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

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Contents

Phase 1
Supervised Test Conditions

On- line as
formed par
(20% of the

All student et
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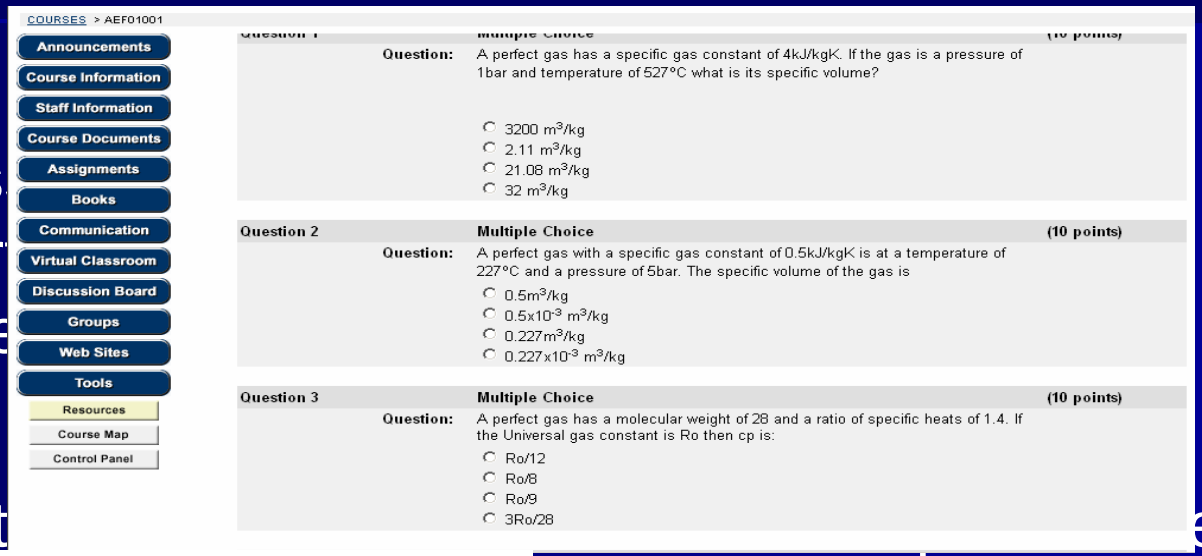
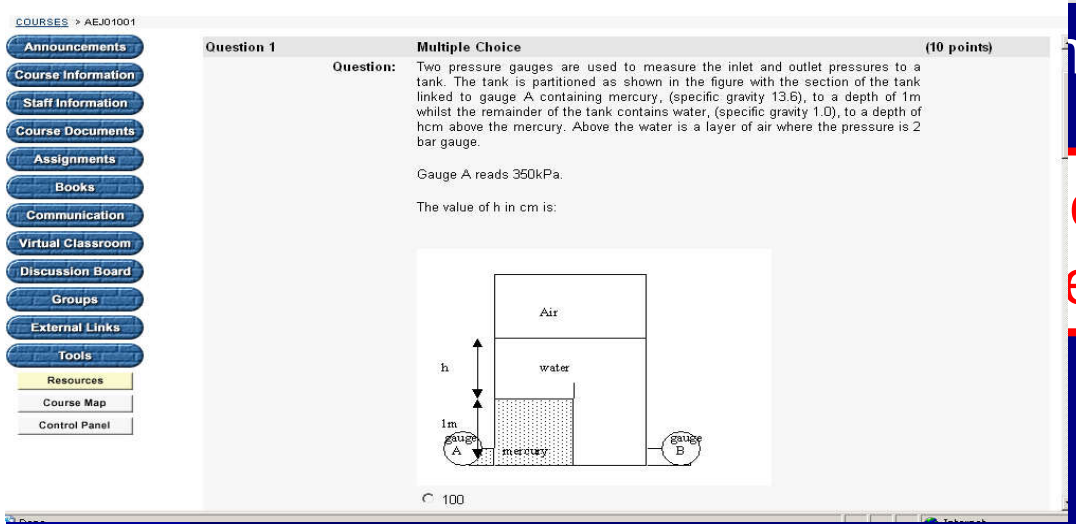
emester 2
evel 1 Fluid Mechanics





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 adminstrate

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.

Cleary 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 ion.

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 «aN»%. The heat lost during the cycle passes to cooling water (c_p = 4196 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 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 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 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	Nquestions	Nchoices	amin	amax	andp	ascf	vmin	vmax	vndp	vscf	hmin	hmax	hndp	hscf	knvmin	knv
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:

ROUND((RAND()*(max-min)+min)*scf,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	102.9811	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 ouput 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	bcv	bmf	bN	bdt	b	bans
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	1								441
43865	0.07	58	32	0	9.605	1								31
44493	0.07	60	32	0	9.278	1								25
44395	0.06	63	28	0	8.389	1								49
44333	0.05	69	30	0	5.459	1								27
44424	0.06	64	22	0	10.395	13.774	77.461	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									84
44127	0.05	64	24	0	7.887									93
44038	0.05	66	30	0	5.947									86
43903	0.08	73	29	0	7.793									054
43826	0.08	72	27	0	8.665									555
43835	0.08	69	50	0	5.182									98
43973	0.05	70	41	0	3.834									20
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 44041.6884704220 65 kJ/kg is burned at a rate of 5.9504822506916556E-2kg/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) 0.9179982294891 9507 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.

