AI Project Lifecycle

Standard difficulty · 20 questions · 40 marks · Time: 38 minutes

Name: _____ Date: _____ Score: ____ / 40

Show your working for Sections B and C. Answers are on the last page — try every question first!

Section A — Choose the correct answer 8 × 1 = 8 marks

1. AI systems learn mainly from:
   (a) feelings **(b)** guesswork **(c)** luck **(d)** data

2. Updating the model when the exam pattern changes: at which stage of the AI project lifecycle does this happen?
   (a) monitoring and maintenance **(b)** data collection and preparation
   (c) model evaluation and refinement **(d)** model development and training

3. Which of these uses AI rather than fixed automation?
   (a) a street light that switches on at 6 p.m. every day
   (b) a conveyor belt that always moves at the same speed
   (c) a traffic signal that changes every 30 seconds whatever the traffic
   (d) an email filter that learns which messages are spam

4. A model is tested on 20 new examples and gets 1 right. What is its accuracy?
   (a) 5% **(b)** 1% **(c)** 95% **(d)** 15%

5. A model learned this rule from past deliveries: an order is on time only if the distance is less than 10 km, the weather is clear, the traffic is low and the delivery partner is experienced; otherwise it is late. How many of these orders does it predict to be on time?
   Order 1: 14 km, clear, high traffic, new partner
   Order 2: 14 km, rainy, low traffic, experienced partner
   Order 3: 12 km, clear, low traffic, experienced partner
   Order 4: 6 km, rainy, high traffic, experienced partner
   Order 5: 2 km, rainy, low traffic, experienced partner
   (a) 2 **(b)** 5 **(c)** 1 **(d)** 0

6. A table of past students has these rows:
   Rahul: attendance 63%, marks —
   Vikram: attendance 56%, marks 58
   Dev: attendance 87%, marks —
   Ananya: attendance 81%, marks 91
   Zoya: attendance 88%, marks —
   Ananya: attendance 81%, marks 91
   Vikram: attendance 56%, marks 58
   How many rows have a missing value (—)?
   (a) 3 **(b)** 2 **(c)** 5 **(d)** 4

7. In the AI project lifecycle, which stage comes immediately before model evaluation and refinement?
   (a) model development and training **(b)** data collection and preparation
   (c) model deployment **(d)** monitoring and maintenance

8. A soil-moisture reading taken every hour in a field. What kind of data source is this?

(a) historical records **(b)** sensors
(c) surveys **(d)** websites

Section B — Short answer 8 × 2 = 16 marks

9. How does an AI system learn?

10. A spam filter is tested on 10 emails it has never seen and labels 8 of them correctly. What is its accuracy?

11. A model learned this rule from past deliveries: an order is on time only if the distance is less than 15 km, the weather is clear, the traffic is low and the delivery partner is experienced; otherwise it is late. Predict each order. (a) 9 km, clear, low traffic, experienced partner (b) 10 km, rainy, high traffic, experienced partner

12. Put the stages of the AI project lifecycle in order. Write the letters in order.
(a) Data collection and preparation
(b) Defining the problem
(c) Monitoring and maintenance
(d) Model evaluation and refinement
(e) Model deployment
(f) Model development and training

13. Before training, a table is cleaned. It has these rows:
Asha: attendance 79%, marks 31
Asha: attendance 79%, marks 31
Vikram: attendance 63%, marks 69
Rahul: attendance 61%, marks 79
Dev: attendance 87%, marks 82
Meera: attendance 79%, marks 49
Priya: attendance 88%, marks 55
Dev: attendance 87%, marks 82
Kabir: attendance 97%, marks —
(a) How many rows are repeats of an earlier row? (b) How many rows have a missing value (—)?

14. A model must reach at least 60% accuracy on a test set of 160 examples. What is the fewest examples it must get right?

15. At which lifecycle stage does each happen? (a) Choosing which kind of model to build (b) Counting how many test predictions were correct

16. Is each one AI or automation? (a) a car wash that sprays every car for the same fixed time (b) a car wash that scans each car and decides how long to scrub it

Section C — Word problems — 4 × 4 = 16 marks

17. Describe the six stages of the AI project lifecycle in order.

18. A model that predicts whether a student will score above 75% is tested on 50 new students and is right for 28. After more data is added and it is trained again, it is right for 35 of 50 new students. (a) What was its accuracy at first? (b) What is it now? (c) By how many percentage points did it improve?

19. A model learned this rule from past deliveries: an order is on time only if the distance is less than 10 km, the weather is clear, the traffic is low and the delivery partner is experienced; otherwise it is late. Four new orders and what really happened:
Order 1: 12 km, clear, low traffic, new partner; actually late
Order 2: 19 km, clear, low traffic, new partner; actually late
Order 3: 3 km, rainy, high traffic, experienced partner; actually on time
Order 4: 8 km, clear, high traffic, experienced partner; actually on time
(a) How many orders does the rule predict on time? (b) For how many orders is the prediction right? (c) What is the accuracy?

20. A sensor for a crop-watering model reads the soil moisture every 15 minutes. (a) How many readings does it take in a day? (b) The model needs at least 4,000 readings to train. After how many whole days will it have enough?

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Answer key

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Q	Answer	Working
1	**(d) data**	—
2	**(a) monitoring and maintenance**	—
3	**(d) an email filter that learns which messages are spam**	—
4	**(a) 5%**	1 ÷ 20 × 100
5	**(d) 0**	1: late, 2: late, 3: late, 4: late, 5: late
6	**(a) 3**	count every row with —, repeats included
7	**(a) model development and training**	defining the problem → data collection and preparation → model development and training → model evaluation and refinement → model deployment → monitoring and maintenance
8	**(b) sensors**	—
9	**By finding patterns in many examples of data and using them to make predictions or decisions.**	—
10	**80%**	8 ÷ 10 × 100
11	**(a) On time; (b) Late**	every condition must hold for on time
12	**b, a, f, d, e, c**	Defining the problem → Data collection and preparation → Model development and training → Model evaluation and refinement → Model deployment → Monitoring and maintenance
13	**(a) 2; (b) 1**	a name that appears again is a repeat; count the rows with —
14	**96**	60% of 160
15	**(a) model development and training (b) model evaluation and refinement**	—
16	**(a) Automation; (b) AI**	AI learns from data and adapts; automation repeats fixed rules
17	**Define the problem; collect and prepare data; develop and train the model; evaluate and refine it; deploy it; monitor and maintain it.**	—
18	**(a) 56%; (b) 70%; (c) 14**	28 ÷ 50 × 100; 35 ÷ 50 × 100
19	**(a) 0; (b) 2; (c) 50%**	1: predicted late, 2: predicted late, 3: predicted late, 4: predicted late
20	**(a) 96; (b) 42**	1,440 minutes ÷ 15; 4,000 ÷ 96, rounded up

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