation: Farmer

Location: A remote tribal village on a mountain

Background: Rajesh is a tribal farmer who lives in a remote village on a mountain. He lives with his wife and three children, and his primary source of income is through subsistence farming. Due to the lack of access to modern healthcare facilities in his village, Rajesh and his family rely heavily on traditional medicinal practices.

Challenges: Rajesh faces several challenges when it comes to accessing emergency medical services. The mountainous terrain makes it difficult for ambulances to reach his village, and the lack of proper roads further compounds the problem. In addition, he does not have access to a phone or any means of communication in case of an emergency.

Goals: Rajesh's primary goal is to ensure that his family is healthy and safe. He understands the importance of quick medical attention in case of an emergency, and would like to have access to reliable ambulance services in his village. He also wishes to have access to modern medical facilities so that he can provide better healthcare to his family.

Personality: Rajesh is a practical and resourceful person, accustomed to living in difficult conditions. He is willing to take risks to ensure the safety of his family, but also values caution and planning. He is skeptical of modern technology and believes in relying on traditional practices, but is open to new ideas that can improve his family's well-being.

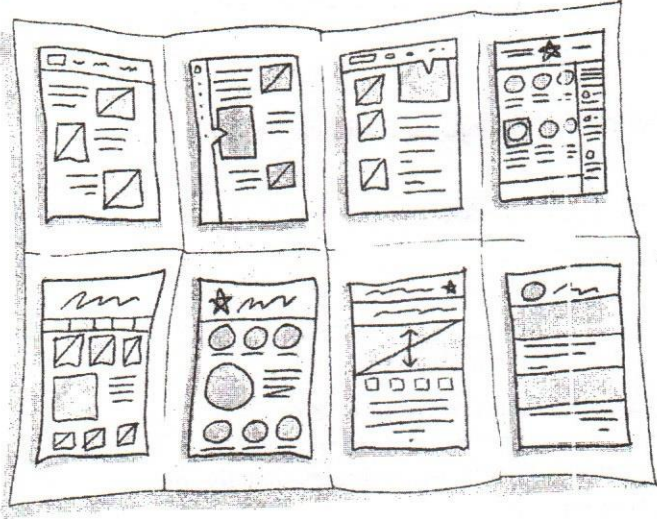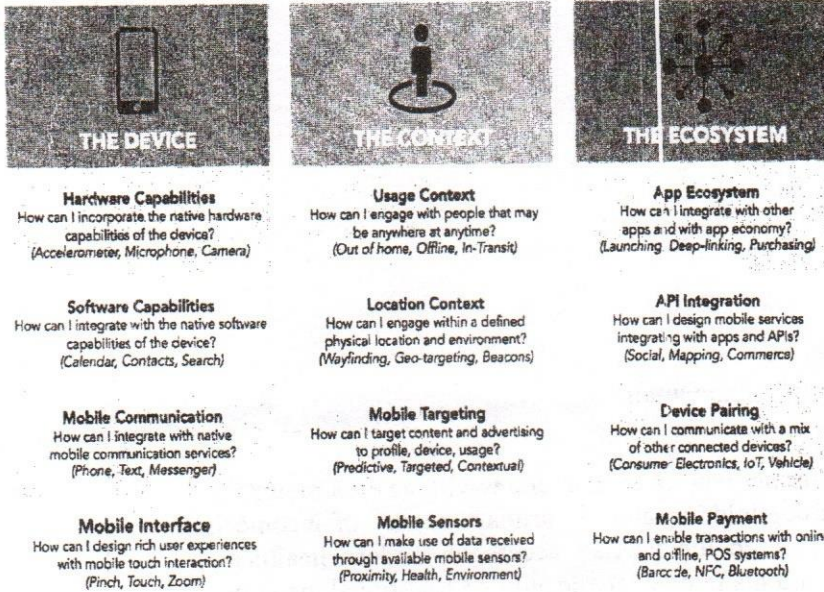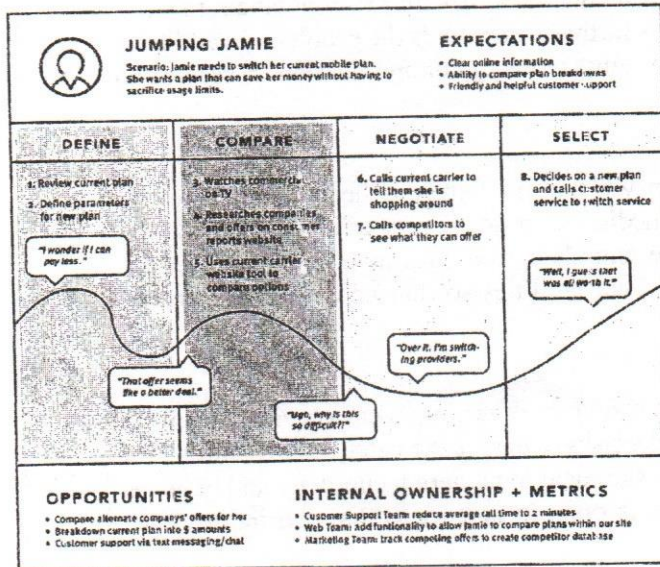|					
	Quote: "I may not have access to modern healthcare facilities, but I will do everything in my power to keep my family safe and healthy.' Create an empathy map for the above given Persona				
b)	We can see in the diagram given below three unique areas of potential advantage that mobile presents for businesses and marketers. Each opportunity area is organized into one of three groups: (1) The Device, (2) The Context, and (3) The Ecosystem.	4	4	2	3

