



ELECTRICAL WORKERS REGISTRATION BOARD

SUMMARY OF

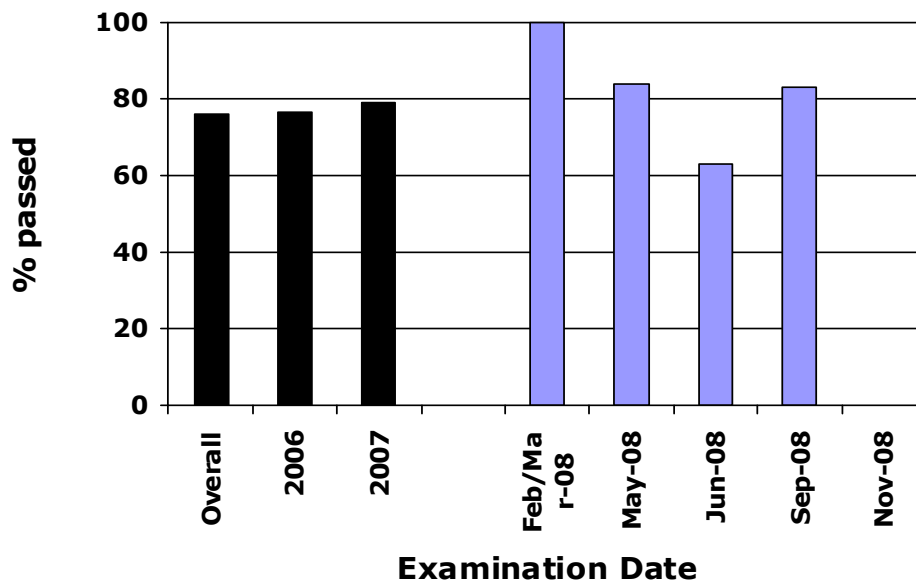
SEPTEMBER 2008 EXAMINATION ROUND

John Sickels
Registrar
18 December 2008

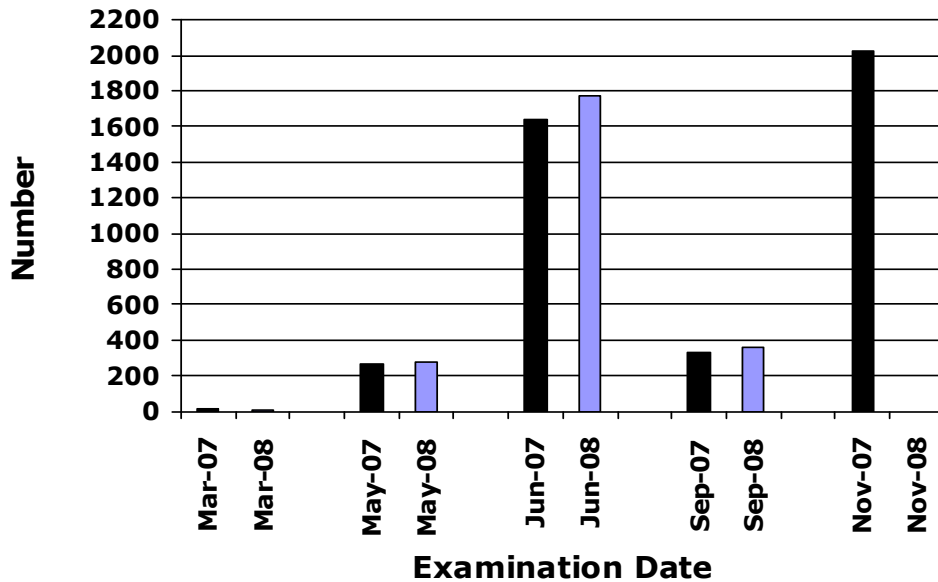
1. Summary of Examinations

	Number candidates	of	Number candidates passed	of who	Percentage passed
ESTA	248		207		83.5
ESTB	100		80		80
Elec. Regulations	6		6		100
Elec. Theory	0		0		0
Elec. Inspector	0		0		0
TEWC	8		7		87.5
E Security	0		0		0
September 2008	362		300		83

2008 - PASS RATES - OVERALL



2008 - CANDIDATE NUMBERS - OVERALL



Mark Ranges

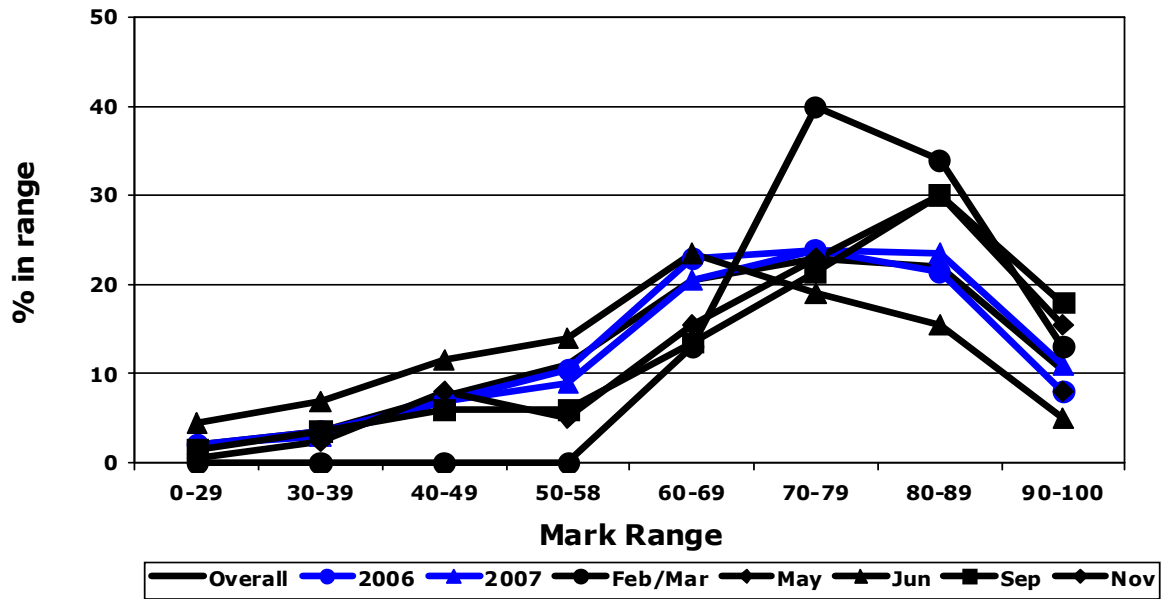
Number of candidates

Range	ESTA	ESTB	ER	ET	EI	TEWC	ES	June 2008	
90 - 100	43	20	1	0	0	2	0	66	candidates
80 - 89	78	28	2	0	0	0	0	108	candidates
70 - 79	52	21	3	0	0	2	0	78	candidates
60 - 69	34	11	0	0	0	3	0	48	candidates
50 - 58	14	8	0	0	0	0	0	22	candidates
40 - 49	15	6	0	0	0	0	0	21	candidates
30 - 39	7	5	0	0	0	1	0	13	candidates
0 - 29	5	1	0	0	0	0	0	6	candidates
	248	100	6	0	0	8	0	362	

