

# Generating On-Line Assessments using MS Office for Use with Blackboard

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- 1 Blackboard tests as part of the module assessment.
- 2 Second Phase of assessments using question pools.
- 3 Third phase using MS Office and mailmerge.
- 4 Fourth phase using Respondus with feedback.
- 5 Conclusions

# Phase 1

## Supervised Test Conditions

On- line as  
formed part  
(20% of the

All student

COURSES > AEFD1001

- Announcements
- Course Information
- Staff Information
- Course Documents
- Assignments
- Books
- Communication
- Virtual Classroom
- Discussion Board
- Groups
- Web Sites
- Tools
- Resources
- Course Map
- Control Panel

**Question 1** Multiple Choice (10 points)

**Question:** A perfect gas has a specific gas constant of  $4 \text{ kJ/kgK}$ . If the gas is a pressure of 1 bar and temperature of  $527^\circ\text{C}$  what is its specific volume?

- $3200 \text{ m}^3/\text{kg}$
- $2.11 \text{ m}^3/\text{kg}$
- $21.08 \text{ m}^3/\text{kg}$
- $32 \text{ m}^3/\text{kg}$

**Question 2** Multiple Choice (10 points)

**Question:** A perfect gas with a specific gas constant of  $0.5 \text{ kJ/kgK}$  is at a temperature of  $227^\circ\text{C}$  and a pressure of 5 bar. The specific volume of the gas is

- $0.5 \text{ m}^3/\text{kg}$
- $0.5 \times 10^{-3} \text{ m}^3/\text{kg}$
- $0.227 \text{ m}^3/\text{kg}$
- $0.227 \times 10^{-3} \text{ m}^3/\text{kg}$

**Question 3** Multiple Choice (10 points)

**Question:** A perfect gas has a molecular weight of 28 and a ratio of specific heats of 1.4. If the Universal gas constant is  $R_0$  then  $c_p$  is:

- $R_0/12$
- $R_0/8$
- $R_0/9$
- $3R_0/28$

COURSES > AEJ01001

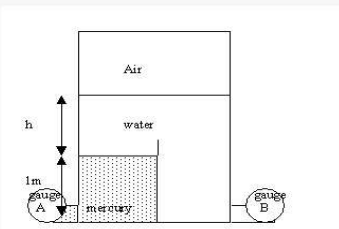
- Announcements
- Course Information
- Staff Information
- Course Documents
- Assignments
- Books
- Communication
- Virtual Classroom
- Discussion Board
- Groups
- External Links
- Tools
- Resources
- Course Map
- Control Panel

**Question 1** Multiple Choice (10 points)

**Question:** Two pressure gauges are used to measure the inlet and outlet pressures to a tank. The tank is partitioned as shown in the figure with the section of the tank linked to gauge A containing mercury, (specific gravity 13.6), to a depth of 1m whilst the remainder of the tank contains water, (specific gravity 1.0), to a depth of  $h \text{ cm}$  above the mercury. Above the water is a layer of air where the pressure is 2 bar gauge.

Gauge A reads 350 kPa.

The value of  $h$  in cm is:



100

Conditions.

Semester 2  
Level 1 Fluid Mechanics

# Phase 2

## Assessments Rolled out to other Modules

The on-line assessments were rolled out to other modules:

### Semester 1

Thermodynamics E1.1  
Thermodynamics S1.1  
Aerofluid Mechanics E2.1  
Aerofluid Mechanics S2.1

### Semester 2

Fluid Mechanics E1.2  
Fluid Mechanics S1.2  
Energy and Power Systems L1.2  
Power and Energy S0.2

Physically impossible to supervise the tests as the demand on time and physical resources available was too great. Students had to take the tests unsupervised.

## Phase 2

# Arrangement for Assessments

In each module the questions for the assessments came from a question pool with each student getting a random mix of questions from the pool.

Students in each module were divided into groups with each group getting a different set of questions from the pool in random order.

All questions used were of the multiple choice type.

### Outcomes

Some students complained they had had harder questions than their peers.

Some students answered by guesswork

The tests were difficult to administer

# Phase 3

## Overcoming the Problems and Using Ms Office

A bank of questions was used such that all students answered the same basic question set but the numerical data within the questions presented to each student was different. (Multiple choice, numerical and also multiple answer type questions were used).

To minimise the chance of any students getting questions with the same numerical data 120 versions of each question were produced.

Clearly to do this manually would have been almost impossible.

# The Method Adopted

Ms Word was used to generate the questions with the data and answers appearing as merge fields.

Ms Excel was used to generate the question data using a random number generator and the answers.

Mailmerge was used to import the data and answers from Excel into the question word file. Executing the mailmerge produced the required number of versions of each question.

## Example of Word File used for a

1. During an engine test fuel with a calorific value of «acv» kJ/kg is burned at a rate of «amf» kg/s and the engine operates with a cycle efficiency of «aen» %. The heat lost during the cycle passes to cooling water ( $c_p = 4196 \text{ J/kgK}$ ). If the temperature rise of the cooling water is «Adt» °C then when steady flow conditions have been achieved the mass flow rate of the cooling water is?

- a) «Aans» kg/s correct
- b) «Awr1» kg/s
- c) «Awr2» kg/s
- d) «Awr3» kg/s

2. During an engine test fuel with a calorific value of «bcv» kJ/kg is burned at a rate of «bmf» kg/s and the engine operates with a cycle efficiency of «bN» %. The heat lost during the cycle passes to cooling water ( $c_p = 4196 \text{ J/kgK}$ ). If the temperature rise of the cooling water is «bdt» °C then when steady flow conditions have been achieved the mass flow rate of the cooling water is?

- a) «Bwr1» kg/s
- b) «Bans» kg/s correct
- c) «Bwr2» kg/s
- d) «Bwr3» kg/s

3. During an engine test fuel with a calorific value of «ccv» kJ/kg is burned at a rate of «cmf» kg/s and the engine operates with a cycle efficiency of «cN» %. The heat lost during the cycle passes to cooling water ( $c_p = 4196 \text{ J/kgK}$ ). If the temperature rise of the cooling water is «cdt» °C then when steady flow conditions have been achieved the mass flow rate of the cooling water is?