KICK FRAME

Mobile Opportunity Map

THE DEVICE

Hardware Capabilities
How can I incorporate the native hardware capabilities of the device?
(Accelerometer, Microphone, Camera)

Software Capabilities
How can I integrate with the native software capabilities of the device?
(Calendar, Contacts, Search)

Mobile Communication
How can I integrate with native mobile communication services?
(Phone, Text, Messenger)

Mobile Interface
How can I design rich user experiences with mobile touch interaction?
(Pinch, Touch, Zoom)

THE CONTEXT

Usage Context
How can I engage with people that may be anywhere at anytime?
(Out of home, Offline, In-Transit)

Location Context
How can I engage within a defined physical location and environment?
(Wayfinding, Geo-targeting, Beacons)

Mobile Targeting
How can I target content and advertising to profile, device, usage?
(Predictive, Targeted, Contextual)

Mobile Sensors
How can I make use of data received through available mobile sensors?
(Proximity, Health, Environment)

THE ECOSYSTEM

App Ecosystem
How can I integrate with other apps and with app economy?
(Launching, Deep-linking, Purchasing)

API Integration
How can I design mobile services integrating with apps and APIs?
(Social, Mapping, Commerce)

Device Pairing
How can I communicate with a mix of other connected devices?
(Consume Electronics, IoT, Vehicle)

Mobile Payment
How can I enable transactions with online and offline, POS systems?
(Barcode, NFC, Bluetooth)

Based on the example given create an opportunity map for your product or service

13. a)		4	3	3	2

JUMPING JAMIE
Scenario: Jamie needs to switch her current mobile plan. She wants a plan that can save her money without having to sacrifice usage limits.

EXPECTATIONS
• Clear online information
• Ability to compare plan breakdowns
• Friendly and helpful customer support

DEFINE
1. Review current plan
2. Define parameters for new plan
"I wonder if I can pay less."

COMPARE
3. Watches commercials on TV
4. Researches competitors and offers on consumer reports website
5. Uses current carrier website tool to compare options
"That offer seems like a better deal."
"Ugh, why is this so difficult?!"

NEGOTIATE
6. Calls current carrier to tell them she is shopping around
7. Calls competitors to see what they can offer
"Over it. I'm switching providers."

SELECT
8. Decides on a new plan and calls customer service to switch service
"Well, I guess that was all worth it."

