

1a) out of 10

Member(Joe) etc 4

Member(x) $\Rightarrow x = \text{Joe} \vee \dots$ 2

MarriedTo(Joe, Sally) 1

Brother(Ellen, Bill) 1

$\forall x \forall y (\text{Member}(x) \wedge \text{MarriedTo}(x, y) \Rightarrow \text{Member}(y))$ 2

[give 1/2 for lost if buggy, missing &]

1b) out of 10

2 has general idea

4 has idea of interp that falsifies

6 sketch interp that falsifies

8 has query + sketch interp that falsifies

10 correct

1 -) out of 10

- 1 for each missing fact / axiom (5 of them)
or buggy

- 1 missing query

- 1 not showing can't be married to one individual

- 1 ^{not} stating she must be married to club members
and these are all of them

4a) out of 10

10 all correct

9 minor error

7 say clash + unsat, have idea don't
show details

5 buggy rule application say unsat + clash

4 buggy rule application say satisfiable

4b) out of 10

10 correct

9 minor errors

7 have much and say satisfiable

6 have much and don't say satisfiable

5 minor elements / confused + don't say satisfiable

4 minor element / very confused

2) out of 10

3 for conversion to clausal form

3 for clausal form (1 for each clause)

4 for resolution proof

Give part marks

3) a) out of 5

2 if they say satisfiable

2 for giving interpretation

1 for argument

b) out of 5

same as for a)

c) out of 5

2 if they say not satisfiable

3 for argument