1. → 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 wate is?¶
¶
a) → 9.068 kg/s → correct¶
b) → 16.804 kg/s¶
c) → 102.991 kg/s¶
d) → 10.299 kg/s¶
¶
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 wa
27 oC then when steady flo
water is?¶
¶
a) → 13.938 kg/s¶
b) → 7.982 kg/s → co
c) → 71.802 kg/s¶
d) → 7.180 kg/s¶
¶
3. → During an engine t
0.08 kg/s and the engine o
passes to cooling water (c
then when steady flow con
is?¶
¶
a) → 20.216 kg/s¶
b) → 71.028 kg/s¶
c) → 6.589 kg/s → correct¶
d) → 7.103 kg/s¶

30 pages

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

```
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
      incorrect   10.299 kg/s incorrect
```

.txt

Ms Word

Formatting lost through .txt upload

Add Question Here

Question 1 **Multiple Choice** **10 points** Modify Remove

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 (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?

Answer

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

Blackboard

1. A two-dimensional flow is described by a stream function, ψ, given by ψ=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) «A ans» m/s correct
b) «A wr1» m/s
c) «A wr2» m/s
d) «A wr3» m/s

2. A two-dimensional flow is described by a stream function, ψ, given by ψ= 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) «B wr1» m/s
b) «B wr2» m/s
c) «B wr3» m/s
d) «B ans» m/s correct

3. A two-dimensional flow is described by a stream function, ψ, given by ψ= 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) «C wr1» m/s
b)
c)
d)

1. A two-dimensional flow is described by a stream function, ψ, given by ψ=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

```
MC    A two-dimensional flow is described by a stream function,?, given by
?=A(x2-y2)+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    7
m/s   incorrect   73.154 m/s  incorrect   41.580 m/s  incorrect
```

.txt

Question 1 | Multiple Choice | 10 points | Modify | Remove

Question A two-dimensional flow is described by a stream function,?, given by ?=A(x2-y2)+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,?, given by
?=A(x2-y2)+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
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,
<font face="symbol">y</font>  ,   given by   <font
face="symbol">y</font>  =A(x<sup>2</sup>-y<sup>2</sup>)+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 kg/m^3 the pressure at the point where r=2.14 m and $\theta = 35^o$ 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 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
efficiency of 58%. The heat lost during the cycle
water is 26 °C then when steady flow conditions

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

Question 3

In a steam power plant the turbine generates
the condenser is 177.0 kJ/kg. If 20.1kW of pow
kg/s 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 J/kgK) . If the temperature rise of the cooling water is 34 °C then when steady flow conditions have been achieved the mass flow rate of the cooling water is?