OPPORTUNITIES
• Compare alternate companys' offers for her
• Breakdown current plan into $ amounts
• Customer support via text messaging/chat

INTERNAL OWNERSHIP + METRICS
• Customer Support Team: reduce average call time to 2 minutes
• Web Team: Add functionality to allow Jamie to compare plans within our site
• Marketing Team: track competing offers to create competitor database

Create a customer journey map for the project that you and your team are working on?

			4	3	3	2

b) Here's a probe kit for the problem statement "System to remedy ride cancellation by drivers on Cab Booking Apps": **[4 3 3 2]**

    1. Can you describe a time when a ride you requested was cancelled by the driver?

    2. How did you feel when the ride was cancelled?

    3. How did you deal with the situation?

Three questions have been done for you, create three on your own?

14. a) Here are 15 ideas to install charging stations for electric vehicles that the project team collected during their brainstorming session. **[4 4 4 3]**

    1. Install charging stations in public parking lots and garages.

    2. Partner with shopping centers and malls to provide charging stations for their customers.

    3. Offer charging stations at highway rest stops to accommodate long-distance travelers.

    4. Place charging stations at airports and transportation hubs for easy access.

    5. Install charging stations in apartment complexes and residential areas.

    6. Partner with restaurants and cafes to provide charging stations for their patrons.

    7. Offer charging stations at hotels and other lodging facilities.

    8. Install charging stations at popular tourist destinations to accommodate travelers.

    9. Place charging stations at schools and universities to promote sustainable transportation.

    10. Offer charging stations at workplaces to encourage employees to use electric vehicles.

    11. Install charging stations at sports arenas and concert venues for event attendees.

    12. Partner with car rental companies to provide charging stations for their electric rental vehicles.

    13. Place charging stations at government buildings and public facilities.

    14. Offer charging stations at parks and outdoor recreational areas.

    15. Install solar-powered charging stations to promote renewable energy use.

Create an affinity map based on the ideas given

			4	4	4	3

b)

Imagine and draw the sketches of 8 concepts that potentially solve the problem, all in 8 minutes.

			5	5	5	5

15. a) Here is an example storyboard for an app prototype that aims to stop online bullying:

Panel 1:

Image: A teenage girl sitting at her desk, looking at her computer screen with a worried expression on her face.

Caption: Sarah is being bullied online again.

Panel 2:

Image: The same girl looking at her phone with a message notification popping up.

Caption: She receives a message from a friend about a new app that can help.

Panel 3:

Image: A close-up of the phone screen, showing the app icon and the app name: "BullyBlocker".

Caption: The app's icon and name is shown.

Panel 4:

Image: A screenshot of the BullyBlocker app's main screen, with two large buttons: "Report Bullying" and "Get Help".

Caption: Sarah downloads the app and opens it. She sees two buttons: "Report Bullying" and "Get Help".

Panel 5:

Image: Sarah clicks on the "Report Bullying" button and is taken to a screen where she can enter details about the bullying she's experiencing.

Caption: Sarah chooses "Report Bullying" and is able to enter details about the situation.

Panel 6:

Image: A screenshot of a pop-up message that says "Thank you for reporting. We're looking into it." with a smiley face.

Caption: After submitting the report, Sarah receives a pop-up message thanking her for the report.

Panel 7:

Image: Sarah clicks on the "Get Help" button and is taken to a screen that lists resources for her to access, including a helpline and counseling services.

