NOVEMBER 2016

THERMODYNAMICS

FEEDBACK ASSESSMENT 1

UNIVERSITY OF EDINBURGH

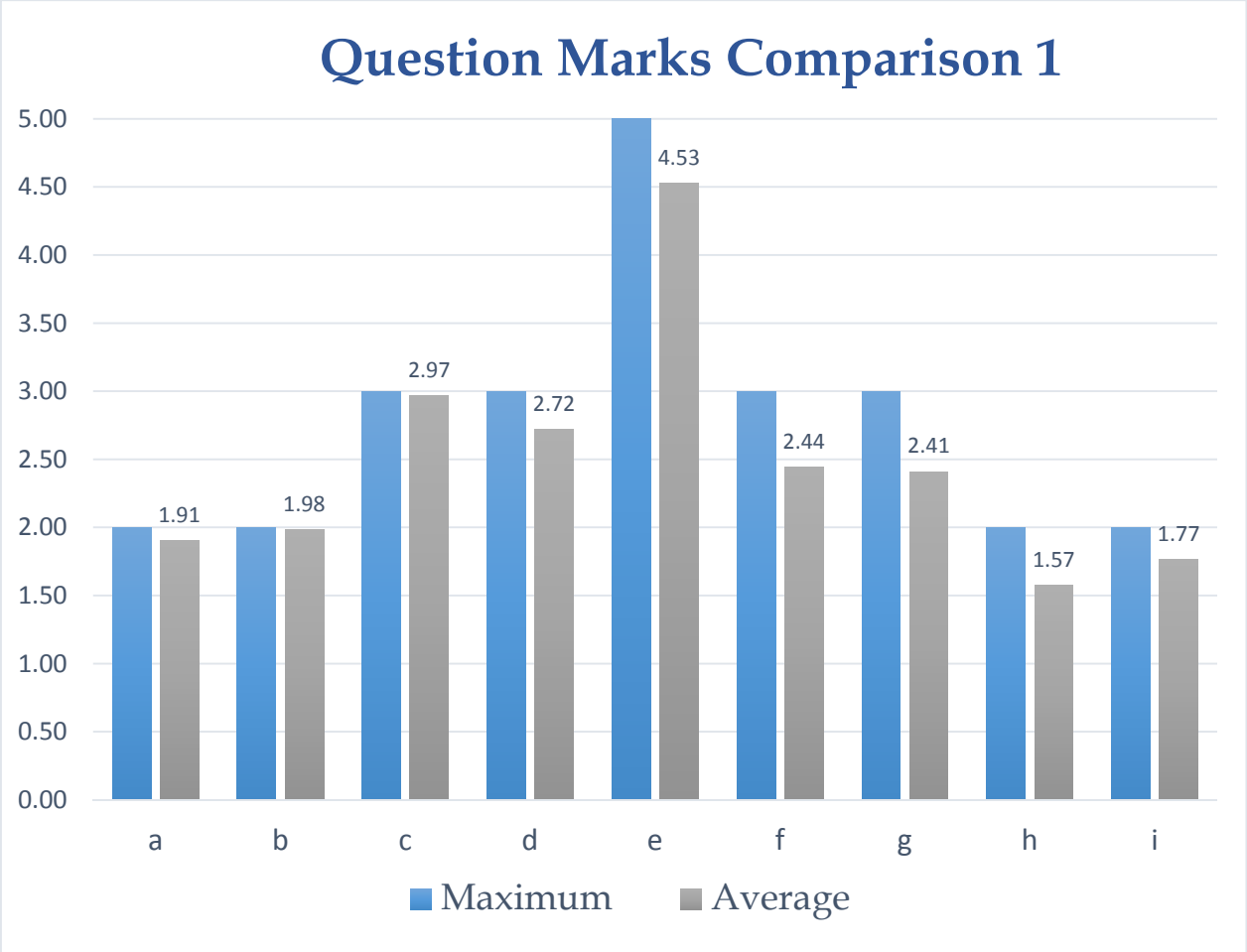

Figure 1: Average mark for each part compared to the max score

1. GENERAL COMMENTS

PARTS A-D)

- Students did very well. Most of them had used the formula for specific heat at constant pressure without explaining the reason.