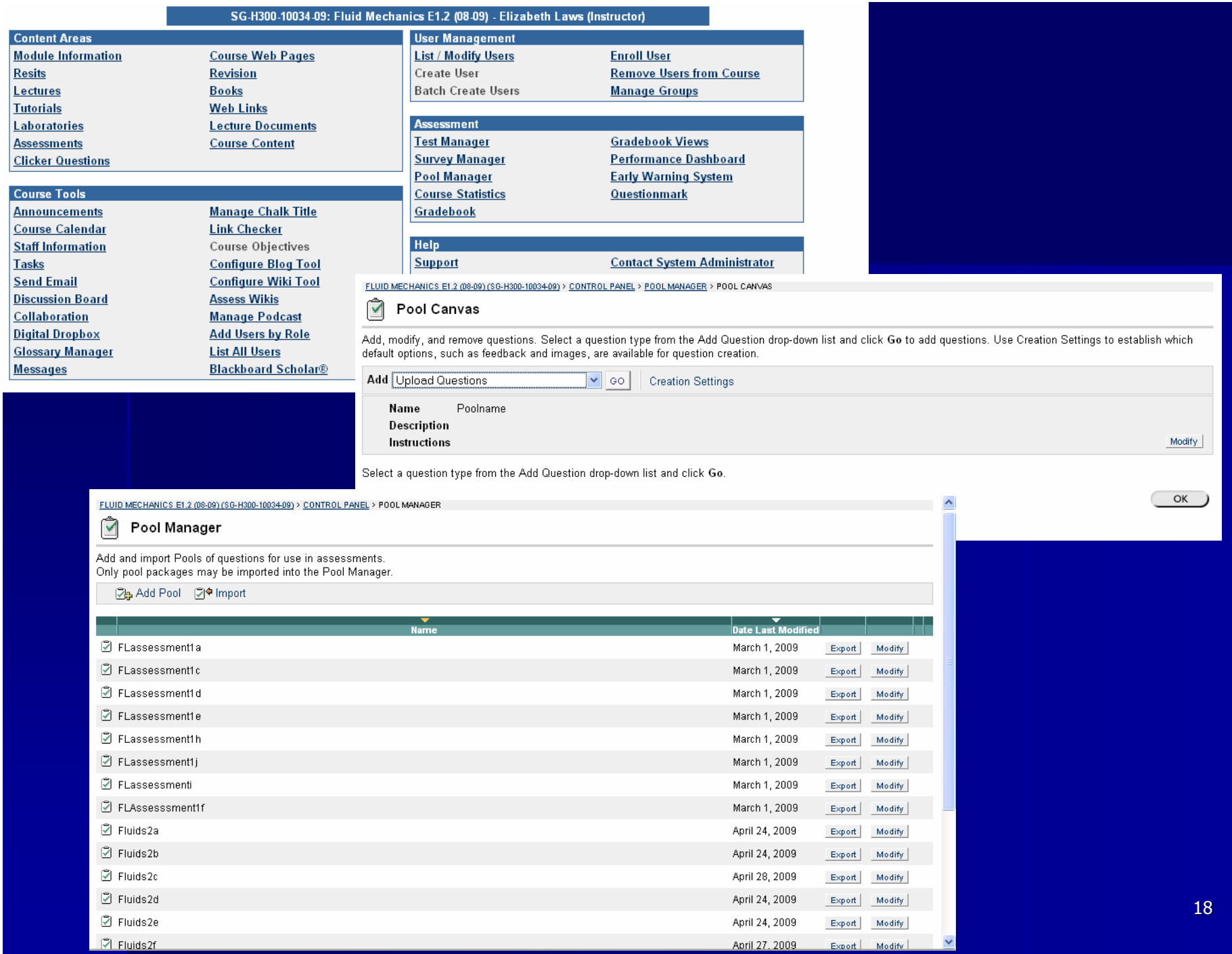
- 13.085kg/s
- 83.656kg/s
- 8.366kg/s
- 12.262kg/s

Student B

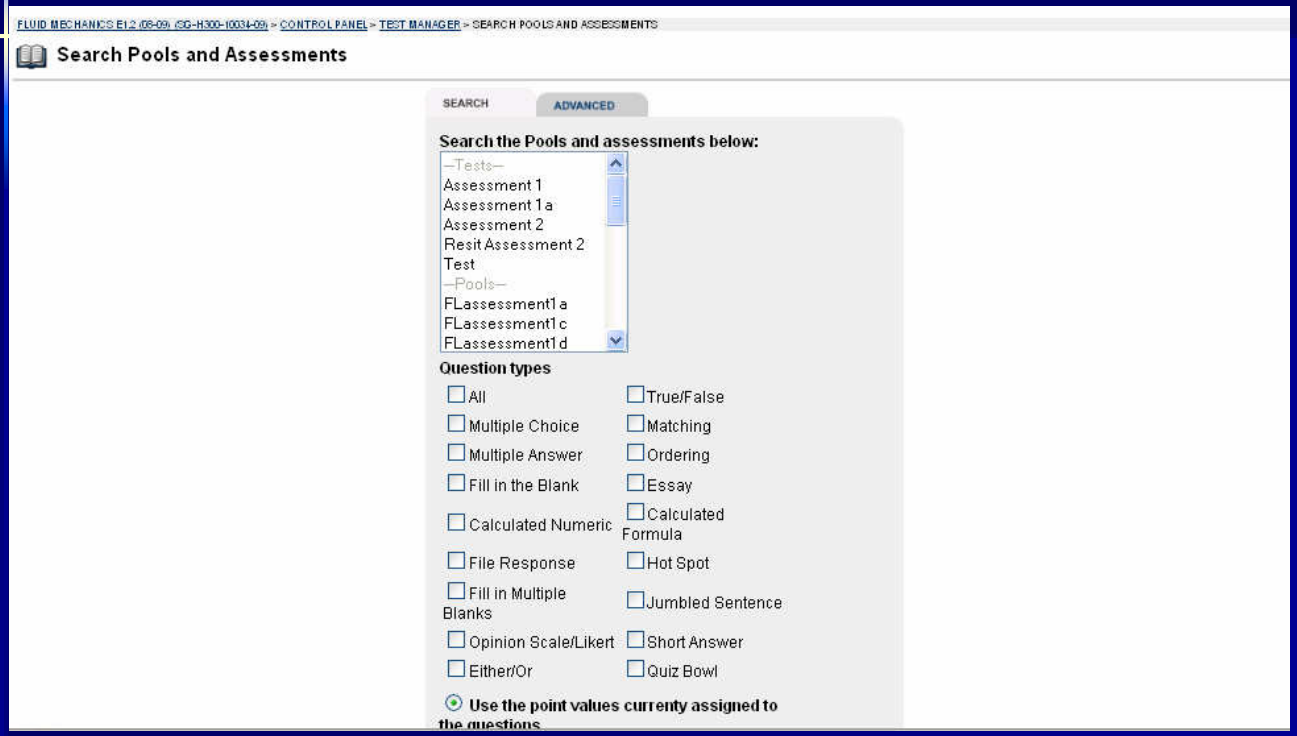
Question 3 **10 points** Save

A fluid at an initial pressure of 1.72 bar and with a volume of 0.79 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?

