Question 2

① likes(jane, X) = likes(X, josh).

X = jane

X = josh ≠ jane

false, can not be unified

② disk(27, queens, sgt_pepper) = disk(A, B, help).

A = 27 B = queens

help ≠ sgt_pepper

cannot be unified

③ [a, b, c] = [X, Y, Z|T]

can be unified

X = a Y = b [Z|T] = [c]

④ ancestor(french(jean), B) = ancestor(A, irish(joe)).

can be unified

A = french(jean)

B = irish(joe)

⑤ characters(hero(luke), X) = characters(X, villain(vader))

If hero(luke) and villain(vader) are both true or false

then it can be unified

X = hero(luke) = X = villain(vader)

else it can not be unified

⑥ f(X, a(b, c)) = f(d, a(Z, c))

it can be unified

X = d. Z = b

⑦ s(X, f(x), z) = s(g(y), f(g(b)), y)

it can not be unified

z ≠ y

⑧ vertical(line(point(X, Y), point(X, Z)))

= vertical(line(point(1, 1), point(1, 3)))

it can be unified

X = 1

Y = 1

Z = 3

⑨ g(Z, f(A, 17, B), A+B, 17)

= g(C, f(D, D, E), C, E)

it can be unified

E = 17

D = 17

A = D = 17

B = 17

A+B = 34 = C

Z = 34 = C

⑩ f(c, a(b, c)) = f(z, a(z, c))

it can not be unified.

Z = C

Z = b ≠ C.

false.

Question 3

① building (library, lb)

ground query

respond: True

② Status (finance, A)

ground query respond: false

→ status (finance, A) :- department (finance, Y), status (Y, A)

→ department (finance, business) → Status (business, A)

→ department (business, Y1) → false

③ department (civil, business)

ground query

false (business ≠ engineering)

④ faculty (X, civil).

non ground query

X = jones

X = james

X = davis

faculty (X, civil) : department (Z, civil), faculty (X, Z)

false ①

⑤ faculty (smith, X) non ground query

X = electrical

X = computer

X = engineering

false ①

⑥ department (X, Y) non ground query

X = electrical

Y = engineering

X = civil

Y = engineering

X = finance

Y = business

→ X = ibm_exams

Y = lb

⑦ faculty (X, civil). department (civil, Y)

non-ground query

X = jones

Y = engineering

X = james

Y = engineering

X = davis

Y = engineering

false

⑧ faculty (Smith).

non-ground query

Smith = smith

; = walsh

; = smith

; = jones

Smith = james

; = davis

; = smith

; = walsh

; = jones

; = james

Smith = davis

false

⑨ building (_, X) non-ground query

X = ev

X = mb

X = lb

X = h

X = tg

X = ev

X = ev

X = mb

false

⑩ status (X, accredited), building (X, Y)

non-ground query

X = engineering

Y = ev

X = electrical

Y = ev

X = civil

Y = ev

false

Question 3

(11) status(_,X), building(X,Y).
ground query
false

(12) faculty(X), faculty(X,Y), department(Y,_). non-ground query

X=Smith
Y=electrical

X=walsh
Y=electrical

X=Smith
Y=electrical

X=jones
Y=civil

X=james
Y=civil

X=davis
Y=civil

X=Smith
Y=electrical

X=walsh
Y=electrical

X=jones
Y=civil

X=james
Y=civil

X=davis
Y=civil

false

(13) faculty(X), faculty(X,Y), !, department(Y,Z).
non-ground query

X=Smith
Y=electrical
Z=engineering

(14) faculty(X), !, faculty(X,_).
non-ground query

X=Smith
X=Smith
X=Smith
false

(15) department(X,_), \+ faculty(_,X).
non-ground query
X=finance
X=ibm-exams