Question 1 (50 marks)

a)

i. [-1] for wrong literals
[-1] for wrong terms
[-1] for wrong complements
[3] for correct GIC even if student have not indicated the number of literals, terms or complements.
[3] for correct GIC from logic diagram
[-3] for wrong GIC and have not indicated literals, terms or complements in the answer.

ii. [4] for correct sum-of-minterms, either using the k-map approach or algebraic expansion approach.
[-0.5] for each missing, extra or wrong minterm.

iii. [-0.5] for each wrong F value in the truth table.

iv. [-1] for each wrong term in F.
[-1] for each wrong implicants.
[5] correct answer based on the wrong k-map/truth table from (iii)

v. [-1] for each wrong term in F.
[-1] for each wrong implicants.
[3] answer is correct base on the wrong k-map

vi. [-1] for wrong literals
[-1] for wrong terms
[-1] for wrong complements
[3] for correct GIC even if student have not indicated the number of literals, terms or complements and have also indicated the reduction of GIC.
[-3] for wrong GIC and have not indicated literals, terms or complements in the answer.

vii. [-1] for each error in the diagram.

b) [-1] for each error.

c)

[-1] for each wrong storage element named.
[-1] for each wrong timing diagram in half a period. Eg. t0-t1

Question 2 (50 marks)

a)

i. [+3] correct working.
Appropriately deduct mark(s) for wrong working.

ii. [+4] correct working
Appropriately deduct mark(s) for wrong working.

b)

i. Students do not need to show the k-map, but they may use it to help them solve the problem. No mark rewarded for showing k-map. They must use algebraic manipulation to obtain the optimized G.
[2] Express G in terms of sum-of-minterms, $G = \Sigma m(\dots)$
[-1] For each incorrect minterm
[13] Correct working step outlined in the solution

ii. [-1] for each error.

c)

i. [-0.5] for each error on the truth table

ii. [-1] for each error on the truth table. If the solution is based on the wrong truth table in (i) and the minterms are correct based on the truth table, no deduction needed.

iii. [-1] for each error. If deductions have been made previously and it's a carry on error, no deduction needed.
Must have 4 inputs to the MUX and AB as select lines.

d) [7] shown correct number of inputs and outputs with block diagrams. Two 2-to-4 decoder and correct number (X) of outputs. Correct GIC calculation and appropriate explanation.
[2] Explanation of the design
[2] Correct GIC calculation
[3] Correct block diagram