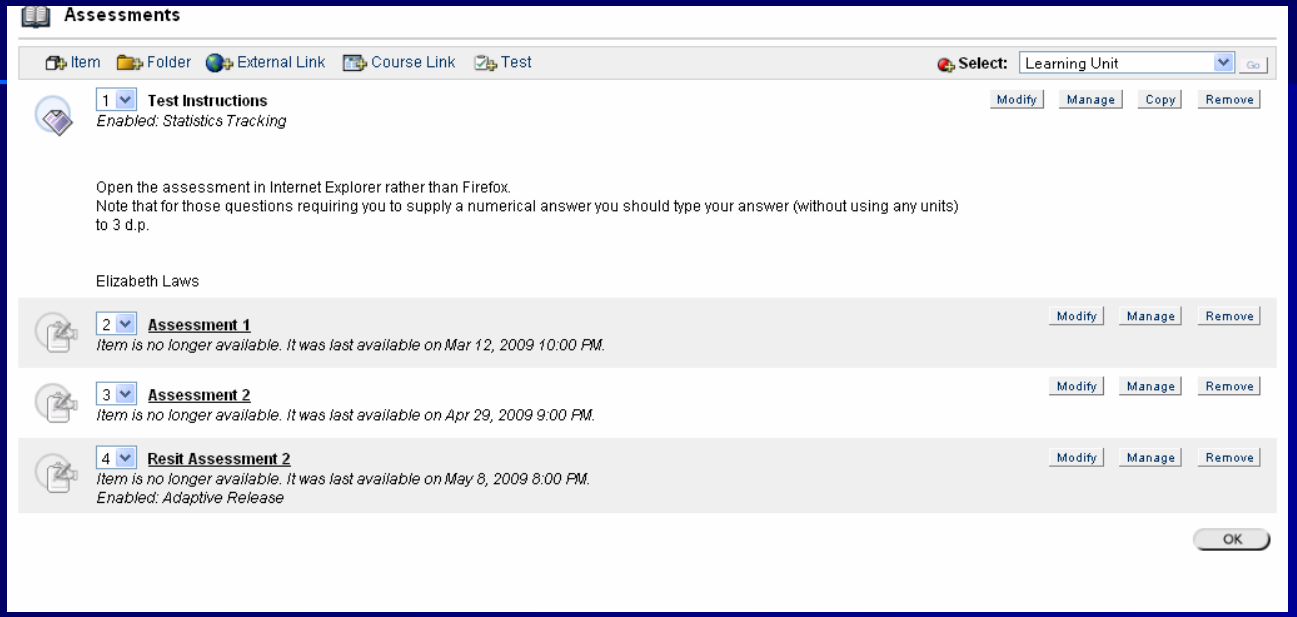
- 1327.627 kJ
- 156856.627kJ
- 5129.228kJ
- 1741.070kJ


SG-H300-10034-09: Fluid Mechanics E1.2 (08-09) - Elizabeth Laws (Instructor)
Content Areas
Module Information
Resits
Lectures
Tutorials
Laboratories
Assessments
Clicker Questions
Course Web Pages
Revision
Books
Web Links
Lecture Documents
Course Content
Course Tools
Announcements
Course Calendar
Staff Information
Tasks
Send Email
Discussion Board
Collaboration
Digital Dropbox
Glossary Manager
Messages
Manage Chalk Title
Link Checker
Course Objectives
Configure Blog Tool
Configure Wiki Tool
Assess Wikis
Manage Podcast
Add Users by Role
List All Users
Blackboard Scholar®
User Management
List / Modify Users
Create User
Batch Create Users
Enroll User
Remove Users from Course
Manage Groups
Assessment
Test Manager
Survey Manager
Pool Manager
Course Statistics
Gradebook
Gradebook Views
Performance Dashboard
Early Warning System
Questionmark
Help
Support
Contact System Administrator
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 Upload Questions GO Creation Settings
Name Poolname
Description
Instructions
Modify
Select a question type from the Add Question drop-down list and click Go.
OK
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.
Add Pool
Import
Name
Date Last Modified
FLassessment1a March 1, 2009 Export Modify
FLassessment1c March 1, 2009 Export Modify
FLassessment1d March 1, 2009 Export Modify
FLassessment1e March 1, 2009 Export Modify
FLassessment1h March 1, 2009 Export Modify
FLassessment1j March 1, 2009 Export Modify
FLassessmenti March 1, 2009 Export Modify
FLAssesssment1f March 1, 2009 Export Modify
Fluids2a April 24, 2009 Export Modify
Fluids2b April 24, 2009 Export Modify
Fluids2c April 28, 2009 Export Modify
Fluids2d April 24, 2009 Export Modify
Fluids2e April 24, 2009 Export Modify
Fluids2f April 27, 2009 Export Modify

Test Manager



Assessment Generation



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 in overall performance.