- a) «Cwr1» kg/s
- b) «Cwr2» kg/s
- c) «cans» kg/s correct
- d) «Cwr3» kg/s

4. During an engine test fuel with a calorific value of «dcv» kJ/kg is burned at a rate of «dmf» kg/s and the engine operates with a cycle efficiency of «dN» %. The heat lost during the cycle passes to cooling water ( $c_p = 4196 \text{ J/kgK}$ ). If the temperature rise of the cooling water is «ddt» °C then when steady flow conditions have been achieved the mass flow rate of the cooling water is?

- a) «Dwr1» kg/s
- b) «Dwr2» kg/s
- c) «Dwr3» kg/s
- d) «dans» kg/s correct

The merge field data came from the Excel spreadsheet through mailmerge

The position of the correct answer was varied.

Executing the mailmerge would result in 30 pages each containing 4 questions



Number of versions of the question to be generated

## Excel Spreadsheet (Data2)

Minimum value, Maximum value number of decimal places,  
Scale factor for variables

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	
1	Number of questions	Nchoices	amin	amax	andp	ascf	vmin	vmax	vndp	vscf	hmin	hmax	hndp	hscf	knvmin	knvmax
2	120	4	0.1	0.3	2	1	2.3	6.7	1	1	3	10	0	1	4.4	
3	a	v	h	knv	sg											
4	0.28	2.7	6	5.917	0.81											
5	0.24	4.2	4	6.06	0.89											
6	0.12	5.4	7	5.804	0.72											
7	0.21	5.1	9	4.595	0.74											
8	0.22	5.7	3	4.736	0.71											
9	0.23	6.3	4	8.238	0.83											
10	0.27	5.9	6	5.378	0.74											
11	0.11	2.9	9	7.062	0.77											
12	0.25	5.1	9	6.331	0.89											
13	0.17	5	6	5.106	0.82											
14	0.25	6	8	4.824	0.8											
15	0.15	6	7	4.998	0.85											
16	0.23	3.6	7	8.397	0.77											
17	0.21	4.4	10	6.072	0.8											
18	0.16	2.8	6	4.703	0.81											
19	0.25	5.6	4	5.877	0.82											
20	0.26	4.2	10	7.165	0.76											
21	0.24	3.8	10	4.6	0.8											
22	0.1	4.5	6	8.079	0.81											
23	0.13	6	8	5.512	0.77											
24	0.14	6.2	6	5.875	0.88											
25	0.11	4.3	6	6.118	0.7											
26	0.15	6.2	9	7.16	0.83											
27	0.12	5.3	10	5.045	0.72											
28	0.26	6.5	10	5.424	0.86											
29	0.16	4.7	7	7.946	0.79											
30	0.17	6	8	5.653	0.85											
31	0.27	3	5	5.363	0.87											
32	0.17	6.4	9	5.23	0.77											

Names of variables used in question

Data calculated using the formula:

$\text{ROUND}((\text{RAND}() * (\text{max} - \text{min}) + \text{min}) * \text{scf}, \text{ndp})$

Generated Data

# Excel Spreadsheet (Output)

A	B	C	D	E	F	G	H	I
acv	amf	aN	adt	a	aans	awr1	awr2	awr3
43805	0.08	62	35	0	9.067629	16.80381	102.9911	10.29911
44328	0.06	66	27	0	7.981951	13.93797	71.80166	7.180166
43867	0.08	74	33	0	6.589491	20.21575	71.02832	7.102832
44279	0.05	58	23	0	9.635046	10.33353	74.82899	7.482899
44102	0.06	65	30	0	7.35734	13.52165	72.80891	7.280891
44206	0.07	65	30	0	8.603805	15.81246	85.14404	8.514404
44438	0.08	63	29	0	10.80968	17.66554	103.75	10.375
44480	0.06	72	27	0	6.595911	15.2572	59.33354	5.933354
44458	0.07	72	28	0	7.41673	17.73218	68.95847	6.895847
43813	0.08	74	28	0	7.756625	20.5261	72.11871	7.211871
43967	0.08	67	20	0	13.83137	19.15871	94.36379	9.436379
44294	0.08	70	24	0	10.55624	19.89398	85.25992	8.525992
44440	0.07	56	35	0	9.320114	13.47294	105.8588	10.58588
44353	0.08	63	33	0	9.481243	17.40138	102.1986	10.21986
43914	0.06	65	25	0	8.791173	13.68981	73.71434	7.371434
44363	0.08	59	20	0	17.33921	17.02306	118.2958	11.82958
44256	0.06	68	24	0	8.43775	14.48175	68.14942	6.814942
43928	0.06	71	27	0	6.746701	14.85858	60.68996	6.068996
44192	0.06	61	34	0	7.24845	12.54986	80.23678	8.023678
44154	0.08	74	23	0	9.516343	21.0351	73.9071	7.39071
44211	0.06	69	22	0	8.908101	14.77925	66.39953	6.639953
44358	0.06	65	25	0	8.880057	13.82822	74.45964	7.445964
44148	0.08	56	19	0	19.49237	16.13421	126.7688	12.67688
43814	0.08	66	24	0	11.8341	18.55392	95.58079	9.558079
43839	0.08	70	23	0	10.90206	19.75611	84.66905	8.466905
44105	0.08	65	27	0	10.9005	18.21031	98.05552	9.805552
44120	0.06	65	18	0	12.26724	14.08471	75.84073	7.584073
44118	0.07	59	23	0	13.12002	14.66286	101.8944	10.18944
44393	0.07	61	33	0	8.752411	14.75614	94.3425	9.43425
44041	0.07	56	16	0	20.2047	14.22933	111.8019	11.18019
43999	0.06	58	20	0	13.21228	12.44792	90.14009	9.014009

Correct and incorrect answers generated using visual basic modules in Excel

The same Excel spreadsheet could be used for all questions only the VB modules need changing