% of candidates

Range	ESTA	ESTB	ER	ET	EI	TEWC	ES	June 2008	
90 - 100	17	20	17	0	0	25	0	18%	of candidates
80 - 89	31.5	28	33	0	0	0	0	30%	of candidates
70 - 79	21	21	50	0	0	25	0	21.5%	of candidates
60 - 69	14	11	0	0	0	37.5	0	13.5%	of candidates
50 - 58	5.5	8	0	0	0	0	0	6%	of candidates
40 - 49	6	6	0	0	0	12.5	0	6%	of candidates
30 - 39	3	5	0	0	0	0	0	3.5%	of candidates
0 - 29	2	1	0	0	0	0	0	1.5%	of candidates

2008 MARK RANGE - OVERALL



2. General Comments

The overall pass rate of 83% is consistent with examinations held in September of previous years. The number of candidates who sat examinations was also consistent with the September examinations since 2004. Between 2004 and 2007, the candidate numbers ranged between 308 and 387.

Due to a mix up in dates, two separate examinations were conducted for Electrical Service Technician A (13 and 20 September), Electrical Service Technician B (20 and 27 September) and Tradespersons Electrical Work Certificate (20 and 27 September).

3. Moderation

The moderation went well with all moderators having valuable input. All examinations were moderated via secure email, with two moderators per examination. The moderators for Electrical Service Technician A, Electrical Service Technician B and Tradespersons Electrical Work Certificate examinations moderated both papers. All moderators completed their work on time and participated in the teleconferences

4. Marking

The marking went very well with all markers returning marked papers by the required dates. The markers for Electrical Service Technician A, Electrical Service Technician B and Tradespersons Electrical Work Certificate examinations marked both papers.

5. Electrical Service Technician A

The pass rate of 83.5% is an excellent result for candidates in these examinations. Candidate numbers were slightly higher than at the same time last year.

Candidates in both examinations did reasonably well in the following questions.

Question 1	Multi-choice questions
Question 3	Drawing a circuit and performing calculations
Question 4	Statutory testing requirements and testing methods
Question 5	Colour coding of flexible cords (1040) and protection devices (1041)
Question 6	Statutory testing requirements and testing methods
Question 7	Fault diagnosis.
Question 8	Power and current calculations

In the other questions, candidate performance was mixed.

Question 2	Isolation – equipment and personal safety.
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Candidates in the 1040 examination did reasonably well with over 90% able to gain 5 or more marks, with 50% gaining 7.5 or more marks. However, in the 1041 examination, only 50% of candidates were able to gain 5 or more marks and only 6% gained 7.5 or more marks.

Question 9 System theory – earthing of fittings and appliances

Candidates in both examinations found this question challenging with only 33.5 % (1040) and 25% (1041) able to gain 7.5 marks or more for this question.

An abridged analysis is contained in Appendix 1 of this paper. The full analysis is contained in Attachment 1.

6. Electrical Service Technician B

The pass rate of 80% is consistent with the September examinations over the previous 3 years with pass rates ranging between 79.5 and 95%. Similarly candidate numbers were consistent with those of the previous 3 years with numbers ranging between 99 and 112.

Candidates in both examinations did reasonably well in the following questions.

Question 1 Short-answer questions
Question 3 Connection and reconnection methods
Question 7 Damp and wet areas
Question 8 System theory – MEN systems
Question 9 Statutory testing requirements

In the other questions, candidate performance was mixed.

Question 2 230V control circuits.

55% of candidates in the 2030 examination were able to gain 7.5 or more marks for this question. However, only 33% of candidates in the 2031 examination were able to gain 7.5 or more marks.

Question 4 Isolation – equipment and personal safety

Candidates in the 2030 examination did very well in this question with 61.5% able to gain 7.5 or more marks. However, only 33% in the 2031 examination were able to gain 7.5 or more marks. It is a concern that while most candidates seem to understand how to test, many do not seem to know why.

Question 5 Testing and inspection methods

Candidate performance in this question was average. Only 46% (2030) and 38% (2031) could gain 7.5 marks or more. In both papers, almost one-third of candidates could not gain even 5 marks. This is a concern because the question in both papers was the same and centred on safety issues with testing. This area needs more emphasis both on-job and off-job.

Questions 6 Single-phase motors

The question in 2030 related largely to single-phase induction motors, while the question in 2031 related to single phase induction motors and universal motors. In paper 2030, 52% of candidates gained 7.5 marks or more, but in paper 2031 this dropped to 33%. This indicates that knowledge of universal motors is scant at best.

An abridged analysis is contained in Appendix 2 of this paper. The full analysis is contained in Attachment 2.

7. Electrician Regulations

Six candidates sat a composite Regulations Examination paper and all passed.

An abridged analysis is contained in Appendix 3 of this paper.

8. Electrician Theory

There was no Electrician Theory Examination in September.

9. Electrical Inspector

There was no Electrical Inspector Examination in September.

10. Tradespersons Electrical Work Certificate

There were 8 candidates for the Tradesperson Electrical Work Certificate examination, 7 of whom passed.

An abridged analysis is contained in Appendix 6 of this paper

11. Electronic Security Alarm Installer

There were no candidates for the Electronic Security Alarm Installer examination

An abridged analysis is contained in Appendix 7 of this paper.

Appendix 1

Electrical Service Technician A

13 and 20 September 2008

ESTA 1040, a moderated paper, was used for the examination of 13 September 2008.
ESTA 1041, a moderated paper, was used for the examination of 20 September 2008

A1.1 - Overall Candidate Performance

	Number candidates	of	Number candidates passed	of who	Percentage passed
ESTA 1040	232		193		83
ESTA 1041	16		14		87.5
September 2008	248		207		83.5

