The Strange Case of Mole Airline flight 1023

Scene of the crash

At 6.30 am you and your team of forensic scientists are called to the scene of an airplane crash. You find evidence of an explosion that indicates it was a bomb. At the site of the crash you find a substance that on examination is shown to be an explosive material which is made of:

C 37.01% H 2.22% N 18.5% O 42.27%

The burned and mangled bodies of the passengers are found around the wreckage. You must identify them from substances found in their belongings as there are no dental records to use. There is a suspicion that one of the passengers may have been murdered before the crash, about an hour before the explosion.

Table 1 Percentage composition data of the compounds found on or within the bodies of the passengers.

Passenger	C	H	N	O	Location on body
1	67.31	6.98	4.62	21.10	Blood
2	63.15	5.30	0	31.55	Face
	46.66	4.48	31.10	17.76	Stomach
3	72.15	7.08	4.68	16.03	Pockets (20 tablets)
4	18.87	2.22	18.15	63.41	Blood and pockets
5	75.42	6.63	8.38	9.57	Blood
	37.01	2.22	18.50	42.27	Pockets
6	57.14	6.16	9.52	27.18	Pockets
7	80.48	7.45	9.39	2.68	Pockets
	81.58	8.90	9.52	0	Pockets
8	60.00	4.48	0	35.53	Pockets
	63.56	6.00	9.27	21.17	Pockets

Table 2. Possible Compounds

Identity	Formula	Notes
Codeine	$C_{18}H_{21}NO_3$	Prescription Pain killer
Cocaine	$C_{17}H_{21}NO_4$	Narcotic, illegal
Aspirin	$C_9H_8O_4$	Pain killer
Aspartame	$C_{14}H_{18}N_2O_5$	Artificial sweetener
Vanilla	$C_8H_8NO_3$	Flavouring
Trinitrotoluene	$C_7H_5N_3O_6$	Explosive
Nitroglycerine	$C_3H_5N_3O_9$	Explosive, heart medication
Curare	$C_{40}H_{44}N_4O$	Poison
Thiobromine	$C_7H_8N_4O_2$	Chocolate (flavouring)
Strychnine	$C_{21}H_{22}N_2O_2$	Rat poison
Dimetacrine	$C_{10}H_{13}N$	Prescription Antidepressant
Acetaminophen	$C_8H_9NO_2$	Painkiller (Tylenol)

Table 3. Personal Data

Deceased	Notes
Amadeo Oldere	Has a heart condition
Connie Majors	Pharmacist
Jim LeClaire	Baker
Archie Starr	Teacher, trying hard to lose weight
Bob Henderson	Professional athlete, suspended for drug use
Lisa Johnson	Engineer, suffered from depression
Bill Jackson	Suspected drug dealer
Norm Anderson	Believed to be the leader of a terrorist organisation

Your Task

1 Use the percentage composition values in Table 1 to determine the formulae for the substances found in or on the bodies. Match these formulae with the compounds in Table 2. Do not round off the numbers. Use all significant figures given and on the periodic table. **You must submit all your working when handing in this assignment**.

2 Use the personal data in table 3 to make a probable identification of each passenger. Use only the information in the tables to draw your conclusions.

3 Who was murdered and who was the most probable murderer?

Passenger	Most Probable Identity
1	_____
2	_____
3	_____
4	_____
5	_____
6	_____
7	_____
8	_____
The murderer was	_____
The victim was	_____

Certified by _____ on ____ / ____ / _____