The output sheet was copied to the output2 sheet with rows in banks of four

# Excel Spreadsheet (Output2)

acv	amf	aN	adt	a	aans	awr1	awr2	awr3	hcv	hmf	hN	hdt	h	hans
43805	0.08	62	35	0	9.068	16.804	102.991	10.299	44328	0.06	66	27	0	7.982
44102	0.06	65	30	0	7.357	13.522	72.809	7.281	44206	0.07	65	30	0	8.604
44458	0.07	72	28	0	7.417	17.732	68.958	6.896	43813	0.08	74	28	0	7.757
44440	0.07	56	35	0	9.320	13.473	105.859	10.586	44353	0.08	63	33	0	9.481
44256	0.06	68	24	0	8.438	14.482	68.149	6.815	43928	0.06	71	27	0	6.747
44211	0.06	69	22	0	8.908	14.779	66.400	6.640	44358	0.06	65	25	0	8.880
43839	0.08	70	23	0	10.902	19.756	84.669	8.467	44105	0.08	65	27	0	10.901
44393	0.07	61	33	0	8.752	14.756	94.343	9.434	44041	0.07	56	16	0	20.205
44481	0.05	69	33	0	4.979	11.946	53.671	5.367	44482	0.06	74	25	0	6.615
43957	0.06	73	19	0	8.932	15.706	58.090	5.809	43847	0.07	58	22	0	13.965
44412	0.05	58	18	0	12.348	10.543	76.343	7.634	44003	0.06	69	33	0	5.911
44380	0.05	72	25	0	5.923	12.771	49.664	4.966	44050	0.07	75	25	0	7.349
43989	0.06	60	31	0	8.116	12.409	82.724	8.272	44243	0.06	73	30	0	5.694
43993	0.06	68	24	0	8.388	11.946	53.671	5.367	44482	0.06	74	25	0	6.615
43865	0.07	58	32	0	9.605	11.946	53.671	5.367	43847	0.07	58	22	0	13.965
44493	0.07	60	32	0	9.278	11.946	53.671	5.367	44003	0.06	69	33	0	5.911
44395	0.06	63	28	0	8.389	11.946	53.671	5.367	44050	0.07	75	25	0	7.349
44333	0.05	69	30	0	5.459	11.946	53.671	5.367	44243	0.06	73	30	0	5.694
44424	0.06	64	22	0	10.395	13.774	77.481	7.748	44200	0.07	74	33	0	5.810
44110	0.06	70	23	0	8.227	14.909	63.894	6.389	43921	0.06	71	30	0	6.071
43953	0.08	60	27	0	12.41	11.946	53.671	5.367	44482	0.06	74	25	0	6.615
44127	0.05	64	24	0	7.887	11.946	53.671	5.367	43847	0.07	58	22	0	13.965
44038	0.05	66	30	0	5.947	11.946	53.671	5.367	44003	0.06	69	33	0	5.911
43903	0.08	73	29	0	7.793	11.946	53.671	5.367	44050	0.07	75	25	0	7.349
43826	0.08	72	27	0	8.665	11.946	53.671	5.367	44243	0.06	73	30	0	5.694
43835	0.08	69	50	0	5.182	11.946	53.671	5.367	44482	0.06	74	25	0	6.615
43973	0.05	70	41	0	3.834	11.946	53.671	5.367	43847	0.07	58	22	0	13.965
44329	0.07	67	50	0	4.881	15.333	75.520	7.552	44467	0.05	68	45	0	3.768
44049	0.08	64	38	0	7.956	17.274	97.168	9.717	44117	0.07	65	42	0	6.133

The output2 spreadsheet formed the table used for the mailmerge

The merged word document was saved as a .txt file for direct upload to Blackboard

# Problem 1

## Mailmerge from Excel to Word

1. During an engine test fuel with a calorific value of 44041.688470422065 kJ/kg is burned at a rate of 5.9504822506916556E-2 kg/s and the engine operates with a cycle efficiency of

### Solution

Necessary to use the Excel command fixed to fix the number of decimal places

- a) 0.91799822948919507 kg/s correct
- b) `FIXED(variable, ndp, 1)` g/s
- c) 9.5472405038004418 kg/s
- d) 0.95472405038004415 kg/s

## How to upload to Blackboard?

# Batch Uploading

The merged Word file was saved in the form web paged filtered.

A Perl program processed the merged .htm file and generated a .txt file

1. → During an engine test fuel with a calorific value of 43805 kJ/kg is burned at a rate of 0.08 kg/s and the engine operates with a cycle efficiency of 62%. The heat lost during the cycle passes to cooling water ( $c_p = 4196 \text{ J/kgK}$ ). If the temperature rise of the cooling water is 35 °C then when steady flow conditions have been achieved the mass flow rate of the cooling water is?

- a) → 9.068 kg/s → correct
- b) → 16.804 kg/s
- c) → 102.991 kg/s
- d) → 10.299 kg/s

30 pages

2. → During an engine test fuel with a calorific value of 44328 kJ/kg is burned at a rate of 0.06 kg/s and the engine operates with a cycle efficiency of 66%. The heat lost during the cycle passes to cooling water ( $c_p = 4196 \text{ J/kgK}$ ). If the temperature rise of the cooling water is 27 °C then when steady flow conditions have been achieved the mass flow rate of the cooling water is?

- a) → 13.938 kg/s
- b) → 7.982 kg/s → correct
- c) → 71.802 kg/s
- d) → 7.180 kg/s

```
MC During an engine test fuel with a calorific value of 43805 kJ/kg is burned
at a rate of 0.08kg/s and the engine operates with a cycle efficiency of 62%.
The heat lost during the cycle passes to cooling water (cp = 4196 J/kgK) . If
The temperature rise of the cooling water is 35 oC then when steady flow
conditions have been achieved the mass flow rate of the cooling water is?
9.068 kg/s correct 16.804 kg/s incorrect 102.991 kg/s .txt
incorrect 10.299 kg/s incorrect
```

3. → During an engine test fuel with a calorific value of 44328 kJ/kg is burned at a rate of 0.08 kg/s and the engine operates with a cycle efficiency of 66%. The heat lost during the cycle passes to cooling water ( $c_p = 4196 \text{ J/kgK}$ ). If the temperature rise of the cooling water is 27 °C then when steady flow conditions have been achieved the mass flow rate of the cooling water is?

- a) → 20.216 kg/s
- b) → 71.028 kg/s
- c) → 6.589 kg/s → correct
- d) → 7.103 kg/s

Ms Word

Formatting lost through .txt upload

Blackboard

Question 1 Multiple Choice 10 points

Question During an engine test fuel with a calorific value of 43805 kJ/kg is burned at a rate of 0.08kg/s and the engine operates with a cycle efficiency of 62%. The heat lost during the cycle passes to cooling water ( $c_p = 4196 \text{ J/kgK}$ ). If the temperature rise of the cooling water is 35 °C then when steady flow conditions have been achieved the mass flow rate of the cooling water is?