ESTA 1040

All candidates

Average pass mark 74.5 %
Median mark 79

Those who passed

Average pass mark 81
Median mark 82

11 Candidates gained 95 marks or better

ESTA 1041

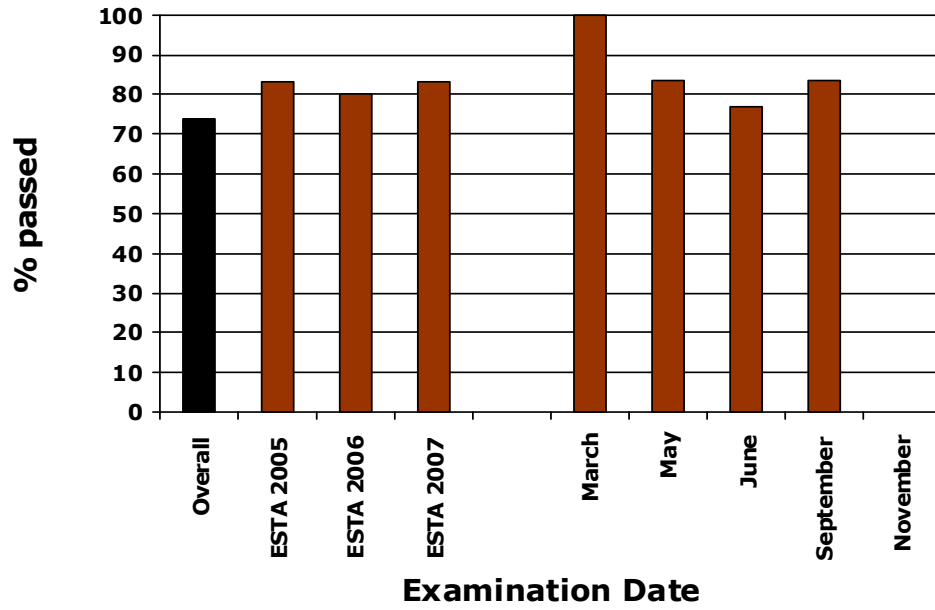
All candidates

Average pass mark 71 %
Median mark 71

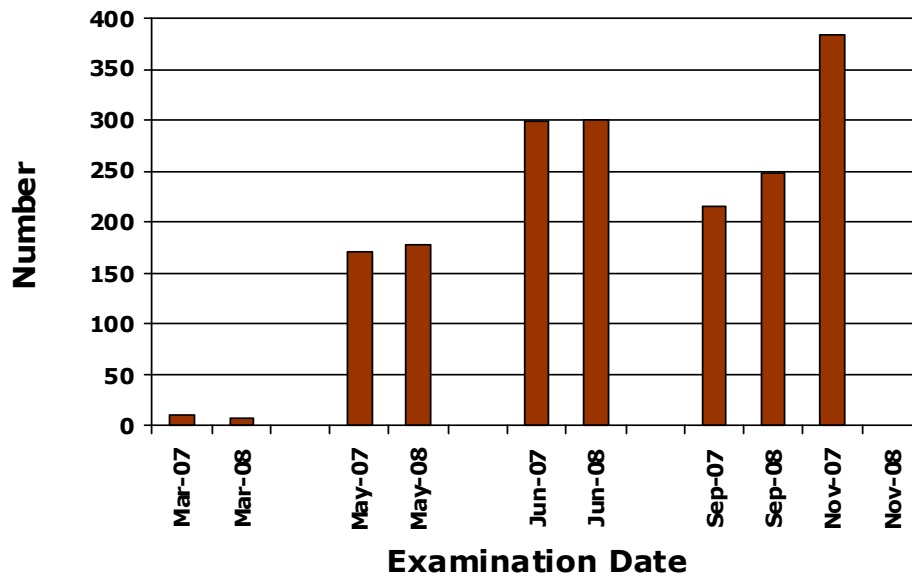
Those who passed

Average pass mark 75
Median mark 75

2008 PASS RATES - ESTA



2008 - CANDIDATE NUMBERS - ESTA



Mark Ranges

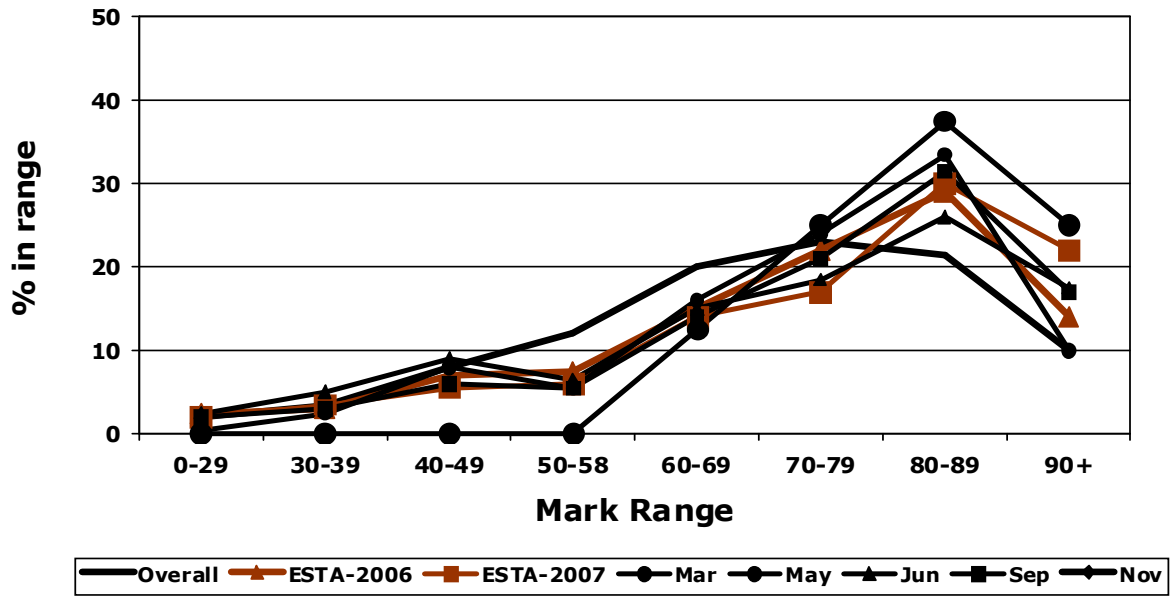
Number of candidates

Range	ESTA 1040	ESTA 1041					September 2008	
90 – 100	42	1					43	candidates
80 – 89	73	5					78	candidates
70 – 79	49	3					52	candidates
60 – 69	29	5					34	candidates
50 – 58	13	1					14	candidates
40 – 49	15	0					15	candidates
30 – 39	6	1					7	candidates
0 – 29	5	0					5	candidates
	232	16					248	

% of candidates

Range	ESTA 1040	ESTA 1041					September 2008	
90 – 100	18	6.25					17	% of candidates
80 – 89	31.5	31.25					31.5	% of candidates
70 – 79	21	18.75					21	% of candidates
60 – 69	12.5	31.25					14	% of candidates
50 – 58	6	6.25					5.5	% of candidates
40 – 49	6.5	0					6	% of candidates
30 – 39	2.5	6.25					3	% of candidates
0 – 29	2	0					2	% of candidates

2008 MARK RANGE - ESTA



A1.2 - Overall Marking Analysis

Performance by topic

Candidates who gained between 75% and 100% of the marks (15 to 20 marks for question 1 and 7.5 to 10 marks for any other question) are considered to have a sound knowledge of a topic. The table below shows the percentage of candidates in each range for a topic. It also compares the performance with some similar questions from previous examination papers.

