ARTIFICIAL INTELLIGENCE (Subject Code: 843) — CLASS XI

Unit 4: Introduction to Capstone Project

Topic: The 5W1H Method (Design Thinking – Define Stage) | Practice Questions

Name: _____	Section: _____	Roll No.: _____

Instructions: Attempt all questions. Where asked, write the problem statement in the format: "Our _____ (users) have the problem of _____ (problem) and it can be solved by _____ (solution)."

Section A: Multiple Choice Questions

Choose the most appropriate option.

1. The handbook describes 5W1H as a simple and reliable method of:

(a) Coding

(b) Questioning

(c) Prototyping

(d) Brainstorming

2. The main purpose of the 5W1H method is to:

(a) Build a model of the solution

(b) Test the prototype with users

(c) Gather relevant facts from users so the problem can be defined in detail

(d) Group users into clusters

3. Which of the following questions belongs to the WHY category?

(a) Who else can be the users?

(b) Why should the problem be solved?

(c) Where does the problem arise?

(d) When does the problem occur?

4. For a traffic problem, the answer "Every morning between 8 a.m. and 10 a.m." answers which question?

(a) Where?

(b) Who?

(c) What?

(d) When?

5. For the same traffic problem, the answer "At the main crossing near the school gate" answers:

(a) Where?

(b) Why?

(c) How?

(d) When?

6. In the handbook's subject-selection example, the 'Why?' questions helped the team find:

(a) Only the place of the problem

(b) Only the users of the problem

(c) The cause of the problem and the reason it is important to solve it

(d) The time at which the problem occurs

7. In the Design Thinking process, the 5W1H method is applied after _____ and before _____.

(a) Prototype, Test

(b) Ideate, Prototype

(c) Empathize, Ideate

(d) Test, Define

8. A good problem statement written after the 5W1H questions should be:

(a) Written from the designer's point of view

(b) Human-centred, focusing on the unmet needs of the users

(c) A list of all possible solutions

(d) A technical description of the AI algorithm

9. A school wants to reduce water wastage. Which of these is a well-framed WHERE question?

(a) In which places in the school is water wasted the most?

(b) Who wastes the most water?

(c) Why is water wasted?

(d) How much water is wasted?

10. The answers to the HOW questions in 5W1H mainly give direction to the:

(a) Empathize stage

(b) Test stage

(c) Selection of team members

(d) Ideate stage

Section B: Fill in the Blanks

11. The 5W1H method is used in the _____ stage of Design Thinking.

12. The question "Who else can be the users?" helps identify _____ users who are also affected by the problem.

13. In the handbook's subject-selection example, the problem was aligned to SDG-4, _____.

14. The empathy map is created in the Empathize stage, and its insights are used to answer the _____ questions.

15. In the subject-selection example, the solution idea selected for the prototype was a _____.

Section C: Match the Following

16. The problem: "Students wait in long queues at the school canteen during recess." Match each answer in Column A with the 5W1H question it answers in Column B.

	Column A (Answer)		Column B
(i)	During the 20-minute recess every day	(a)	Who?
(ii)	At the school canteen counter	(b)	What?
(iii)	Students of all classes and canteen staff	(c)	Where?
(iv)	Only one counter takes orders and payment, so it is slow	(d)	When?
(v)	Students lose their break time and often skip food	(e)	Why?
(vi)	Pre-ordering through an app so food is ready on arrival	(f)	How?

Hint: (v) describes the problem itself.

Section D: Spot the Error

17. A student wrote the following 5W1H answers for the problem "Stray dogs in the colony park." Three answers are written against the wrong question. Identify them and write the correct question for each.

5W1H	Answer
Who?	Children and elderly people who use the park
What?	In the evening, between 6 p.m. and 8 p.m.
Where?	Stray dogs chase and scare people in the park
When?	In the colony park near Gate No. 2
Why?	Leftover food is thrown in the park, which attracts the dogs
How?	Install covered dustbins and contact an animal shelter for vaccination and care

Section E: Short Answer Questions (2 marks each)

18. Why is it important to define a problem using 5W1H before jumping to solutions?

19. How are the empathy map and the 5W1H method related to each other?

20. In the subject-selection example, two questions were asked under 'Why?'. Write both and explain why each is useful.

21. Write the general format of a problem statement. Which 5W1H answers are used to fill it?

22. Give two 'Who?' questions that a team should ask about any problem.

Section F: Application – Frame, Answer and Define (5 marks each)

For each problem: (a) frame one question under each of Who, What, Where, When, Why and How; (b) answer each question; (c) write the problem statement.

23. Elderly people living alone in your colony often forget to take their medicines on time.

24. Large amounts of water are wasted in your school because of leaking taps and overflowing water tanks.

25. Many Class XI students find it difficult to keep track of assignment deadlines given by different subject teachers.

Section G: Write the Problem Statement (3 marks)

26. Read the 5W1H answers below and write a suitable problem statement. Also name the SDG to which the problem is aligned.

5W1H	Answer
Who?	Small farmers in villages
What?	They do not know the right time and amount of water for irrigation, so crops are over- or under-watered
Where?	Farms that depend on borewells and canals
When?	Throughout the growing season, especially in summer
Why?	They have no easy way to check soil moisture and weather forecasts; wastage of water and lower crop yield
How?	A system that uses soil-moisture and weather data to suggest when and how much to irrigate

Section H: Case-Based Question (5 marks)

27. Read the case and answer the questions that follow.

A Class XI team surveyed shopkeepers in a local market. Many shopkeepers said that a lot of food packets and medicines in their shops expire before they are sold. One shopkeeper said, "I only notice expired items when a customer complains." Most shops keep stock records in a notebook. The problem is worst after festival seasons, when shopkeepers buy extra stock. Expired goods mean losses for shopkeepers, health risks for customers and more waste.

