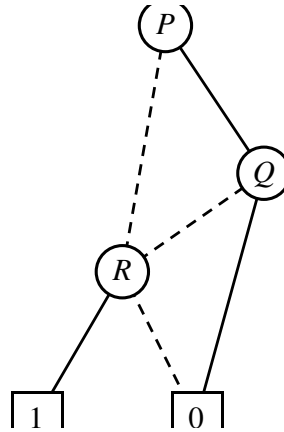


2006 Paper 6 Question 9

Logic and Proof

- (a) Exhibit a formula that is logically equivalent to the following BDD, justifying your answer. [3 marks]



- (b) Consider the following set of four clauses, where the variables are x , y and z :

$$\{P(x, z), P(y, x), Q(f(z))\}$$

$$\{\neg P(x, a), \neg P(a, x), Q(x)\}$$

$$\{\neg Q(x)\}$$

$$\{\neg Q(b)\}$$

- (i) What is the Herbrand universe of these clauses? [4 marks]
- (ii) Exhibit a Herbrand model satisfying these clauses, or prove that none exists. [13 marks]