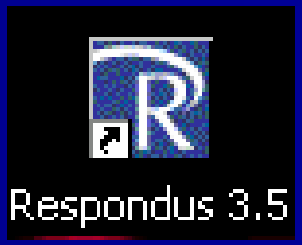
Giving Feedback

1. It is not possible to upload feedback directly into Blackboard.

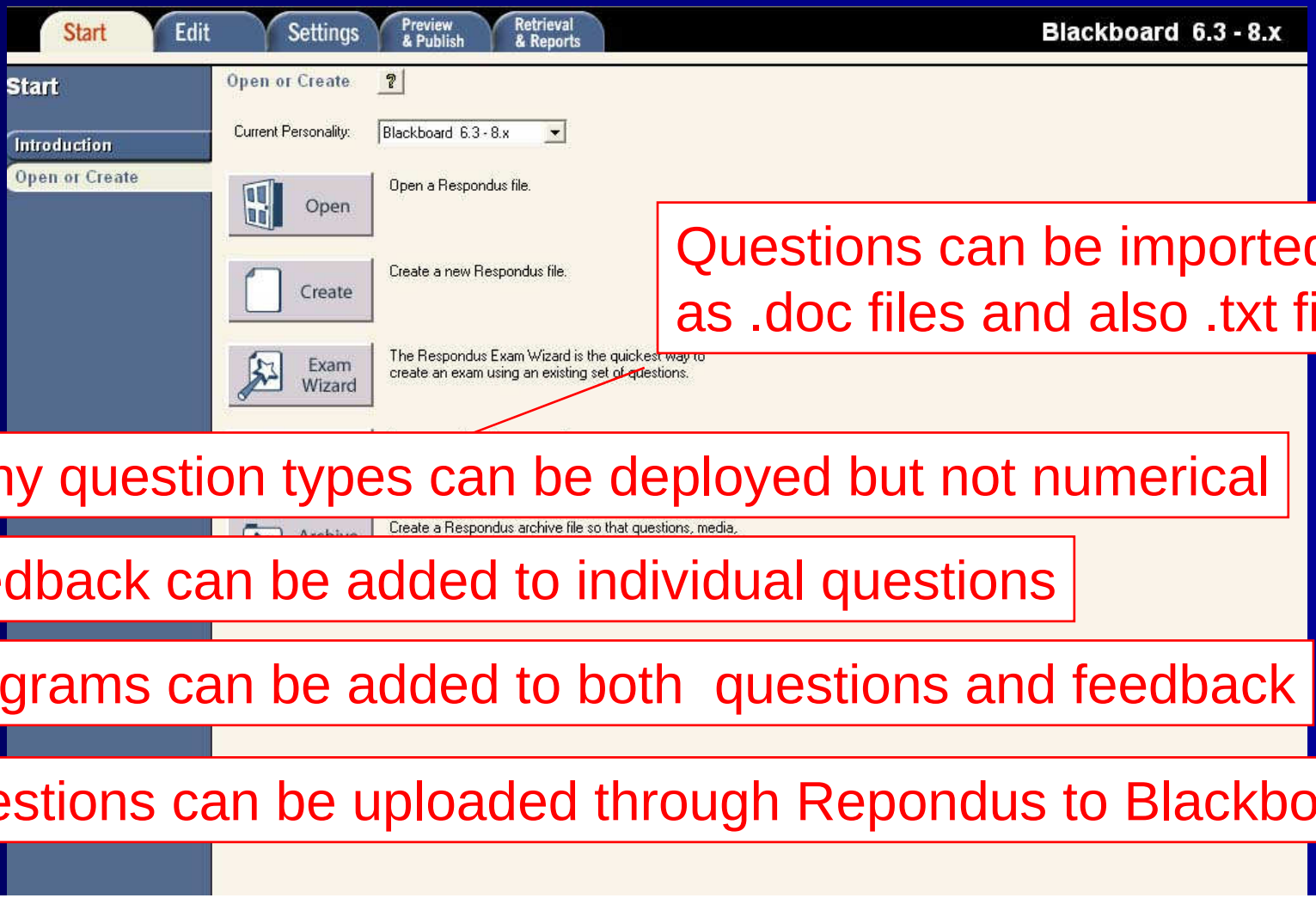
2. Generic feedback could be given but the same feedback would need to be added to every question

tedious

3. To provide individual feedback the package Respondus has been used.



Respondus



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

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

«aqn». A flat plate, with cross-sectional area of «Aa» m^2 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^2/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, τ, is μx velocity gradient. Assuming a linear variation of velocity then the velocity gradient is «av»/(«ah»x10^{-3}) /s. The density of the fluid is «asg»x1000 kg/m^3 and the dynamic viscosity is «aknv»x10^{-6} x the fluid density (Pa.s). (Note that the kinematic viscosity has been converted from mm^2 to m^2 (1 $mm^2 = 10^{-6}$ m^2). The force is then calculated by evaluating τ x plate area.