The questions in bold are from ESTA 1041

The questions in bold/italic are from ESTA 1042

	Topic No.	Topic	Year	Q.No.	Subject	75-100% (%)	50 – 70% (%)	0 – 45% (%)
Q 1	-	10, 2 mark questions				71.5	25	3.5
<i>Q 1</i>	-	<i>10, 2 mark questions</i>				<i>75</i>	<i>25</i>	<i>0</i>

	Topic No.	Topic	Year	Q.No.	Subject	75-100% (%)	50 – 70% (%)	0 – 45% (%)
Q 2	L1.40/54	Isolation Equipment and Personal safety			Insert fuse link, cannot turn off main switch – two precautions. Fault in wiring. Difference between switching off and isolation. Continued isolation	49.5	42	8.5
Q 2	L1.40/54	Isolation Equipment and Personal safety			Precautions when testing. Why bonding necessary on isolating transformer. Insert fuse link, cannot turn off main switch – two precautions. Fault in wiring,	6	44	50
			Jun 2006	6	Protective devices for personal safety, replacing a blown fuse, repairing appliance with high PEC reading	41	38	21
			May 2007	5	Safety, replacing a blown fuse, continued isolation, switching off and isolating, PPE and its use	54	31	15
			Nov 2007	2	Check before turning off main switch, define PPE, switching off and isolating, precautions when connecting test instruments	42	38	20
			Nov 2007	6	Why recommend main switch turned off, cause of fault, isolating transformers, protective devices	35	44	21

	Topic No.	Topic	Year	Q.No.	Subject	75-100% (%)	50 – 70% (%)	0 – 45% (%)
Q 3	A5.5	<u>Theory</u> - Simple circuits			Draw circuit diagram – 2 resistances in series, one in parallel. Calculate total resistance, circuit voltage, total power consumed	65	8	27
Q 3	A5.5	<i>Theory</i> - Simple circuits			<i>Draw circuit diagram – 2 resistances in series, one in parallel. Calculate power consumed by one resistor, current drawn by series resistors, power if one resistor short-circuited</i>	56	25	19
			Sep 2007	6	Draw 230V circuit supplying 2 elements in series and 2 in parallel, Calculate ammeter reading, effect if resistance open circuited.	62.5	22	15.5
			Sep 2007	6	Draw 230V circuit supplying 2 elements in series and 2 in parallel, Calculate ammeter reading, power dissipated.	67	14	19
			May 2008	7	Draw 230V circuit supplying 2 elements controlled by two-position selector switch, Calculate current flow and power dissipated with switch in various positions.	85	7	8
			Jun 2008	7	Calculate total power consumed, current drawn ff resistance open-circuited. Reading on voltmeter if resistance open-circuited	55	16	29

	Topic No.	Topic	Year	Q.No.	Subject	75-100% (%)	50 – 70% (%)	0 – 45% (%)
Q 4	K2.38 K4.46	<u>Statutory testing and inspection requirements</u> <u>Testing and inspection methods</u>			IR testing without damage to semi-conductors. IR test of a dishwasher. Why multimeter not used for IR test.	43	39	18
Q 4	K2.38 K4.46	<u>Statutory testing and inspection requirements</u> <u>Testing and inspection methods</u>			<i>PEC test on Class I appliance.</i> <i>Visual inspections</i>	88	6	6
			Sep 2006	9	Testing portable oven, reasons for PEC, polarity and insulation tests, reason for PEC, polarity and IR tests, why PEC test before insulation resistance test	54	25	21
			Nov 2006	5	Five visual checks required by Standard, PEC test in class I appliance	82	14	4
			May 2007	4	Five visual checks required by Standard, use of micro-gap switch, why earth pin longer, why bayonet cap must not be used	86	11	3
			Jun 2007	4	Testing portable oven to AS/NZS 3760, polarity testing	40.5	34.5	25
			Jun 2007	4	Visual checks to AS/NZS 3760, PEC testing	29	47	24
			Nov 2007	7	Polarity testing, testing to AS/NZS 3760, testing portable RCDs.	69	17	14

	Topic No.	Topic	Year	Q.No.	Subject	75-100% (%)	50 – 70% (%)	0 – 45% (%)
Q 5	H3d.41	<u>Cables and Cords Specifications</u>			Colour coding and polarity of flexible cords, Voltage drop in flexible cords	75	20	5
			Sep 2007	7	Why PEC should be longer in plug, why cord from Class II appliance not used on a Class I appliance. Three qualities of insulation , What makes simmerstat and thermostat operate	34.5	38	27.5
			Nov 2007	8	Effect of cord would on drum, why voltage drops in cord, current ratings	56	27	17
			Mar 2008	8	Effect of cord would on drum. Measures to prevent cord failing, why voltage drops in cord, current ratings	50	50	0
Q 5	H1c.31	<u>Protection and Control</u> Selection of control and protection equipment			<i>Under-rated and over-rated fuses. Advantages of HRC fuse over rewirable fuses. Why not permitted to bridge HRC fuse with fuse wire. Types of faults on MCBs and HRC fuses</i>	50	25	25
			Nov 2007	5	What thermal overload detects, HRC fuse characteristics, how RCD operates, define PRCD	57	24	19
			Mar 2008	4	How RCD operates on fault, meaning of PRCD. Three disadvantages of rewirable fuses. Why not permitted to use fuse wire on HRC fuse	75	12.5	12.5

	Topic No.	Topic	Year	Q.No.	Subject	75-100% (%)	50 – 70% (%)	0 – 45% (%)
Q 6	K2.38 K4.46	<u>Statutory testing and inspection requirements</u> <u>Testing and inspection methods</u>			Visual checks of Class I appliance. Using micro-gap switch on d.c. Why earth pin longer than active and neutral, why bayonet cap adaptor must not be used on Class I heater	63	28	9
Q 6	K2.38 K4.46	<u>Statutory testing and inspection requirements</u> <u>Testing and inspection methods</u>			<i>IR test of appliance with MOV. Alternative to IR test. IR test of appliance with semi-conductors. IR test of concrete mixer.</i>	69	19	12
			Jun 2007	4	IR testing, testing appliance with MOV fitted	52.5	33.5	14
			Nov 2007	9	IR testing and semi-conductors. IR testing appliance. Testing appliance with MOV fitted.	55	26	19
			Mar 2008	2	IR testing and earth leakage testing, IR testing and avoid damage to semi-conductor devices, IR test of concrete mixer	75	25	0
			May 2008	6	IR testing and earth leakage testing, IR testing and avoid damage to semi-conductor devices, IR test of concrete mixer	55	29	16
			Jun 2008	6	Reason for PEC test, how it is carried out, acceptable values. Why ohmmeter not used for IR test, connecting ammeter in parallel	47	32	21

