2910310 Artificial intelligence

Examiner's report: Zone B

Question 1

Part a). asked candidates to apply their knowledge of intelligent agents to the case of spellchecking software. Most candidates were able to do this without difficulty.

Continuing on the 'spellcheckers as agents' theme, candidates were then asked to look at the environment in which these agents work and classify it in terms of accessibility, determinism, episodicity, dynamism and discreteness. While many were able to do this it was clear from some answers that a number of candidates had not transferred their knowledge of bookwork to everyday scenarios.

Part c) required candidates to find an example satisfying a list of conditions. This proved more difficult, showing that application of concepts was not practiced as much as one might hope.

Question 2

All problems are search problems and part a) should have provided no difficulty to candidates. However some did find it difficult to express this fact coherently.

In part b) Although some candidates correctly discussed the differences between directed and undirected search, others ploughed ahead with irrelevant descriptions of depth and breadth first searches.

Parts c) and d) were on the whole well answered, though it would be wise for candidates to learn how a general search algorithm works and know how the order of visiting nodes in search space can be altered by use of different queuing protocols. Many candidates appear to have attempted to learn each in isolation. Knowing how a general search algorithm works greatly simplifies the set of search techniques conceptually.

Part e) is bookwork though it should be possible for candidates to make an educated guess if they have forgotten the results. Good candidates could define the terms optimal and complete and explain briefly why they give the answer that they do.

Part f) was not as well answered as one might expect. It is not sufficient just to give the answer 'breadth first'. The question asks for reasoning, so this must be given.

Question 3

Part a) is bookwork and was well answered, but few candidates were able to answer part b) fully, it seems that in the minds of candidates these two systems are not as related as we might hope.

The order, or lack of it, of rows in a truth table may make the difference between obtaining full marks and obtaining no marks. A surprising number of candidates still insist on a random order with the subsequent consequences of mistakes creeping in when attempting part c).

Both truth tables and Boolean algebra can be used to determine whether two expressions are equivalent. Many candidates seemed unaware that, for complex expressions, the algebraic approach has definite advantages and so were unable to give a good answer to part d).

Part e) was poorly answered. It was evident that many candidates had not practised the skills of translating between English and FOPC (First Order Predicate Calculus).

In part g) a discussion both of non monotonic reasoning and default logic might be expected. Few candidates were able to give answers that were wholly satisfactory.

Question 4

In Question 4 a language is given in the form of grammatical and lexical rules and candidates are required to work with these to determine the sentences that belong to this grammar.

Part a) and b) were straightforward for most candidates and c) required a simple combinatorial calculation that should have been well within the capabilities of most candidates. It was surprising that a few made major errors in the calculation.

In part d) the effect on the language of adding a few rules to the language was investigated. Recursion was introduced and this obviously has a drastic effect on the language both in terms of the number of legal sentences and their 'naturalness'. The additions also introduce ambiguity – this fact was missed by many candidates.

Carrying on the theme of ambiguity in part e), candidates should have produced alternative syntax structures for an ambiguous sentence.

Finally in part f) candidates had the opportunity to show some knowledge of pragmatics. Unfortunately few availed themselves of that opportunity.

Question 5

The controversies in the philosophy of AI are rehearsed in question 5. Part a) asks candidates to state the case for and against allowing the label 'intelligent' to be applied to machines. Candidates in general seem able to give one side of the argument rather than a balanced view.

Part b) allows the candidate to give Searle arguments for claiming that a machine cannot be said to have real understanding together with the six replies that are given by the strong AI community. This is mainly bookwork and both sides of the argument against strong AI are needed for full marks.

The final part of this question, part c) requires candidates to give a reasoned view of the progress that current applications may be making AI. Unfortunately it was clear from many answers that candidates have not kept themselves informed of such developments and have a naive view of the applications of AI. Although some good answers were given, many candidates seemed unaware of AI as an applicable subject.