c) «Awr2» N

@ For a Newtonian fluid τ, is μx velocity gradient.. Assuming a linear variation of velocity then the velocity gradient is «av»/(«ah»x10^{-3}) /s. The density of the fluid is «asg»x1000 kg/m^3 and the dynamic viscosity is «aknv»x10^{-6} x the fluid density (Pa.s). (Note that the kinematic viscosity has been converted from mm^2 to m^2 (1 $mm^2 = 10^{-6}$ m^2). The force is then calculated by evaluating τ x plate area.

d) «awr3» N

@ For a Newtonian fluid τ, is μx velocity gradient. Assuming a linear variation of velocity then the velocity gradient is «av»/(«ah»x10^{-3}) /s. The density of the fluid is «asg»x1000 kg/m^3 and the dynamic viscosity is «aknv»x10^{-6} x the fluid density (Pa.s). (Note that the kinematic viscosity has been converted from mm^2 to m^2 (1 $mm^2 = 10^{-6}$ m^2). The force is then calculated by evaluating τ x plate area.

«bqn». A flat plate, with cross-sectional area of «Ba» m^2 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^2/s and specific gravity «Bsg». Above the plate is air. The force on the plate due to the fluid is?

a) «Bwr1» N

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 m^2 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 the gap is filled with a fluid with kinematic viscosity 7.851 mm^2/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

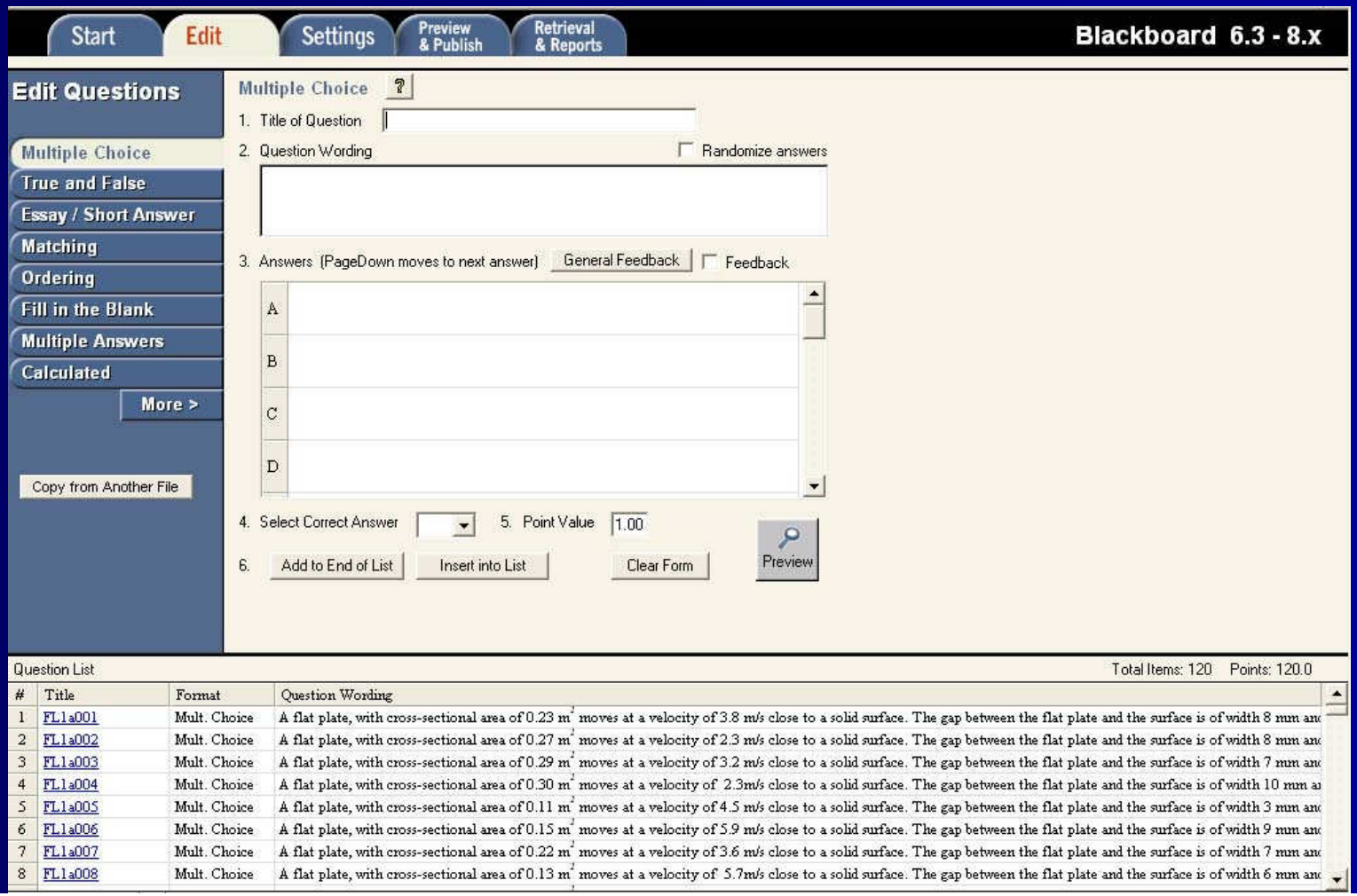
100.0% a. Well done.