	Topic No.	Topic	Year	Q.No.	Subject	75-100% (%)	50 – 70% (%)	0 – 45% (%)
Q 7	H10.66	<u>Fault diagnosis</u>			Fan heater used when faulty – calculate current in PEC, effect on operation of fuse. Phase/neutral transpositions. Why low PEC value contributes to safety	60	22.5	17.5
Q 7	H10.66	<u>Fault diagnosis</u>			Appliances plugged in socket out – fuse blows. Describe how to determine if socket outlet overloaded, describe tests to determine if faulty appliance	50	19	31
			Nov 2007	4	Faulty heater. Calculate fault current, whether fuse will blow, power dissipated. Phase, neutral transpositions.	62.5	16	21.5
			Mar 2008	9	Situation that causes transpositions. Faulty washing machine, calculate fault current, whether fuse will blow.	75	12.5	12.5
			May 2008	5	Appliances plugged in socket out – fuse blows. Describe how to determine if socket outlet overloaded, describe tests to determine if faulty appliance	14	22	64
			Jun 2008	5	Faulty dishwasher, calculate current and power in PEC and whether fuse would operate, effect of transpositions	68	22	10

	Topic No.	Topic	Year	Q.No.	Subject	75-100% (%)	50 – 70% (%)	0 – 45% (%)
Q 8	C2.11	<u>a.c.</u> – Measurements V, A, P, pf			Portable water heater – calculate current and power in low positions and resistance, current and power in high position	72.5	7.5	20
Q 8	C2.11	<u>a.c.</u> – Measurements V, A, P, pf			Calculate voltage drop permitted at socket outlet. Calculate power consumed by heater and at minimum permitted voltage.	44	37	19
			Nov 2006	9	Portable water heater – calculate current and power in low positions and resistance, current and power in high position	63	13	24
			Jun 2007	9	Ohmmeter testing heater, calculate current and power at 230V, power at 240V	77	7	16
			Jun 2007	9	Portable water heater, power on high and medium, current on low, fault on heater.	61	18	21
			May 2008	2	Ohmmeter testing appliance, calculate current and power. Calculate difference in power if resistance open-circuited	72	14	14
			June 2008	2	Calculate current for heater at 230V. Calculate permitted voltage variation, power at minimum and maximum voltage variations. Faults on identical heaters	43	21	36

	Topic No.	Topic	Year	Q.No.	Subject	75-100% (%)	50 – 70% (%)	0 – 45% (%)
Q 9	D3.21	<u>System theory - Earthing of installations fittings and appliances</u>			Sequence of actions when PEC test too high. How damp conditions affect operation of Class I appliance. Insulating properties of materials	33.5	31.5	35
Q 9	D3.21	<u>System theory - Earthing of installations fittings and appliances</u>			Name parts of sine wave, define Hertz. Danger if appliances used in earthed situation. PEC effect on safety, PEC testing	25	56	19
			May 2005	14	Describe earthed situation, danger if appliances used in earthed situation	29	31	40
			Nov 2005	15	Testing high res. PEC, danger if appliances used in earthed situation	58	23	19
			Jun 2006	2	Define terms, explain damp situation, danger if Class I appliances used in damp situation	40	48	12
			May 2006	5	Describe earth situation. Danger if appliances used in earthed situation. PEC effect on safety, PEC testing	21	39	40
			Mar 2008	5	Name parts of sine wave, define Hertz. Danger if appliances used in earthed situation. PEC effect on safety, PEC testing	68	22	10

A1.3 - ESTA 1040

A1.3.1 - Moderation

Two moderators were used for ESTA 1040

This paper and ESTA 1041 were, for the most part, "parallel" papers. In most cases, the same topic (albeit different questions) was covered in the same numbered question in both papers. Moderation was conducted by secure email and the content of both papers was considered reasonable in terms of content and time. Both papers presented a similar degree of difficulty.

A1.3.2 - Marking

Four markers were used for ESTA 1040.

Teleconferences were held with the markers on 27 and 29 September.

Version 2 of the answer schedule was sent to markers on 27 September.

Comments

A good paper in general and overall an excellent pass rate.

A1.3.3 - Amendments to ESTA 1040

The significant amendments to <u>ESTA 1040</u> arising from the moderation and marking were as follows:			
No.	Question (Moderation)	Answer (Moderation)	Answer (Marking)
1(c)	Option 4 change to ensure a clearer distinction between it and the correct answer	-	-
2(a)	-	-	Additional option added
2(b)	Rewritten to make intention clearer	-	-
2(b)(ii)	-	Amended to make accurate	Reference to the electrician being registered removed
2(c)	-	-	Amended to ensure clear distinction between isolation and switching off.
2(d)	Rewritten to make intention clearer	Additional option added	-
4(a)	-	-	3 rd bullet point replaced with a different option
4(d)	Amended to make intention clearer	-	-
3(c)	-	Answer corrected	-
3(d)	-	Answer corrected, additional option added	-
4(b)(ii)	-	Answer amended to align with question	-
4(b)(iv)	-	Answer amended to align with question	-
5(a)(i)	(E) amended to make intention clearer	-	Different colour codings set out separately
5(a)(ii)	(E) amended to make intention clearer	-	Different colour codings set out separately
6(b)	-	Condensed to two options (2 nd bullet point was a repeat of the 1 st)	-
6(c)	Editorial amendment	-	-
6(d)	Editorial amendment	-	-
7(a)	-	-	Accurate answer inserted
9(a)	Rewritten to make intention clearer	-	-
9(b)	-	Amended for better accuracy	Accurate answer inserted
9(c)	-	-	Additional option added.

A1.4 - ESTA 1041

A1.4.1 - Moderation

Two moderators were used for ESTA 1041.

This paper and ESTA 1040 were, for the most part, "parallel" papers. In most cases, the same topic (albeit different questions) was covered in the same numbered question in both papers. Moderation was conducted by secure email and the content of both papers was considered reasonable in terms of content and time. Both papers presented a similar degree of difficulty.

A1.4.2 - Marking

Four markers were used for ESTA 1041.

A teleconference was held with the markers on 29 September.

Comments

This was a very good paper for those candidates who knew their theory. However there were a few that had very little idea and did not gain high marks.

A1.4.3 – Amendments to ESTA 1041

The significant amendments to ESTA 1041 arising from the moderation and marking were as follows:			
No.	Question (Moderation)	Answer (Moderation)	Answer (Marking)
2(c)	-	Last bullet point amended to make meaning clearer	-
2(d)	Rewritten to make intention clearer	-	-
3(a)	Rewritten to make intention clearer	-	-
3(d)	Amended to make intention clearer	-	-
4(b)	Rewritten to make intention clearer	-	-
4(b)(i)	-	Amended to make meaning clearer	-
6(c)	-	Last bullet point amended to make meaning clearer	-
7(a)	Amended to make intention clearer	-	-
7(a)(iii)	-	Amended to make meaning clearer	-
7(b)	Amended to make intention clearer	-	-
7(b)(i)	-	Additional option added	-
7(b)(iii)	-	Amended to make meaning clearer	-
8(a)	Rewritten to align with the requirements of regulation 53	Amended accordingly	-
9(c)(ii)	Rewritten to make intention clearer	-	-

Appendix 2

Electrical Service Technician B

19, 20 and 27 November 2008

ESTB 2030, a moderated paper, was used for the examination of 20 September 2008.
ESTB 2031, a moderated paper, was used for the examination of 27 September 2008.
ESTB 2032, a composite paper, was used for the examination of 19 September 2008.

