Question 1

A retail company runs two different promotional email campaigns, A and B, to test which is more effective at driving customer purchases.

1. They send Campaign A to 5,000 randomly selected customers, in which 250 make a purchase.

2. They send Campaign B to 5,000 different randomly selected customers, in which 200 make a purchase.

Conduct a hypothesis test to verify if Campaign A is more effective than Campaign B in converting customers using a classical approach and a P-value approach, at a significance level $\alpha = 0.05$.

Question 2

A researcher wants to know if drinking coffee reduces reaction time. The researcher measures the reaction time (in milliseconds) of 5 volunteers before and after drinking a cup of coffee.

Person	**Before Coffee** (x_i)	**After Coffee** (y_i)
1	250	238
2	270	270
3	260	254
4	280	274

Assume that d is normally distributed. Conduct a hypothesis test at a significant level $\alpha = 0.05$ using a classical approach.

Question 3

A researcher wants to know whether college students who drink coffee daily sleep fewer hours on average than those who do not drink coffee. Two independent random samples are taken:

Group	**Sample Size** n	**Mean Sleep Hours** $\bar{x}$	**Standard Deviation** s
Coffee drinkers	$n_1 = 36$	$\bar{x}_1 = 6.5$	$s_1 = 2$
Non-coffee drinkers	$n_2 = 40$	$\bar{x}_2 = 7.2$	$s_2 = 3$

Conduct a hypothesis test using a classical approach at a significant level $\alpha = 0.1$.