PART E)

- Some small algebraic errors.
- A few students decided to re-express the central equation in terms of pressure instead of volume, which introduced more algebra. Mostly this was still done correctly, although a few students ignored a dT (T =temperature) term that comes from writing the ideal gas equation in infinitesimals, which led to further errors.
- Some students forgot to do the final part of the question, which asked to re-express vf.

PART F)

- The greatest source of confusion on this assessment. I think less than half the students got the right expression for thrust.
- Most students worked from the statement that the thrust $W = \frac{d(mv)}{dt} = m\frac{dv}{dg} + v\frac{dm}{dt}$, for m = mass and v = velocity. There were a number of creative expressions that supposedly followed from this, most saying that the source of thrust was a change in the mass with $\frac{dv}{dt} = 0$
- Few students considered the physics of the system but those who did often got the right answer (even if they somewhat dubiously fitted it into the above expression for W.)
- I was very generous in not taking away marks for $\dot{W}$ if W was wrong but they correctly used the information that $\dot{W} = vW$.

PART G)

- Some students didn't get the quadratic growth in efficiency ŋ at low velocities
- Some students failed to expand the square root in ŋ at high velocities. Others didn't really show much working for finding the limits.
- I was very generous in not taking away marks if their follow-on calculations from f) used a wrong expression for $\dot{W}$

PART H)

- Many students stated their frustration that the question did not give them all the values needed to find a numerical answer (i.e. they were unhappy they needed to find a "reasonable" value for the density). However, most did use some value, and I was generous with marks (including not taking any away if their calculations used expressions from f) that were incorrect.)

PART I) [Incorrectly G) on sheet]

- Most people got the point: the ramjet is unable to move at v = 0. Some students lost a mark because, although they noted the low efficiency at low velocities, they didn't follow the logic through.

2. COMPARISON BETWEEN GROUPS AND INDIVIDUAL SUBMISSIONS FOR

In this assessment 1, there have been a total of 13 groups:

	Number of participants		
	2 st	3 st	5 st
Number of groups	6	2	5

	a	b	c	d	e	f	g	h	i
Average Individuals	1.86	1.98	2.95	2.64	4.41	2.33	2.36	1.49	1.72
Average Groups 2 st	2.00	2.00	3.00	2.83	4.67	2.50	2.33	2.00	`2.00
Average Groups 3 St	2.00	2.00	3.00	2.50	4.00	2.50	2.50	1.00	1.00
Average Groups 5 St	2.00	2.00	3.00	3.00	5.00	2.80	2.60	1.80	2.00

