Teacher Answer Key

Case Study

1. The second AI winter was driven by the failure of expert systems — programs built on hand-coded rules — which were expensive to maintain and collapsed when confronted with situations their designers had not anticipated. Neural networks were seen as an unproven alternative with no commercial track record, so the dominant research community dismissed them during a period of tight budgets and skepticism.

2. The AI field has repeatedly seen promising approaches abandoned during winters only to be vindicated later — rule-based systems, neural networks, and machine learning all had periods of dismissal. This suggests we should evaluate AI research claims carefully without either uncritical enthusiasm or premature rejection, since the limiting factor is often hardware or data rather than the fundamental idea.

Multiple Choice

1. B

2. D

3. A

Matching

1-E, 2-D, 3-A, 4-C, 5-B

Fill-in-the-Blank

1) Dartmouth, 2) Kasparov, 3) days

Short Answer (Sample Responses)

Q1: An AI winter is a period of reduced funding and public interest following failed promises in the field. The second winter in the late 1980s was caused by the failure of expert systems, which were expensive to maintain and collapsed in real-world conditions outside their narrow design parameters. The pattern shows that periods of extreme hype tend to set expectations too high, and when those expectations are not met quickly, the entire field suffers even when the underlying ideas have long-term value.

Q2: The transformer paper introduced a new way of building neural networks that was dramatically more efficient at processing language sequences. The 2017 timing matters because it coincided with the availability of massive text datasets from the internet and powerful enough computing hardware to train very large models —

without those two ingredients, the transformer architecture alone would not have produced the results it did.

Q3: Modern AI chatbots like ChatGPT can fool many people in short text conversations, which suggests they might pass a basic version of the Turing Test in controlled conditions. However, this reveals a limitation in the test itself: it measures behavioral output rather than understanding. ChatGPT can seem to understand without actually understanding anything — it generates statistically plausible responses based on patterns in training data, which is fundamentally different from the human thinking Turing was imagining.