Question No. 1

(a)
```
capital_city(santiago).
city_in_country(santiago, chile).
country_in_continent(chile,south_america).
city_visited(santiago).
```

accept in any order **[4]**

(b)
```
ThisCity =
manchester
london
```
[2]

(c)
```
countries_visited(ThisCountry)
IF
city_visited(ThisCity)                    1
AND                                       1
city_in_country(ThisCity, ThisCountry)    2
```
[4]

Question No. 2

(a)
```
made_with(laasi, milk).
made_with(laasi, yogurt).
dairy_product(milk).
dairy_product(yogurt).
```
[4]

(b) Ingredient =

cheese, egg, flour **[2]**

(c)
```
contains_meat(Dish)
IF
made_with(Dish, X)        (2 marks)
AND                       (1 mark)
meat(X)                   (1 mark)
```
[4]

Question No. 3

(a)
```
parent(philippe, meena).
parent(gina, meena).
```
[2]

(b) **ahmed, aisha, raul** [2]

(c)
```
father(F, ahmed).
```
[1]

(d)
```
mother(X, Y)
IF
female(X) AND parent(X, Y).
```
[2]

(e)
```
grandparent(W, Z)
IF
parent(W,X)
AND parent(X,Z).
```
[2]

(f)
```
grandfather(G, K)
IF
male(G) AND
grandparent(G, K).

alternative:

father(G, X) AND
parent(X, K).
```
[2]

Question No. 4

3(a)	1 mark per clause • `person(mimi).` • `food(lettuce).` • `likes(mimi, chocolate).` • `dislikes(mimi, sushi).` • `dislikes(mimi, lettuce).`	**5**
3(b)	1 mark per answer `chocolate, pizza`	**2**

3(c)	1 mark per bullet
	• `might_like(B,A)`
	• `Person(B)`
	• `Food(A)`
	• `AND`
	• `AND NOT`
	• `Dislikes` predicate
	
	For example:
	`might_like(B, A).`
	`IF person(B) AND food(A)`
	`AND NOT(dislikes(B, A)).`
		6

Question No. 5

2(a)	1 mark for each statement
	
	`15 is_a(gecko, lizard).`
	`16 maxsize(gecko, 182).`
		2

2(b)	1 mark for 2 results 2 marks for 3 correct results `green_iguana, cayman, smooth_iguana`	**2**
2(c)	1 mark per bullet - `is_a` used with brackets () - `squamata, X` in correct order `is_a(squamata, X).`	**2**
2(d)	1 mark for each bullet to max 3 - `is_a(X, Z)` - `and // , has(Z, Y).` `is_a(X, Z) AND has(Z, Y).`	**3**
2(e)	`YES`	**1**

Question No. 6

1(a)	1 mark per fact
	
	`14 direct(london, rome).`
	`15 flies(rome, british_air).`
		2

1(b)	1 mark per bullet: • palma • salzburg `K = palma, salzburg`	**2**
1(c)	1 mark per bullet: • direct • glasgow, M `direct(glasgow, M).`	**2**
1(d)	1 mark per bullet: • `flies(Z,X)` • `AND` • `direct(Z, Y)` `flies(Z, X) AND direct(Z, Y)`	**3**
1(e)	`YES`	**1**

Question No. 7

1(a)(i)	1 mark for each correct statement: • bird(lays_egg). • bird(has_wings).	**2**
1(a)(ii)	1 mark for each correct line: • feature(eagle, lays_eggs). • feature(eagle, has_wings).	**2**
1(b)(i)	1 mark for each animal: tuna, crab	**2**
1(b)(ii)	1 mark per bullet point: • feature() • tuna, C feature(tuna, C)	**2**

1(c)	1 mark per bullet point to max 3:
	
	• feature(X,Y) AND bird(Y) // feature(X, has_wings)
	• AND
	• feature(X,Z) AND bird(Z) // feature(X, lays_eggs)
	
	(feature(X, Y) AND bird(Y)) AND (feature(X, Z) AND bird(Z))
		3

1(d)(i)	A programming style/classification // characteristics/features that programming language has/uses	**1**
1(d)(ii)	1 mark for each: • Low-level • Imperative // Procedural	**2**

Question No. 8

2(a)	1 mark for each fact:
	
	`18 type(waterdog, gundog).`
	`19 is_a(standardpoodle, waterdog).`
		2

2(b)	1 mark for each result: `H = english_setter, irish_setter`	**2**
2(c)	1 mark per bullet point to max 2: • `is_a` • `(irish_setter, W)` `is_a(irish_setter, W)`	**2**
2(d)	1 mark per bullet point to max 3: • `is_a(X,Z)` • `AND` • `fav_bird(Z, Y).` `fav_bird(X, Y) IF is_a(X, Z) AND fav_bird(Z, Y).`	**3**
2(e)	`NO`	**1**

Question No. 9

5(a)	• person(gina) • country(cyprus) • visited(gina, cyprus)	3
5(b)	**1 mark** for 2 correct, **2 marks** for 3 correct william deeraj meghan	2

5(c)	**1 mark** per bullet point
	• person(P) // country(C)
	• AND country(C) // AND person(P)
	• AND NOT // , NOT
	• visited(P, C)
	
	mightvisit(P, C)
	IF person (P) AND country (C) AND NOT visited(P, C)
		4

Question No. 10

3(a)	**1 mark** for each statement • `person(elle).` • `sport(rugby).` • `plays(elle, rugby).` • `will_not_play(elle, hockey).`	**4**
3(b)	`johann, jessica`	**1**

3(c)	**1 mark** per bullet point
	
	• `person(Y)`
	• `AND // ,`
	• `sport(X)`
	• `AND NOT // , NOT`
	• `will_not_play(Y, X)`
	
	`mightplay(Y, X)`
	`IF person (Y) AND sport (X) AND NOT(will_not_play(Y, X))`
		5

Question No. 11

2(a)	`studies(sam, history).` `tutors(nina, sam).`	**2**
2(b)	`freya, hua` // `hua, freya`	**1**

2(c)	**one** mark for correct use of `X`
	one mark for two other variables in correct positions
	one mark for three correct clauses in any order
	one mark for correct syntax
	`teaches(R, S),`
	`studies(X, S),`
	`tutors(R, X).`
		4

Question No. 12

2(a)	`type(caracal, wild).` `hair(caracal, short).`	**2**
2(b)	`persian`	**1**
2(c)(i)	`type(Pet, domestic).`	**1**
2(c)(ii)	`spots(WildSpotty, yes)` `,type(WildSpotty, wild).`	**2**