Q1.

Given that relevent is positive and irrelevent is negative class.

Algorithm 1:

Actual / Predicted	Positive	Negative
Positive	(TP) 25	(FP) 15
Negative	(FN) 5	(TN) 55

Algorithm 2:

Actual / Predicted	Positive	Negative
Positive	(TP) 20	(FP) 10
Negative	(FN) 10	(TN) 60

Q2.

$$\text{Sensitivity} = \text{Recall} = \frac{TP}{TP+FN} \,, \text{Specificity} = \frac{TN}{TN+FP} \,, \text{Precision} = \frac{TP}{TP+FP}$$

* Balanced Accuracy $= \dfrac{\text{Sensitivity} + \text{Specificity}}{2}$

Algorithm 1: $BA_1 = \left(\dfrac{25}{30} + \dfrac{55}{70}\right)/2 = \dfrac{17}{21} \approx 0.81$

Algorithm 2: $BA_2 = \left(\dfrac{20}{30} + \dfrac{60}{70}\right)/2 = \dfrac{16}{21} \approx 0.76$

* F_1 - Score $= \dfrac{2 \times \text{Precision} \times \text{Recall}}{\text{Precision} + \text{Recall}}$

Algorithm 1: $F_1\text{-Score}_1 = \dfrac{2 \times \frac{25}{40} \times \frac{25}{30}}{\frac{25}{40} + \frac{25}{30}} = \dfrac{5}{7} \approx 0.71$

Algorithm 2: $F_1\text{-Score}_2 = \dfrac{2 \times \frac{20}{30} \times \frac{20}{30}}{\frac{20}{30} + \frac{20}{30}} = \dfrac{2}{3} \approx 0.67$

* In replacing accuracy with balanced accuracy or f1-score, I think my friend's suggestion is better here, since balanced accuracy cares both positive and negative, but f1-score doesn't care about true negative.

Q3.

No, because both metrics focus more on positive class of an imbalanced dataset.

Q4.

Specificity, precision, recall, accuracy