Answer

- ✓ 9.068 kg/s
- 16.804 kg/s
- 102.991 kg/s
- 10.299 kg/s

1. A two-dimensional flow is described by a stream function,  $\psi$ , given by  $\psi = A(x^2 - y^2) + Bxy$ , where A and B are constants. If A = «aA» and B = «aB» the resultant velocity at the point («ax», «ay») is given by?

- a) «Aans» m/s correct
- b) «Awr1» m/s
- c) «Awr2» m/s
- d) «Awr3» m/s

1. A two-dimensional flow is described by a stream function,  $\psi$ , given by  $\psi = A(x^2 - y^2) + Bxy$ , where A and B are constants. If A=1 and B=4 the resultant velocity at the point (4.8,7.7) is given by?

- a) 40.578 m/s correct
- b) 74.823 m/s
- c) 73.154 m/s
- d) 41.580 m/s

Ms Word

2. A two-dimensional flow is described by a stream function,  $\psi$ , given by  $\psi = A(x^2 - y^2) + Bxy$ , where A and B are constants. If A=1 and B=4 the resultant velocity at the point (4.8,7.7) is given by?

- a) «Bwr1» m/s
- b) «Bwr2» m/s
- c) «Bwr3» m/s
- d) «Bans» m/s correct

A two-dimensional flow is described by a stream function,  $\psi$ , given by  $\psi = A(x^2 - y^2) + Bxy$ , where A and B are constants. If A=1 and B=4 the resultant velocity at the point (4.8,7.7) is given by? 40.578 m/s correct  
 74.823 m/s incorrect 73.154 m/s incorrect 41.580 m/s incorrect

.txt

3. A two-dimensional flow is described by a stream function,  $\psi$ , given by  $\psi = A(x^2 - y^2) + Bxy$  where A and B are constants. If A = «cA» and B = «cB» the resultant velocity at the point («cx», «cy») is given by?

- a) «Cwr1» m/s
- b)
- c)
- d)

Question 1 Multiple Choice 10 points Modify Remove

**Question** A two-dimensional flow is described by a stream function,  $\psi$ , given by  $\psi = A(x^2 - y^2) + Bxy$ , where A and B are constants. If A=1 and B=4 the resultant velocity at the point (4.8,7.7) is given by?

- Answer**
- ✓ 40.578 m/s
  - 74.823 m/s
  - 73.154 m/s
  - 41.580 m/s

Blackboard

# Problem 2 Need to Retain Formatting and Symbols

Ms Word and Excel used as previously

The Perl program was modified to edit the merged word file, strip out all html other than superscript, subscript and symbols and replace the question number with the question type required for Blackboard (MC, MA, NUM)

The Perl program again generated an output file with an extension .txt which could be directly uploaded to Blackboard now retaining symbols and formatting.

# Example

MC A two-dimensional flow is described by a stream function,  $\psi$ , given by  $\psi = A(x^2 - y^2) + Bxy$ , where A and B are constants. If A=1 and B=4 the resultant velocity at the point (4.8, 7.7) is given by? 40.578 m/s correct  
74.823 m/s incorrect 73.154 m/s incorrect 41.580 m/s incorrect

Before

MC A two-dimensional flow is described by a stream function,  $\psi$ , given by  $\psi = A(x^2 - y^2) + Bxy$ , where A and B are constants. If A=1 and B=4 the resultant velocity at the point (4.8, 7.7) is given by? 40.578 m/s correct  
74.823 m/s incorrect 73.154 m/s incorrect 41.580 m/s incorrect

After

Question 4 Multiple Choice

10 points

Modify

Remove

**Question** A two-dimensional flow is described in polar co-ordinates by a stream function  $Ar^3 \sin \theta$  where A is a constant. If A=2, the pressure at the point (0,0) is 731.4 kPa and the density of the fluid is  $790 \text{ kg/m}^3$  the pressure at the point where  $r=2.14 \text{ m}$  and  $\theta=35^\circ$  is?

**Answer**

641kJ kPa

✓ 611kPa

731kJ kPa

731 kPa

Blackboard

◀ Add Question Here



# Individual students got the same questions in a random order and with different numerical data

## Question 1

10 points

Save

A fluid at an initial pressure of 1.42 bar and with a volume of  $0.75 \text{ m}^3$  is compressed by a reversible and polytropic non-flow process to a pressure of 11.78 bar during which the internal energy of the fluid increases by 2446 kJ. If the polytropic index for the process is 1.57 then the heat transfer which occurs during the compression is?

- 244384.058kJ
- 2230.058kJ
- 3331.889kJ
- 2576.902kJ

Student A

## Question 2

10 points

Save

During an engine test fuel with a calorific value of 4206 kJ/kg is burned at a rate of 0.07 kg/s and the engine operates with a cycle efficiency of 65.00%. The heat lost during the cycle passes to cooling water ( $c_p = 4196 \text{ J/kgK}$ ). If the temperature rise of the cooling water is  $26 \text{ }^\circ\text{C}$  then when steady flow conditions have been achieved the mass flow rate of the cooling water is?

- 16.221kg/s
- 117.466kg/s
- 13.515kg/s
- 11.747kg/s

## Question 3

In a steam power plant the turbine generates 199 kW of power and the condenser is 177.0 kJ/kg. If 20.1kW of power is lost to the cooling water then the mass flow rate of the cooling water is?

## Question 1

10 points

Save

A closed rigid tank contains a hot fluid that is cooled whilst its contents are stirred by a paddle wheel. Initially, the internal energy of the fluid is 348kJ. During the cooling process, the fluid loses 89.6 kJ of heat, and the paddle wheel does 74.6 kJ of work on the fluid. The final internal energy of the fluid in kJ, neglecting the energy stored in the paddle wheel, is?