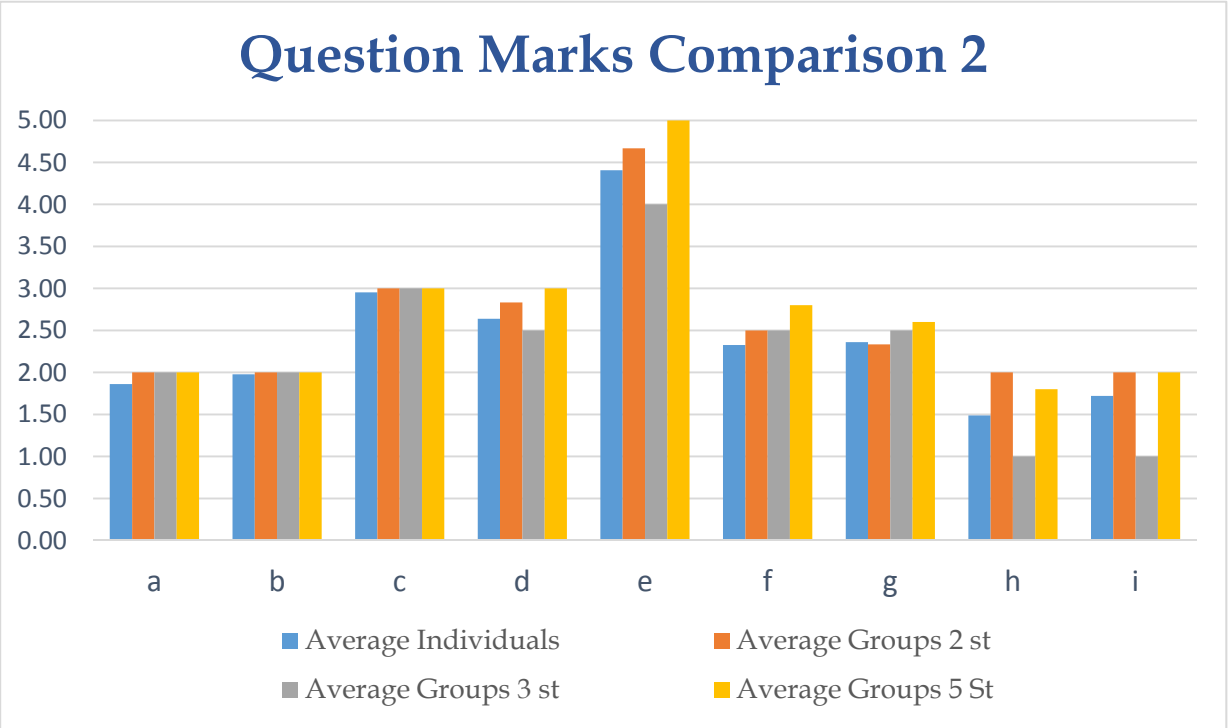

Figure 2: Average mark for each part considering the different options

3. COMPARISON BETWEEN GROUPS AND INDIVIDUAL

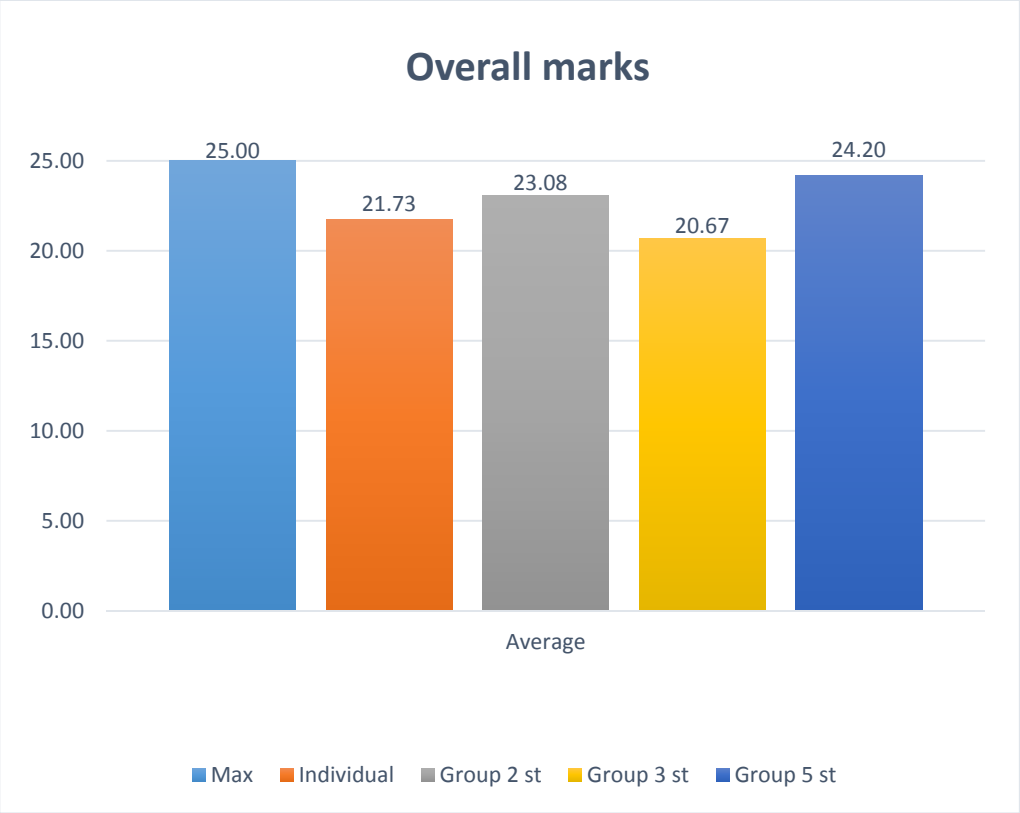

Figure 3: Average overall marks compared to the max for the different options