A2.1 - Overall Candidate Performance

	Number candidates	of	Number candidates passed	of who	Percentage passed
ESTB 2030	78		65		83
ESTB 2031	21		15		71.5
ESTB 2032	1		0		0
September 2008	100		80		80

ESTB 2030

All candidates

Average pass mark 78%
Median mark 79.5

Those who passed

Average pass mark 81.5%
Median mark 83.5

2 Candidates gained 100 marks. 7 Candidates gained 95 or more marks

ESTB 2031

All candidates

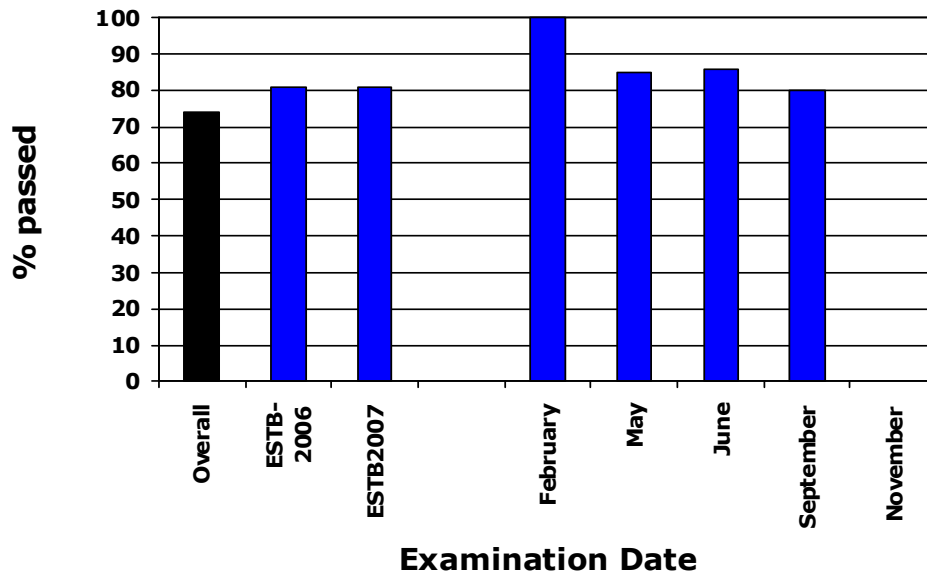
Average pass mark 70%
Median mark 79

Those who passed

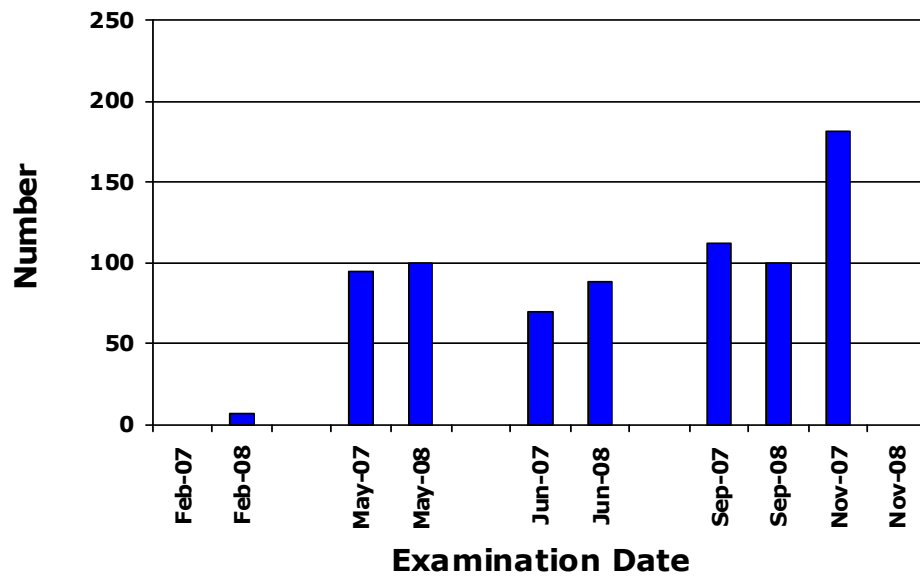
Average pass mark 81.5%
Median mark 83

1 Candidate gained 95 or more marks

2008 PASS RATES - ESTB



2008 CANDIDATE NUMBERS - ESTB



Mark Ranges

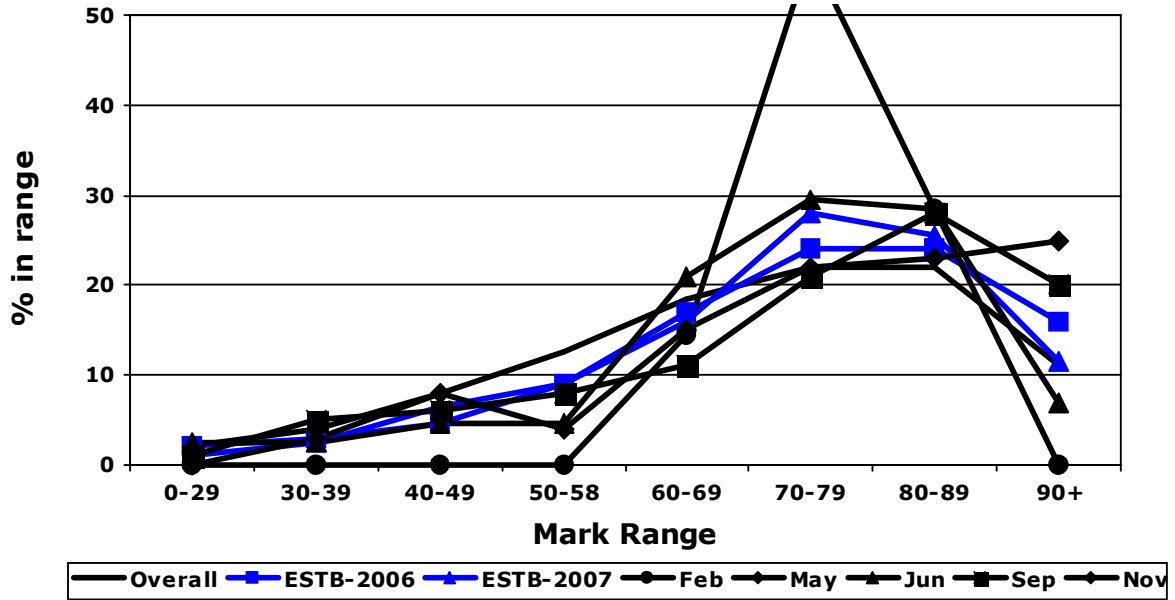
Number of candidates

Range	ESTB 2030	ESTB 2031	ESTB 2032	September 2008	
90 – 100	17	3	0	20	candidates
80 – 89	22	6	0	28	candidates
70 – 79	16	5	0	21	candidates
60 – 69	10	1	0	11	candidates
50 – 58	6	2	0	8	candidates
40 – 49	3	2	1	6	candidates
30 – 39	4	1	0	5	candidates
0 – 29	0	1	0	1	candidates
	78	21	1	100	