## Question 2

10 points

Save

During an engine test fuel with a calorific value of 44206 kJ/kg is burned at a rate of 0.07 kg/s and the engine operates with a cycle efficiency of 65.00%. The heat lost during the cycle passes to cooling water ( $c_p = 4196 \text{ J/kgK}$ ). If the temperature rise of the cooling water is  $34 \text{ }^\circ\text{C}$  then when steady flow conditions have been achieved the mass flow rate of the cooling water is?

- 13.085kg/s
- 83.656kg/s
- 8.366kg/s
- 12.262kg/s

Student B

## Question 3

10 points

Save

A fluid at an initial pressure of 1.72 bar and with a volume of  $0.79 \text{ m}^3$  is compressed by a reversible and polytropic non-flow process to a pressure of 11.65 bar during which the internal energy of the fluid increases by 1571 kJ. If the polytropic index for the process is 1.48 then the heat transfer which occurs during the compression is?

- 1327.627 kJ
- 156856.627kJ
- 5129.228kJ
- 1741.070kJ

**Content Areas**

<a href="#">Module Information</a>	<a href="#">Course Web Pages</a>
<a href="#">Resits</a>	<a href="#">Revision</a>
<a href="#">Lectures</a>	<a href="#">Books</a>
<a href="#">Tutorials</a>	<a href="#">Web Links</a>
<a href="#">Laboratories</a>	<a href="#">Lecture Documents</a>
<a href="#">Assessments</a>	<a href="#">Course Content</a>
<a href="#">Clicker Questions</a>	

**User Management**

<a href="#">List / Modify Users</a>	<a href="#">Enroll User</a>
<a href="#">Create User</a>	<a href="#">Remove Users from Course</a>
<a href="#">Batch Create Users</a>	<a href="#">Manage Groups</a>

**Assessment**

<a href="#">Test Manager</a>	<a href="#">Gradebook Views</a>
<a href="#">Survey Manager</a>	<a href="#">Performance Dashboard</a>
<a href="#">Pool Manager</a>	<a href="#">Early Warning System</a>
<a href="#">Course Statistics</a>	<a href="#">Questionmark</a>
<a href="#">Gradebook</a>	

**Help**

[Support](#)      [Contact System Administrator](#)

**Course Tools**

<a href="#">Announcements</a>	<a href="#">Manage Chalk Title</a>
<a href="#">Course Calendar</a>	<a href="#">Link Checker</a>
<a href="#">Staff Information</a>	<a href="#">Course Objectives</a>
<a href="#">Tasks</a>	<a href="#">Configure Blog Tool</a>
<a href="#">Send Email</a>	<a href="#">Configure Wiki Tool</a>
<a href="#">Discussion Board</a>	<a href="#">Assess Wikis</a>
<a href="#">Collaboration</a>	<a href="#">Manage Podcast</a>
<a href="#">Digital Dropbox</a>	<a href="#">Add Users by Role</a>
<a href="#">Glossary Manager</a>	<a href="#">List All Users</a>
<a href="#">Messages</a>	<a href="#">Blackboard Scholar®</a>

FLUID MECHANICS E1.2 (08-09) (SG-H300-10034-09) > CONTROL PANEL > POOL MANAGER > POOL CANVAS

**Pool Canvas**

Add, modify, and remove questions. Select a question type from the Add Question drop-down list and click **Go** to add questions. Use Creation Settings to establish which default options, such as feedback and images, are available for question creation.

Add

<b>Name</b>	Poolname	
<b>Description</b>		
<b>Instructions</b>		<input type="button" value="Modify"/>

Select a question type from the Add Question drop-down list and click **Go**.

FLUID MECHANICS E1.2 (08-09) (SG-H300-10034-09) > CONTROL PANEL > POOL MANAGER

**Pool Manager**

Add and import Pools of questions for use in assessments.  
Only pool packages may be imported into the Pool Manager.

Name	Date Last Modified		
<input checked="" type="checkbox"/> FLAssessment1a	March 1, 2009	<a href="#">Export</a>	<a href="#">Modify</a>
<input checked="" type="checkbox"/> FLAssessment1c	March 1, 2009	<a href="#">Export</a>	<a href="#">Modify</a>
<input checked="" type="checkbox"/> FLAssessment1d	March 1, 2009	<a href="#">Export</a>	<a href="#">Modify</a>
<input checked="" type="checkbox"/> FLAssessment1e	March 1, 2009	<a href="#">Export</a>	<a href="#">Modify</a>
<input checked="" type="checkbox"/> FLAssessment1h	March 1, 2009	<a href="#">Export</a>	<a href="#">Modify</a>
<input checked="" type="checkbox"/> FLAssessment1j	March 1, 2009	<a href="#">Export</a>	<a href="#">Modify</a>
<input checked="" type="checkbox"/> FLAssessment1i	March 1, 2009	<a href="#">Export</a>	<a href="#">Modify</a>
<input checked="" type="checkbox"/> FLAssessment1f	March 1, 2009	<a href="#">Export</a>	<a href="#">Modify</a>
<input checked="" type="checkbox"/> Fluids2a	April 24, 2009	<a href="#">Export</a>	<a href="#">Modify</a>
<input checked="" type="checkbox"/> Fluids2b	April 24, 2009	<a href="#">Export</a>	<a href="#">Modify</a>
<input checked="" type="checkbox"/> Fluids2c	April 28, 2009	<a href="#">Export</a>	<a href="#">Modify</a>
<input checked="" type="checkbox"/> Fluids2d	April 24, 2009	<a href="#">Export</a>	<a href="#">Modify</a>
<input checked="" type="checkbox"/> Fluids2e	April 24, 2009	<a href="#">Export</a>	<a href="#">Modify</a>
<input checked="" type="checkbox"/> Fluids2f	April 27, 2009	<a href="#">Export</a>	<a href="#">Modify</a>

# Test Manager

FLUID MECHANICS E1.2 (06-09) / SG-H300-10034-09) > CONTROL PANEL > TEST MANAGER > SEARCH POOLS AND ASSESSMENTS

## Search Pools and Assessments

SEARCH

ADVANCED

Search the Pools and assessments below:

