

COMPUTER SCIENCE TRIPOS Part IB – 2018 – Paper 6

10 Logic and Proof (MJ)

(a) Describe the DPLL method, explaining briefly each of its four steps. [4 marks]

(b) Use the DPLL method to find a model satisfying the following set of clauses, or to prove that no such model exists.

$$\{P, Q\} \{R\} \{Q, \neg S, \neg Q\} \{\neg Q, \neg R, S\} \{P, \neg Q\} \{P, Q, \neg S\} \{P, \neg R, S\} \{\neg P, \neg S\}$$

[6 marks]

(c) Describe briefly the procedure for constructing a BDD. Illustrate your answer by constructing the BDD (using the variable order  $P < Q < R < S$ ) for:

$$(\neg P \vee (Q \wedge S)) \vee (S \vee (\neg R \vee S))$$

[10 marks]