% of candidates

Range	ESTB 2030	ESTB 2031	ESTB 2032	September 2008	
90 – 100	22	14	0	20%	of candidates
80 – 89	28	28.5	0	28%	of candidates
70 – 79	20	23.5	0	21%	of candidates
60 – 69	13	5	0	11%	of candidates
50 – 58	8	9.5	0	8%	of candidates
40 – 49	4	9.5	100	6%	of candidates
30 – 39	5	5	0	5%	of candidates
0 – 29		5	0	1%	of candidates

2008 MARK RANGE - ESTB



A2.2 - Overall Marking Analysis

Performance by topic

Candidates who gained between 75% and 100% of the marks (15 to 20 marks for question 1 and 7.5 to 10 marks for any other question) are considered to have a sound knowledge of a topic. The table below shows the percentage of candidates in each range for a topic. It also compares the performance with some similar questions from previous examination papers.

The questions in bold are from ESTB 2030

The questions in bold/italic are from ESTB 2031

	Topic No.	Topic	Year	Q.No.	Subject	75-100% (%)	50 – 70% (%)	0 – 45% (%)
Q 1	-	10, 2 mark questions				69.5	25.5	5
<i>Q 1</i>	-	<i>10, 2 mark questions</i>				<i>72</i>	<i>14</i>	<i>14</i>

	Topic No.	Topic	Year	Q.No.	Subject	75-100% (%)	50 – 70% (%)	0 – 45% (%)
Q 2	E2.16	<u>3ph-Motor/Alternators Selection, starting, protection</u>			Diagram of 230V control circuit. How thermal overload and HRC fuse protect motor. Starter fault	55	23	22
Q 2	E2.16	<u>3ph-Motor/Alternators Selection, starting, protection</u>			Diagram of 230V control circuit. What faults thermal overload and HRC fuses detect. Motor faults	33	29	38
			Sep 2007	8	Name numbered parts of 239V motor control circuit, two typical operating voltages, how thermal overload and HRC fuse protects motor, reveal of supply to motor	72	23	5
			Nov 2007	6	Draw and label circuit diagram of 230V motor control circuit, finding motor winding, connecting motor	60.5	25	14.5
			Feb 2008	2	Two causes for faults – sustained overcurrent, overheating motor faulty starter, motor not starting. Reason for using reduced voltage starters	14	72	14
			May 2008	9	Draw 400V control circuit, motor faults.	59	20	21
			Jun 2008	9	Draw 400V control circuit, motor faults.	58.5	19.5	22

	Topic No.	Topic	Year	Q.No.	Subject	75-100% (%)	50 – 70% (%)	0 – 45% (%)
Q 3	H10.66	<u>Fault diagnosis</u>			Reconnection of printing press – safety before connecting testing before connection, main safety checks after connection	52.5	32	15.5
Q 3	H10.66	<u>Fault diagnosis</u>			Connect new hot water cylinder to existing isolating switch – testing before connection.	66.5	14.5	19
			May 2006	3	Safely isolate MCB circuit supplying appliances, locate faults, describe remedial action	53	28.5	18.5
			Sep 2005	5	Faulty three phase hot water cylinder – isolation, reason for fault, testing to locate fault	65	23	12
			Nov 2006	3	3 phase motor with broken isolator. , safe disconnection and isolation procedures, testing and diagnose fault.	54	34.5	11.5
			May 2007	4	Replacement hot water cylinder, tests before connection, safety precautions before connection	59	20	21
			Sep 2007	9	Reconnection of single phase sewing machine, detail instrument checks before connection, ensuring own safety checks after reconnection.	55	35	10

	Topic No.	Topic	Year	Q.No.	Subject	75-100% (%)	50 – 70% (%)	0 – 45% (%)
Q 4	L1.40/54	Isolation Equipment and Personal safety			Precautions when isolator not close to motor. Why prove-test- prove is used. Situations where two danger tags are used. Continued isolation.	61.5	22	16.5
Q 4	L1.40/54	Isolation Equipment and Personal safety			What prove-test-prove establishes. Continued isolation. Safety of persons and property	38	52.5	9.5
			Sep 2007	3	Why prove-test-prove is used and how it is carried out, difference between switching off and isolation four way of ensuring continued isolation	38	43.5	18.5
			Nov 2007	8	Precautions when connecting meter, Why prove-test-prove is used and how it is carried out, ensuring continued isolation	23	51	26
			Feb 2008	3	Three precautions after disconnecting an appliance, why prove-test-prove is used, testing to confirm isolation, three ways of ensuring continued isolation	0	100	0
			Jun 2008	6	Three precautions after disconnecting an appliance, why prove-test-prove is used, testing to confirm isolation, three ways of ensuring continued isolation	50.5	39	10.5

	Topic No.	Topic	Year	Q.No.	Subject	75-100% (%)	50 – 70% (%)	0 – 45% (%)
Q 5	K4.46	<u>Testing and inspection methods</u>			Main safety issues – connecting ammeter in parallel, connecting voltmeter in series. Safety precautions when testing. Testing to ensure appliance is electrically safe.	46	27	27
Q 5	K4.46	<u>Testing and inspection methods</u>			Main safety issues – connecting ammeter in parallel, connecting voltmeter in series. Safety precautions when testing. Testing to ensure appliance is electrically safe.	38	29	33
			Sep 2007	5	What happens if ammeter connected in parallel and voltmeter connected in series, four safety precautions when using test instruments	50	30	20
			Sep 2007	5	Detail tests before reconnection to be made to motor repaired by another person	16	48	36
			Nov 2007	3	Three-phase planer, tests to establish the fault, causes of fault, making machine operationally safe	10	51	39
			Feb 2008	8	Connecting ammeter in parallel and voltmeter in series, carrying out IR test.	58	28	14
			Jun 2008	4	Connecting ammeter in parallel and voltmeter in series, carrying out IR test.	68	19.5	12.5