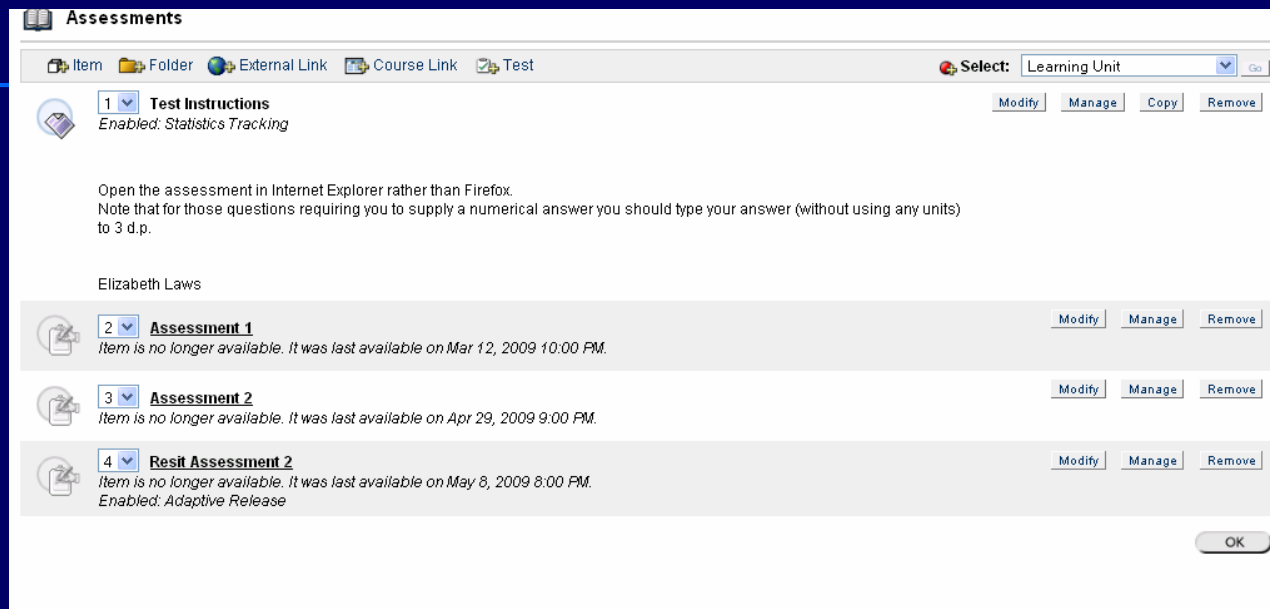
—Tests—  
Assessment 1  
Assessment 1a  
Assessment 2  
Resit Assessment 2  
Test  
—Pools—  
FLassessment1a  
FLassessment1c  
FLassessment1d

Question types

- |  |   |
|--|---|
| <input type="checkbox"/> All                     | <input type="checkbox"/> True/False         |
| <input type="checkbox"/> Multiple Choice         | <input type="checkbox"/> Matching           |
| <input type="checkbox"/> Multiple Answer         | <input type="checkbox"/> Ordering           |
| <input type="checkbox"/> Fill in the Blank       | <input type="checkbox"/> Essay              |
| <input type="checkbox"/> Calculated Numeric      | <input type="checkbox"/> Calculated Formula |
| <input type="checkbox"/> File Response           | <input type="checkbox"/> Hot Spot           |
| <input type="checkbox"/> Fill in Multiple Blanks | <input type="checkbox"/> Jumbled Sentence   |
| <input type="checkbox"/> Opinion Scale/Likert    | <input type="checkbox"/> Short Answer       |
| <input type="checkbox"/> Either/Or               | <input type="checkbox"/> Quiz Bowl          |

Use the point values currently assigned to the questions

# Assessment Generation



The screenshot displays the Blackboard 'Assessments' interface. At the top, there is a navigation bar with icons for 'Item', 'Folder', 'External Link', 'Course Link', and 'Test'. A 'Select:' dropdown menu is set to 'Learning Unit'. Below this, a list of assessment items is shown:

- 1 Test Instructions**  
Enabled: Statistics Tracking  
Open the assessment in Internet Explorer rather than Firefox.  
Note that for those questions requiring you to supply a numerical answer you should type your answer (without using any units) to 3 d.p.  
Elizabeth Laws
- 2 Assessment 1**  
Item is no longer available. It was last available on Mar 12, 2009 10:00 PM.
- 3 Assessment 2**  
Item is no longer available. It was last available on Apr 29, 2009 9:00 PM.
- 4 Resit Assessment 2**  
Item is no longer available. It was last available on May 8, 2009 8:00 PM.  
Enabled: Adaptive Release

Each item has 'Modify', 'Manage', and 'Remove' buttons. An 'OK' button is located at the bottom right of the interface.

Using this method large question pools can be generated quickly and uploaded to Blackboard.

Tests can then be created using a random choice of questions from the pool.

# Experience during the 2008-9 Academic Year

- 1 The method was used to generate 2 assessments for 8 different modules involving over 400 students with the largest cohort being 100.
- 2 Each assessment had 10 questions and the 2 Blackboard assessments accounted for 20% of the module mark.
- 3 Each question had 120 variants and the tests gave the questions variants in random order. The likelihood of any students getting the same question was low.
- 4 The students were spurred on to work by the assessments and overall they led to an improvement<sub>21</sub> in overall performance.

# Giving Feedback

- 1 It is not possible to upload feedback directly into Blackboard.
- 2 Generic feedback could be given but the same feedback would need to be added to every question  
**tedious**
- 3 To provide individual feedback the package Respondus has been used.



# Respondus

Blackboard 6.3 - 8.x

Start Edit Settings Preview & Publish Retrieval & Reports

Start

Introduction

Open or Create

Open or Create ?

Current Personality: Blackboard 6.3 - 8.x

Open Open a Respondus file.

Create Create a new Respondus file.

Exam Wizard The Respondus Exam Wizard is the quickest way to create an exam using an existing set of questions.

Archive Create a Respondus archive file so that questions, media,

Questions can be imported as .doc files and also .txt files

Many question types can be deployed but not numerical

Feedback can be added to individual questions

Diagrams can be added to both questions and feedback

Questions can be uploaded through Repondus to Blackboard

# Word File and Excel File Modified

Question number

«aqn». A flat plate, with cross-sectional area of «Aa» m<sup>2</sup> moves at a velocity of «Av» m/s close to a solid surface. The gap between the flat plate and the surface is of width «Ah» mm and the gap is filled with a fluid with kinematic viscosity «aknv» mm<sup>2</sup>/s and specific gravity «Asg». Above the plate is air. The force on the plate due to the fluid is?