0.0% b. For a Newtonian fluid the shear stress, τ, is μ x velocity gradient. Assuming a linear variation of velocity then the velocity gradient is $3.8/(8x10^{-3})$ /s. The density of the fluid is $0.83x1000$ kg/m^3 and the dynamic viscosity is $7.851x10^{-6}$ x the fluid density (Pa.s). (Note that the kinematic viscosity has been converted from mm^2 to m^2 ($1\ mm^2 = 10^{-6}\ m^2$). The force is then calculated by evaluating τ x plate area.

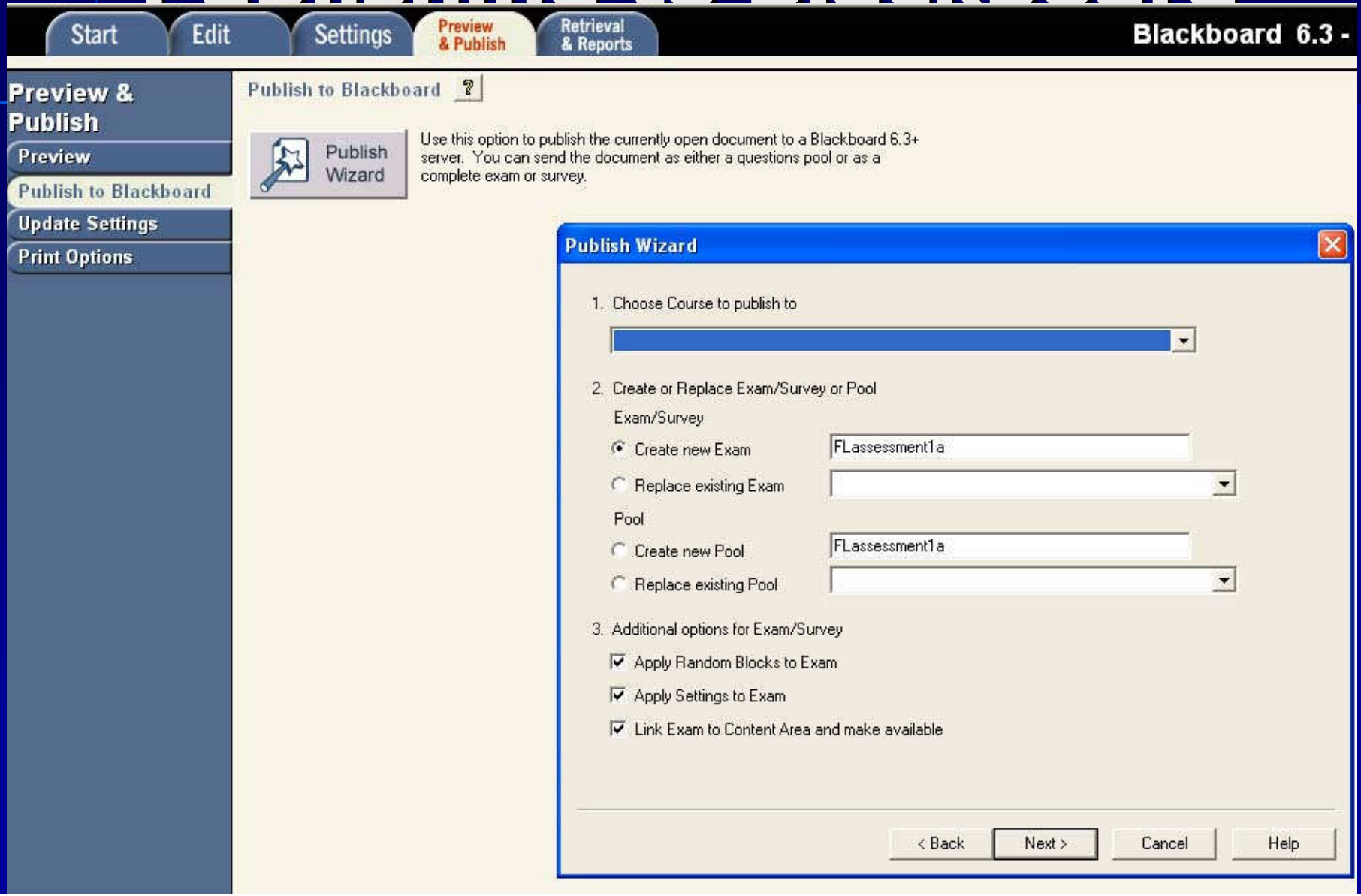
0.0% c. For a Newtonian fluid τ, is μ x velocity gradient.. Assuming a linear variation of velocity then the velocity gradient is $3.8/(8x10^{-3})$ /s. The density of the fluid is $0.83x1000$ kg/m^3 and the dynamic viscosity is $7.851x10^{-6}$ x the fluid density (Pa.s). (Note that the kinematic viscosity has been converted from mm^2 to m^2 ($1\ mm^2 = 10^{-6}\ m^2$). The force is then calculated by evaluating τ x plate area.