(a) Answer Who?, What?, Where? and When? for this problem. (2)

(b) Write two answers to the question 'Why?' – one for why the problem occurs and one for why it should be solved. (1)

(c) Write the problem statement. (1)

(d) Name one SDG to which this problem can be aligned. (1)

ANSWER KEY / SAMPLE ANSWERS

Section A: MCQ

Q	1	2	3	4	5	6	7	8	9	10
Ans	(b)	(c)	(b)	(d)	(a)	(c)	(c)	(b)	(a)	(d)

Section B: Fill in the Blanks

11. Define 12. other (secondary) 13. Quality Education 14. 5W1H 15. chatbot

Section C: Match the Following

16. (i)–(d) When, (ii)–(c) Where, (iii)–(a) Who, (iv)–(e) Why, (v)–(b) What, (vi)–(f) How

Section D: Spot the Error

17. 'What?' – "In the evening, between 6 p.m. and 8 p.m." is actually the answer to WHEN?

'Where?' – "Stray dogs chase and scare people in the park" is actually the answer to WHAT?

'When?' – "In the colony park near Gate No. 2" is actually the answer to WHERE?

(Who?, Why? and How? are correct.)

Section E: Short Answers (key points)

18. It helps the team understand the exact problem, the users, the place, time and cause. Without this, the team may solve the wrong problem or miss important users; a clear definition leads to better ideas.

19. The empathy map (Empathize stage) collects what users say, think, do and feel. These insights are used to answer the 5W1H questions (Define stage) and write the problem statement.

20. "Why does the problem occur?" – finds the root cause, so the solution targets it. "Why should it be solved?" – shows the importance/benefit of solving it and justifies the project.

21. "Our _____ have the problem of _____ and it can be solved by _____." Who? fills the users, What? fills the problem, and How? fills the solution.

22. Any two: Who are the users? Who else can be the users? Who is affected the most? What do you know about the users?

Section F: Sample Answers (accept any relevant questions and answers)

23. Medicine reminders for the elderly

5W1H	Answer
Who?	Who are affected? – Elderly people living alone; also their families and doctors.
What?	What is the problem? – They forget to take medicines or take the wrong dose.
Where?	Where does it happen? – At home, when no family member is present.
When?	When does it happen? – Daily, especially when they take several medicines at different times.
Why?	Why does it occur? – Memory problems and complicated schedules. Why solve it? – Missed doses can harm their health.
How?	How can it be solved? – A voice-based reminder device/app that announces each medicine and alerts family if a dose is missed.

Problem statement: Our elderly people living alone have the problem of forgetting to take their medicines on time, and it can be solved by a voice-based reminder system that alerts them and their family members.

24. Water wastage in school

5W1H	Answer
Who?	Who is responsible / affected? – School staff, students and the community.
What?	What is the problem? – Water is wasted through leaking taps and overflowing tanks.
Where?	Where does it happen? – Washrooms, drinking-water points and rooftop tanks.
When?	When does it happen? – When the motor is left on and leaks go unnoticed, especially after school hours.
Why?	Why does it occur? – No one monitors tank levels or reports leaks. Why solve it? – To save water (SDG-6) and reduce bills.
How?	How can it be solved? – Sensors that detect tank levels and leaks and automatically switch off the motor and alert staff.

Problem statement: Our school has the problem of water wastage from leaking taps and overflowing tanks, and it can be solved by a sensor-based system that monitors water levels and leaks and alerts the staff.

25. Tracking assignment deadlines

5W1H	Answer
Who?	Who are the users? – Class XI students; also teachers and parents.
What?	What is the problem? – Students miss or forget deadlines given by different teachers.
Where?	Where does it arise? – In school and at home while planning study time.
When?	When does it happen? – When many assignments are given in the same week, before tests.
Why?	Why does it occur? – Deadlines are given orally or on different platforms. Why solve it? – Late work lowers marks and adds stress.
How?	How can it be solved? – A single planner app/chatbot that collects all deadlines and sends reminders.

Problem statement: Our Class XI students have the problem of keeping track of assignment deadlines from different teachers, and it can be solved by a single planner app that collects all deadlines and sends timely reminders.

Section G: Problem Statement

26. Our small farmers have the problem of not knowing the right time and amount of water for irrigation, and it can be solved by a system that uses soil-moisture and weather data to suggest when and how much to irrigate.

SDG: SDG-2 Zero Hunger (also accept SDG-6 Clean Water and Sanitation).

Section H: Case-Based

27. (a) Who? – Shopkeepers in the local market (also customers). What? – Food packets and medicines expire before they are sold. Where? – In shops in the local market. When? – Throughout the year, worst after festival seasons when extra stock is bought.

(b) Why does it occur? – Stock is recorded in notebooks, so expiry dates are not tracked. Why should it be solved? – It causes losses for shopkeepers, health risks for customers and more waste.

(c) Our shopkeepers have the problem of goods expiring before they are sold, and it can be solved by a smart stock-tracking system that alerts them about items nearing expiry.

(d) SDG-12 Responsible Consumption and Production (also accept SDG-3 Good Health and Well-being).