\*a) «aans» N

@ Well done.

b) «Awr1» N

@ For a Newtonian fluid the shear stress,  $\tau$ , is  $\mu \times$  velocity gradient. Assuming a linear variation of velocity then the velocity gradient is  $\langle av \rangle / (\langle ah \rangle \times 10^{-3})$  /s.

The density of the fluid is  $\langle asg \rangle \times 1000$  kg/m<sup>3</sup> and the dynamic viscosity is  $\langle aknv \rangle \times 10^{-6}$  x the fluid density (Pa.s). (Note that the kinematic viscosity has been converted from mm<sup>2</sup> to m<sup>2</sup> (1 mm<sup>2</sup> = 10<sup>-6</sup> m<sup>2</sup>). The force is then calculated by evaluating  $\tau \times$  plate area.

c) «Awr2» N

@ For a Newtonian fluid  $\tau$ , is  $\mu \times$  velocity gradient. Assuming a linear

variation of velocity then the velocity gradient is  $\langle av \rangle / (\langle ah \rangle \times 10^{-3})$  /s. The

density of the fluid is  $\langle asg \rangle \times 1000$  kg/m<sup>3</sup> and the dynamic viscosity is

$\langle aknv \rangle \times 10^{-6}$  x the fluid density (Pa.s). (Note that the kinematic viscosity has been converted from mm<sup>2</sup> to m<sup>2</sup> (1 mm<sup>2</sup> = 10<sup>-6</sup> m<sup>2</sup>). The force is then

calculated by evaluating  $\tau \times$  plate area.

d) «awr3» N

@ For a Newtonian fluid  $\tau$ , is  $\mu \times$  velocity gradient. Assuming a linear variation

of velocity then the velocity gradient is  $\langle av \rangle / (\langle ah \rangle \times 10^{-3})$  /s. The density of the

fluid is  $\langle asg \rangle \times 1000$  kg/m<sup>3</sup> and the dynamic viscosity is  $\langle aknv \rangle \times 10^{-6}$  x the fluid

density (Pa.s). (Note that the kinematic viscosity has been converted from

mm<sup>2</sup> to m<sup>2</sup> (1 mm<sup>2</sup> = 10<sup>-6</sup> m<sup>2</sup>). The force is then calculated by evaluating  $\tau \times$

plate area.

«bqn». A flat plate, with cross-sectional area of «Ba» m<sup>2</sup> moves at a velocity

of «Bv» m/s close to a solid surface. The gap between the flat plate and the

surface is of width «Bh» mm and the gap is filled with a fluid with kinematic

viscosity «bknv» mm<sup>2</sup>/s and specific gravity «Bsg». Above the plate is air. The

force on the plate due to the fluid is?

a) «Awr1» N

0	2	1	0	3	2	120	
4	aqn	aa	av	ah	aknv	asg	aans
8		0.28	3.2	9	5.845	0.90	0.524
12	5	0.14	2.5	9	6.743	0.78	0.205
16	9	0.26	3.1	7	4.573	0.72	0.379
20	13	0.16	5.0	8	7.033	0.87	0.612
24	17	0.20	2.4	5	6.016	0.71	0.410
28	21	0.22	4.8	9	4.901	0.86	0.495
32	25	0.14	6.5	3	7.666	0.73	1.698
36	29	0.13	2.9	7	5.415	0.77	0.225
40	33	0.28	3.1	6	5.368	0.89	0.691
44	37	0.18	5.0	10	7.619	0.74	0.507
48	41	0.15	2.6	3	7.228	0.73	0.686
52	45	0.27	6.4	8	8.032	0.88	1.527
56	49	0.29	4.8	6	5.215	0.79	0.956
60	53	0.28	2.9	6	7.921	0.90	0.965
64	57	0.16	5.1	6	5.880	0.71	0.568
68	61	0.23	3.4	9	5.423	0.86	0.405
72	65	0.12	3.8	9	5.280	0.90	0.241
76	69	0.16	6.6	5	4.599	0.75	0.728
80	73	0.26	6.3	5	7.384	0.82	1.984
84	77	0.13	3.3	6	7.276	0.82	0.427
88	81	0.11	3.6	9	7.471	0.86	0.283
92	85	0.16	2.6	8	5.651	0.85	0.250
96	89	0.27	2.2	5	5.152	0.72	0.334



# Including Feedback

Appearance in Internet Explorer (other browsers may vary slightly).  
Changes made in Edit will not appear until you Save the document.

Go To <.....> Prev. << Next >> 1 of 120 Modify Item Close

## Question 1

Mult. Choice

(1.00 points)

**Question:** A flat plate, with cross-sectional area of  $0.23 \text{ m}^2$  moves at a velocity of  $3.8 \text{ m/s}$  close to a solid surface. The gap between the flat plate and the surface is of width  $8 \text{ mm}$  and the gap is filled with a fluid with kinematic viscosity  $7.851 \text{ mm}^2/\text{s}$  and specific gravity  $0.83$ . Above the plate is air. The force on the plate due to the fluid is?

- 0.712 N
- 0.858 N
- 1.033 N
- 0.930 N

## Feedback

100.0% a. Well done.

- 0.0% b. For a Newtonian fluid the shear stress,  $\tau$ , is  $\mu \times$  velocity gradient. Assuming a linear variation of velocity then the velocity gradient is  $3.8/(8 \times 10^{-3})/\text{s}$ . The density of the fluid is  $0.83 \times 1000 \text{ kg/m}^3$  and the dynamic viscosity is  $7.851 \times 10^{-6} \times$  the fluid density (Pa.s). (Note that the kinematic viscosity has been converted from  $\text{mm}^2$  to  $\text{m}^2$  ( $1 \text{ mm}^2 = 10^{-6} \text{ m}^2$ ). The force is then calculated by evaluating  $\tau \times$  plate area.
- 0.0% c. For a Newtonian fluid  $\tau$ , is  $\mu \times$  velocity gradient.. Assuming a linear variation of velocity then the velocity gradient is  $3.8/(8 \times 10^{-3})/\text{s}$ . The density of the fluid is  $0.83 \times 1000 \text{ kg/m}^3$  and the dynamic viscosity is  $7.851 \times 10^{-6} \times$  the fluid density (Pa.s). (Note that the kinematic viscosity has been converted from  $\text{mm}^2$  to  $\text{m}^2$  ( $1 \text{ mm}^2 = 10^{-6} \text{ m}^2$ ). The force is then calculated by evaluating  $\tau \times$  plate area.
- 0.0% d. For a Newtonian fluid  $\tau$ , is  $\mu \times$  velocity gradient. Assuming a linear variation of velocity then the velocity

# Imported Files in Repondus

Start Edit Settings Preview & Publish Retrieval & Reports **Blackboard 6.3 - 8.x**

**Edit Questions**

Multiple Choice ?