0.0% d. For a Newtonian fluid τ, is μ x velocity gradient. Assuming a linear variation of velocity then the velocity

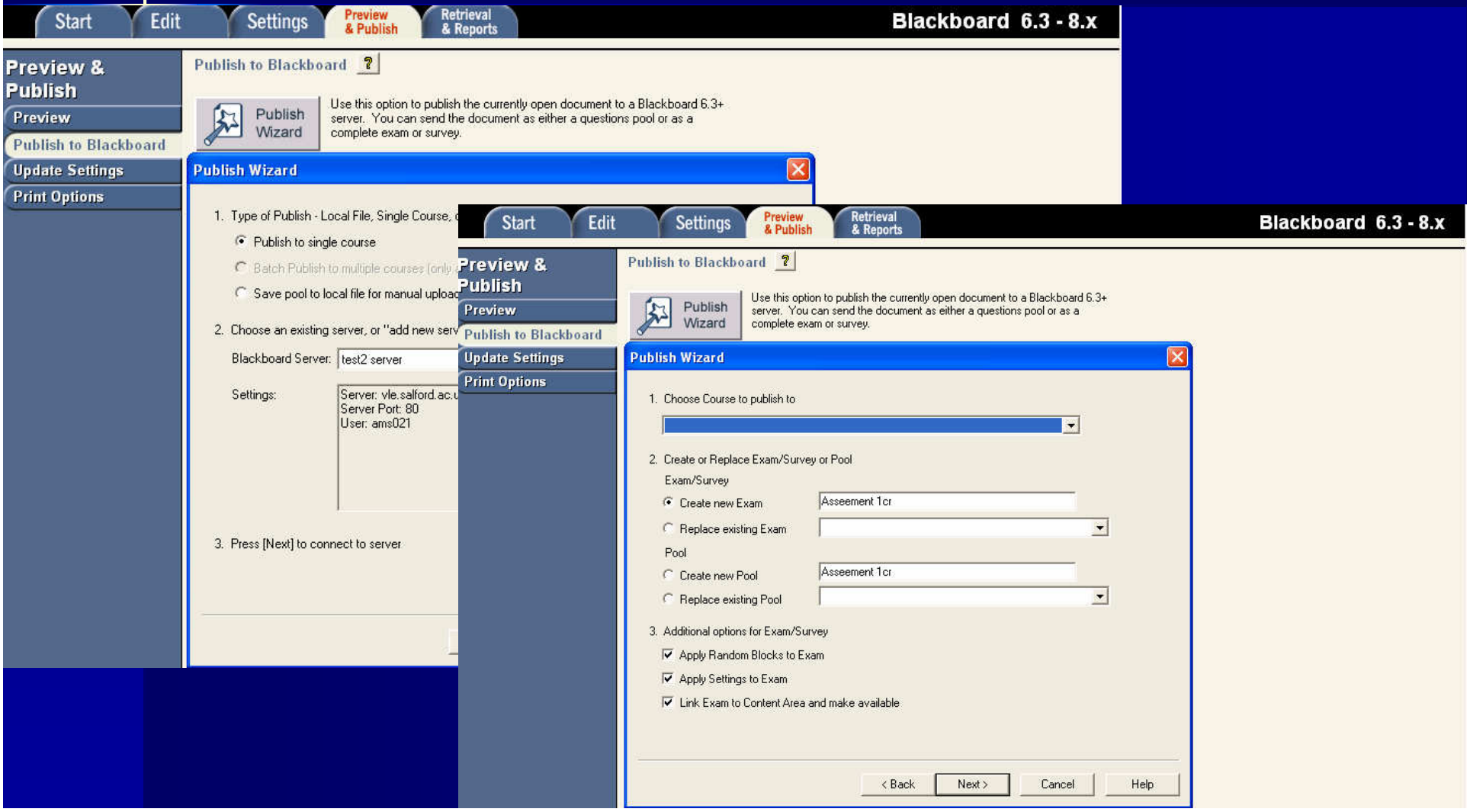
Imported Files in Repondus



Publishing to Blackboard



Publishing to Blackboard



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.