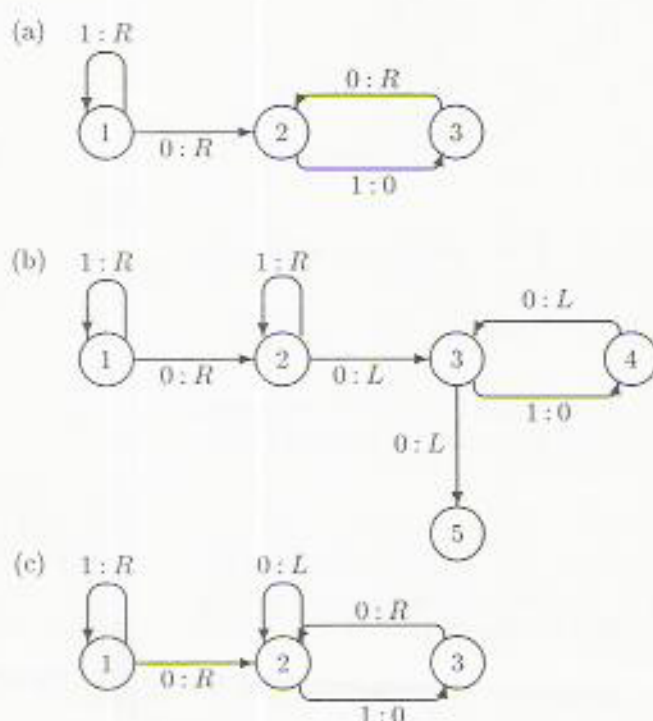


Question 6 (Unit 1) - 10 marks

- (i) We wish to design a Turing machine which, using monadic notation, inputs a pair (m, n) of positive integers in standard starting position (on an otherwise blank tape) and halts scanning the rightmost of a string of m 1s on an otherwise blank tape.

Write down which of the following Turing machines is suitable for this task. For each machine which is unsuitable, explain why it is unsuitable: this explanation can take the form of a sequence of configurations for appropriate test data.



[7]

- (ii) Devise and give the flow graph of a Turing machine which, using monadic notation, inputs a pair (m, n) of positive integers in standard starting position (on an otherwise blank tape) and halts scanning the leftmost of a string of n 1s on an otherwise blank tape.

[3]