1. Title of Question

2. Question Wording   Randomize answers

3. Answers (PageDown moves to next answer)  General Feedback  Feedback

A

B

C

D

4. Select Correct Answer  5. Point Value

6.

Copy from Another File

Question List Total Items: 120 Points: 120.0

#	Title	Format	Question Wording
1	<a href="#">FL1a001</a>	Mult. Choice	A flat plate, with cross-sectional area of 0.23 m <sup>2</sup> moves at a velocity of 3.8 m/s close to a solid surface. The gap between the flat plate and the surface is of width 8 mm and
2	<a href="#">FL1a002</a>	Mult. Choice	A flat plate, with cross-sectional area of 0.27 m <sup>2</sup> moves at a velocity of 2.3 m/s close to a solid surface. The gap between the flat plate and the surface is of width 8 mm and
3	<a href="#">FL1a003</a>	Mult. Choice	A flat plate, with cross-sectional area of 0.29 m <sup>2</sup> moves at a velocity of 3.2 m/s close to a solid surface. The gap between the flat plate and the surface is of width 7 mm and
4	<a href="#">FL1a004</a>	Mult. Choice	A flat plate, with cross-sectional area of 0.30 m <sup>2</sup> moves at a velocity of 2.3m/s close to a solid surface. The gap between the flat plate and the surface is of width 10 mm and
5	<a href="#">FL1a005</a>	Mult. Choice	A flat plate, with cross-sectional area of 0.11 m <sup>2</sup> moves at a velocity of 4.5 m/s close to a solid surface. The gap between the flat plate and the surface is of width 3 mm and
6	<a href="#">FL1a006</a>	Mult. Choice	A flat plate, with cross-sectional area of 0.15 m <sup>2</sup> moves at a velocity of 5.9 m/s close to a solid surface. The gap between the flat plate and the surface is of width 9 mm and
7	<a href="#">FL1a007</a>	Mult. Choice	A flat plate, with cross-sectional area of 0.22 m <sup>2</sup> moves at a velocity of 3.6 m/s close to a solid surface. The gap between the flat plate and the surface is of width 7 mm and
8	<a href="#">FL1a008</a>	Mult. Choice	A flat plate, with cross-sectional area of 0.13 m <sup>2</sup> moves at a velocity of 5.7m/s close to a solid surface. The gap between the flat plate and the surface is of width 6 mm and

# Publishing to Blackboard

Start

Edit

Settings

Preview  
& Publish

Retrieval  
& Reports

Blackboard 6.3 -

## Preview & Publish

Preview

Publish to Blackboard

Update Settings

Print Options

Publish to Blackboard ?



Publish  
Wizard

Use this option to publish the currently open document to a Blackboard 6.3+ server. You can send the document as either a questions pool or as a complete exam or survey.

### Publish Wizard

1. Choose Course to publish to

2. Create or Replace Exam/Survey or Pool

Exam/Survey

Create new Exam

FLassessment1 a

Replace existing Exam

Pool

Create new Pool

FLassessment1 a

Replace existing Pool

3. Additional options for Exam/Survey

Apply Random Blocks to Exam

Apply Settings to Exam

Link Exam to Content Area and make available

< Back

Next >

Cancel

Help


# Publishing to Blackboard

Start Edit Settings **Preview & Publish** Retrieval & Reports **Blackboard 6.3 - 8.x**

**Preview & Publish**

- Preview
- Publish to Blackboard**
- Update Settings
- Print Options

Publish to Blackboard ?

 **Publish Wizard** Use this option to publish the currently open document to a Blackboard 6.3+ server. You can send the document as either a questions pool or as a complete exam or survey.

**Publish Wizard**


- Type of Publish - Local File, Single Course, or Batch Publish to multiple courses (only available in Blackboard 6.3+)
  - Publish to single course
  - Batch Publish to multiple courses (only available in Blackboard 6.3+)
  - Save pool to local file for manual upload
- Choose an existing server, or "add new server"
  - Blackboard Server: test2 server
  - Settings:
    - Server: vle.salford.ac.uk
    - Server Port: 80
    - User: ams021
- Press [Next] to connect to server

Start Edit Settings **Preview & Publish** Retrieval & Reports **Blackboard 6.3 - 8.x**

**Preview & Publish**

- Preview
- Publish to Blackboard**
- Update Settings
- Print Options

Publish to Blackboard ?

 **Publish Wizard** Use this option to publish the currently open document to a Blackboard 6.3+ server. You can send the document as either a questions pool or as a complete exam or survey.

**Publish Wizard**

- Choose Course to publish to
- Create or Replace Exam/Survey or Pool
  - Exam/Survey
    - Create new Exam
    - Replace existing Exam
  - Pool
    - Create new Pool
    - Replace existing Pool
- Additional options for Exam/Survey
  - Apply Random Blocks to Exam
  - Apply Settings to Exam
  - Link Exam to Content Area and make available

< Back Next > Cancel Help

# Conclusions

- 1 Harnessing the use of Ms Office and mailmerge it is possible to generate large question pools for use with Blackboard easily and quickly.
- 2 For questions without feedback the Perl program and .txt upload gives the fastest solution.
- 3 For questions with feedback the Respondus package is the most convenient but currently unsuitable for numerical questions since a tolerance cannot be specified. This would be essential for questions requiring the use of a calculator.

# Summary

The assessments generated were a fairer way of assessing large cohorts of students taking tests remotely.

The majority of students found the tests beneficial and worked enthusiastically to achieve good scores.

Because the assessments are marked automatically the pressure on time associated with marking is lifted.