Caption: Sarah clicks on "Get Help" and finds a list of resources she can access for additional support.
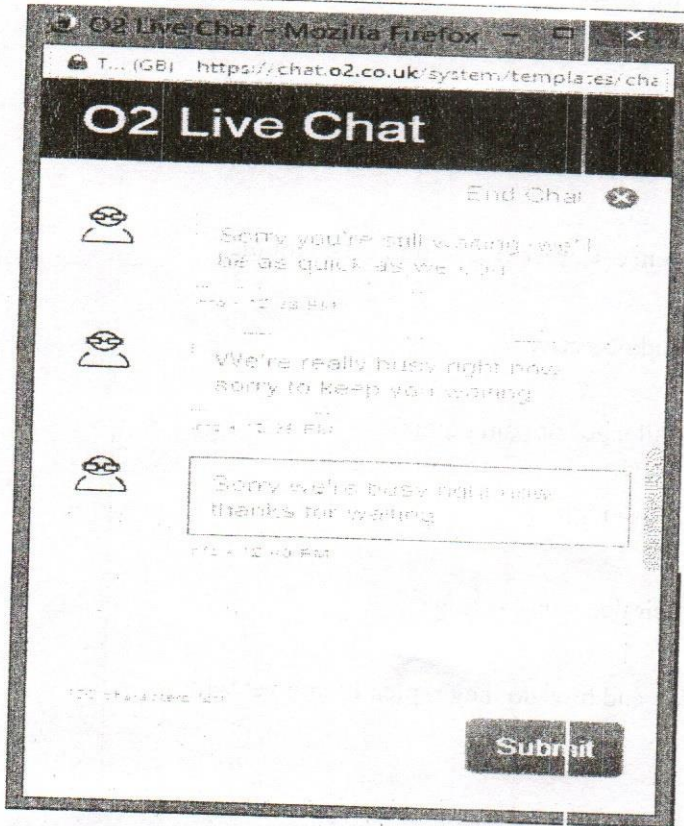
Panel 8:

Image: A close-up of Sarah's face, looking relieved and more confident.

Caption: With BullyBlocker, Sarah feels empowered and supported in her fight against online bullying.

Create one similar for the problem statement that you and your team have identified.
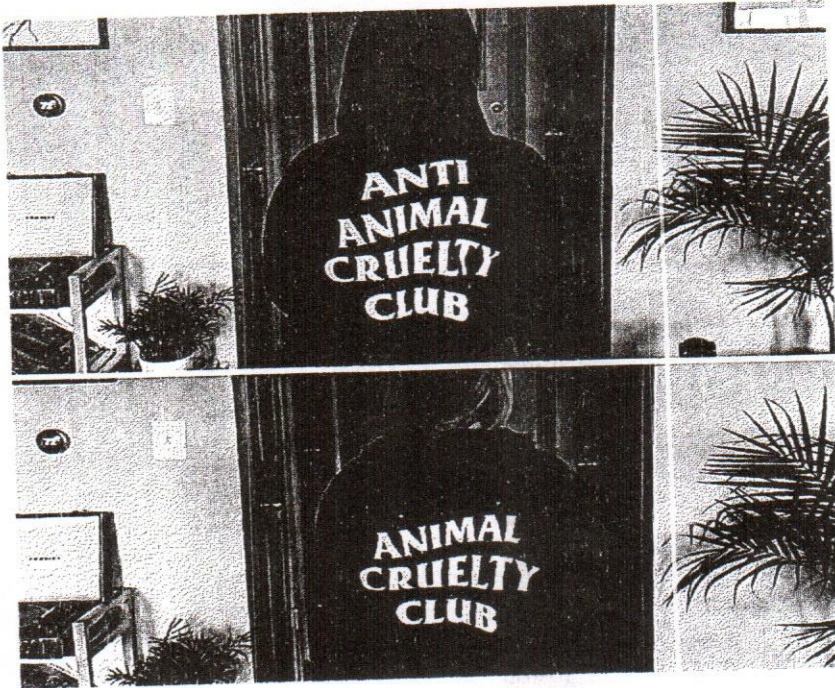
b)

You identify this design flaw during the testing phase? How would you solve it?

				4	5	1	10

16. a) Why is this a bad design example? Redesign it to make it a more effective design?

				4	4	2	3

b) Here's a basic template for creating a persona:

Persona Name:

Demographics: Age, Gender, Marital status, Occupation, Income, Location

Background: Education, Work Experience, Career Goals, Interests, Hobbies

Goals: What are their primary goals and objectives?

Challenges: What are their biggest challenges or pain points?

Values/Beliefs: What are their values and beliefs?

Influences: What factors influence their decision-making?

Behaviors: What actions do they take, and how do they typically interact with products, services, or brands?

