- Q2.a

-5	-10	-15	-10	-5
0	5	10	10	5
0	0	0	0	0
0	-5	-10	-10	-5
5	10	15	10	5

$F_1 * I_A$

-10	-10	0	10	10
-15	-10	5	10	10
-15	-10	5	10	10
-15	-10	5	10	10
-10	-10	0	10	10

$F_2 * I_A$

- Q2.b
  - F1 first order derivatives (gradients) in y direction,
  - F2 first order derivatives (gradients) in x direction,

- 2c. We have the same question in exercise 3, do it yourself :P

- 2d. Global brightness change or any other reasonable answers

- 2e

0	0	0	0	0	0	0
0	0	A	B	C	0	0
0	0	D	E	F	0	0
0	0	G	H	I	0	0
0	0	0	0	0	0	0

- 2.f Remark, the question is not very clear to me. You can say translate the output up by 1 pixel, left by 2 pixels and output only the first 3*3 pixels

- 2.g - j we have same question in 2020 exam and exercises

- 3.a
  - for Y, the output before SoftMax $M \cdot \boldsymbol{y} = [1.6, 1.5, 0.5, 2.9]^T$
  - For L, the output before SoftMax $[1.9, 3, 0.5, 1.9]^T$
  - For O, the output before SoftMax $[1.3, 1, 1.7, 0]^T$
  - For X, the output before SoftMax $[0.6, 2, 0, 4.8]^T$

  - For O, the output after SoftMax $[0.29, 0.21, 0.43, 0.08]^T$
  - For X, the output after SoftMax $[0.01, 0.06, 0.01, 0.92]^T$

- 3.b This is an ambiguous question; you can skip it.

- 3.c –f We have the same question in Exam 2020, and exercises, see the solution there.
- 3.g the question is ambiguous. You can skip it.

- 3.h we did not introduce scoring this year. You can skip it.
- 3.i the question is ambiguous. Generally, say: provide a reasonably large testing queries, which covers all 10 classes; compute the mean average precision among the queries for all 10 classes (the which is not covered this year.) The system with a high mean average precision is better.