User Story: A brief narrative that describes how the persona interacts with your product or service.

Use this template and create a persona

17.		Answer any *two* of the following:				
	a)	Problem statement: Redesigning a mobile app for a fitness center to improve the user experience	4	4	3	2
		User perception/feedback: "I find the current app to be confusing and cluttered. It's difficult to navigate and find the information I need, like class schedules and booking options. The color scheme is also uninviting and doesn't motivate me to use the app. I wish the app would be more user-friendly and visually appealing, so I can easily book classes and track my fitness progress."				
		Write the design goal and design requirements				
		Design goal / objective				
		Design requirements Our product/service should …				
		NOTES ---				
	b)	Here is an example for Idea Evaluation.	4	4	4	3
		Idea description: Develop a mobile app for tracking water consumption. Criteria: Feasibility, Impact, User experience, Cost, Scalability. Weight: Feasibility (5), Impact (4), User experience (3), Cost (2), Scalability (1). Evaluation: Feasibility: $4/5 \times 5 = 20$ Impact: $3/5 \times 4 = 12$ User experience: $4/5 \times 3 = 12$ Cost: $2/5 \times 2 = 4$ Scalability: $3/5 \times 1 = 0.6$ Total score: $20 + 12 + 12 + 4 + 0.6 = 48.6$ Decision: Based on the evaluation and other relevant factors, the team decides to move forward with developing the app. Create one similar for an idea that you have thought of for your project?				
	c)	A good survey goal answers 3 main questions: What type of responses do I want? What type of data am I hoping to get? How will I use that data once I get it?	4	4	5	5

Take a look at the pet food package designs below. Your goal for a concept test on them can't just be "are they good?" You need something specific that answers the three questions above.
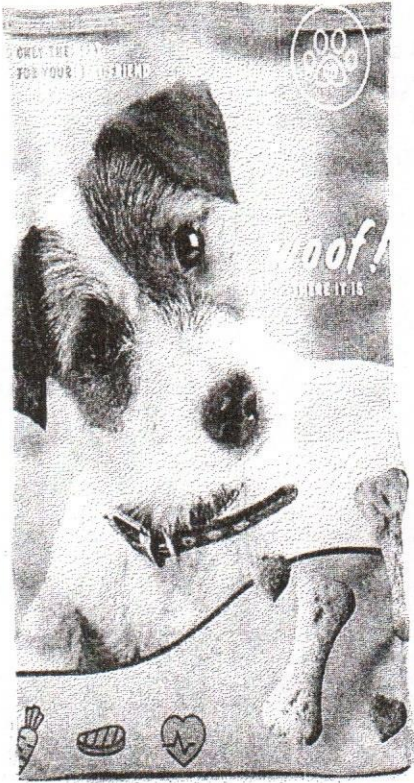
Ad Design #1
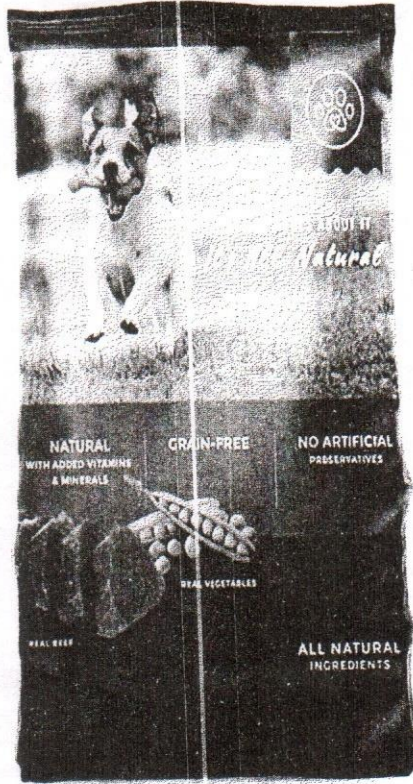
Ad Design #2

Vague goal

I want to get feedback on my pet food package design.

Write a Specific goal

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

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	40%
iii)	Blooms Taxonomy Level – 3 & 4	40%

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