	Topic No.	Topic	Year	Q.No.	Subject	75-100% (%)	50 – 70% (%)	0 – 45% (%)
Q 6	F1.19	<u>1ph-Motors</u> - Theory			Circuit diagram of cap-start motor, reversing motor. Reversing universal motor. Diagram of split-phase motor, reversing of motor. Motor fault.	72	15	13
Q 6	F1.19	<u>1ph-Motors</u> - Theory			<i>Circuit diagram of universal motor with reverse switch. Why universal motors more suitable for some applications. Circuit diagram of cap-start motor, reversing motor.</i>	33	24	43
			May 2006	4	Circuit diagrams and rotation of single phase motors, advantage of cap-start, replacement for centrifugal switch	47	37	16
			Jun 2007	2	Reversal of cap start and universal motor, calculate current drawn circuit diagram of split-phase, use of reversing switch while motor running	37	52.5	10.5
			Jun 2007	2	Circuit diagram of cap-start motor, reversing, purpose of capacitor, calculate power, faults on single phase motors	55	35.5	9.5
			May 2008	2	Name parts of diagram of 230V induction motor. Redraw diagram to reverse motor. Effect on motor if various parts were faulty.	48	39	13

	Topic No.	Topic	Year	Q.No.	Subject	75-100% (%)	50 – 70% (%)	0 – 45% (%)
Q 7	J.33	<u>Damp and wet areas</u>			Describe term IP rating and following numbers. Define IP34. Ratings of equipment for swimming pool	95	5	0
Q 7	J.33	<u>Damp and wet areas</u>			<i>Ratings of equipment for bathroom. Define IP rating, 1st and 2nd numbers on an IP rating, describe protection of IP 34 fitting.</i>	71.5	19	9.5
			Sep 2005	7	Damp situations and IP ratings	92	7	1
			Jun 2006	5	IP ratings, replacement of towel rail in bathroom	72	24	4
			Jun 2007	5	Define damp situation, IP rating, 1 st an 2 nd numbers on an IP rating, IP rating of apparatus in bathroom	95	5	0
			Jun 2007	5	Define IP rating, 1 st an 2 nd numbers on an IP rating, describe protection of IP 56 fitting, IP rating of apparatus in bathroom	71	10	19
			Nov 2007	4	Define IP rating, 1 st and 2 nd numbers on an IP rating, describe protection of IP 34 fitting. IP rating of apparatus near swimming pool	79.5	14.5	6

	Topic No.	Topic	Year	Q.No.	Subject	75-100% (%)	50 – 70% (%)	0 – 45% (%)
Q 8	D4.22	<u>System theory - MEN systems</u>			List nominal voltage in MEN system. Define term MEN system. Situations where no neutral required. Frequency and peak voltage	55	28	17
Q 8	D4.22	<u>System theory - MEN systems</u>			Diagram of MEN system with single and three phase installations. Why PEC is required. Why neutral required with different heating loads.	62	9.5	28.5
			Jun 2007	7	Define term MEN system, why system is multiple earthed, sketch and label system diagram	61	39	0
			Feb 2008	7	Define term MEN system, why neutral is required. Draw circuit diagram of 3 phase and single phase consumers connected to distribution system.	100	0	0
			May 2008	4	Circumstances in which neutral is required and not required in three phase final subcircuit. Diagram of MEN system arrangement	56	21	23
			Jun 2008	8	Why PEC is needed and must be secure, why neutral conductor is required, and situations where it is not required. Define MEN	45	32	23

	Topic No.	Topic	Year	Q.No.	Subject	75-100% (%)	50 – 70% (%)	0 – 45% (%)
Q 9	K2.38	<u>Statutory testing and inspection requirements</u>			AS/NZS 3760 – test on an appliance. IR values for isolating transformer. Polarity testing	69	17	14
Q 9	K2.38	<u>Statutory testing and inspection requirements</u>			Testing of portable water heater. Visual checks.	43	33	24
			Jun 2007	4	Testing to AS/NZS 3760, polarity tests	94	3	3
			Sep 2007	7	Standard to which appliance must be tested, testing requirements and visual checks to Standard	56	38	6
			Sep 2007	7	Standard to which appliance must be tested, three checks and tests to be carried out, testing requirements of Standard, polarity testing	34.5	38	27.5
			Feb 2008	6	Testing to AS/NZS 3760, inspections and tests. Polarity testing	72	28	0
			May 2008	3	Testing to AS/NZS 3000. PEC tests, testing to check integrity of insulation	80	16	4

2.3 - ESTB 2030

A2.3.1 - Moderation

Two moderators were used for ESTB 2030.

This paper and ESTB 2031 were “parallel” papers. That is, the same topic (albeit different questions) was covered in the same numbered question in both papers. Moderation was conducted by secure email and the content of both papers was considered reasonable in terms of content and time.

A2.3.2 - Marking

Two markers were used for ESTB 2030.

Teleconferences were held with the markers on 29 September and 6 October.

Version 2 of the answer schedule was sent to markers on 29 September.

Comments

A well-balanced examination that most candidates answered well. The questions and answers had been well moderated.

A2.3.3 - Amendments to ESTB 2030

The significant amendments to ESTB 2030 arising from the moderation and marking were as follows:			
No.	Question (Moderation)	Answer (Moderation)	Answer (Marking)
1(e)	-	Additional option added	-
1(h)	-	Additional option added	2 nd bullet point replaced with answer that more reflects the question
1(j)	Rewritten to make intention clearer	-	-
2(b)	-	Rewritten for greater accuracy	-
3(b)	-	-	Answer corrected
3(c)	-	Additional option added	-
4(d)	Rewritten to include additional information	Amended accordingly	Additional option added
5(b)	-	-	Two options condensed into one answer
5(c)	-	Additional option added	-
6(c)(i)	Additional information added	-	-
9	Rewritten to make intention clearer	Amended accordingly	-

A2.4 - ESTB 2031

A2.4.1 - Moderation

Two moderators were used for ESTB 2031.

This paper and ESTB 2030 were “parallel” papers. That is, the same topic (albeit different questions) was covered in the same numbered question in both papers. Moderation was conducted by secure email and the content of both papers was considered reasonable in terms of content and time.

A2.4.2 - Marking

Two markers were used for ESTB 2031.

A teleconference was held with the markers on 6 October.

Comments

This was a good examination paper with no real problems emerging.

A2.4.3 - Amendments to ESTB 2031

The significant amendments to ESTB 2031 arising from the moderation and marking were as follows:			
No.	Question (Moderation)	Answer (Moderation)	Answer (Marking)
2(a)(i)	Rewritten to include additional information. Marks increased from 3 to 4	-	-
2(a)(ii)	-	Additional option added	-
2(a)(iii)	Deleted	-	-
4	Rewritten to put the different parts into better context	-	-
5(c)	-	Additional option added	-
7(a)	Rewritten to make intention clearer	Amended accordingly	-

Appendix 3
Electrician Regulations
20 September 2008

ER 33, a composite paper, was used for the examination of 20 September 2008

A3.1 - Overall Candidate Performance

	Number candidates	of	Number candidates passed	of who	Percentage passed
ER 33	6		6		100
September 2008	6		6		100

ER 33

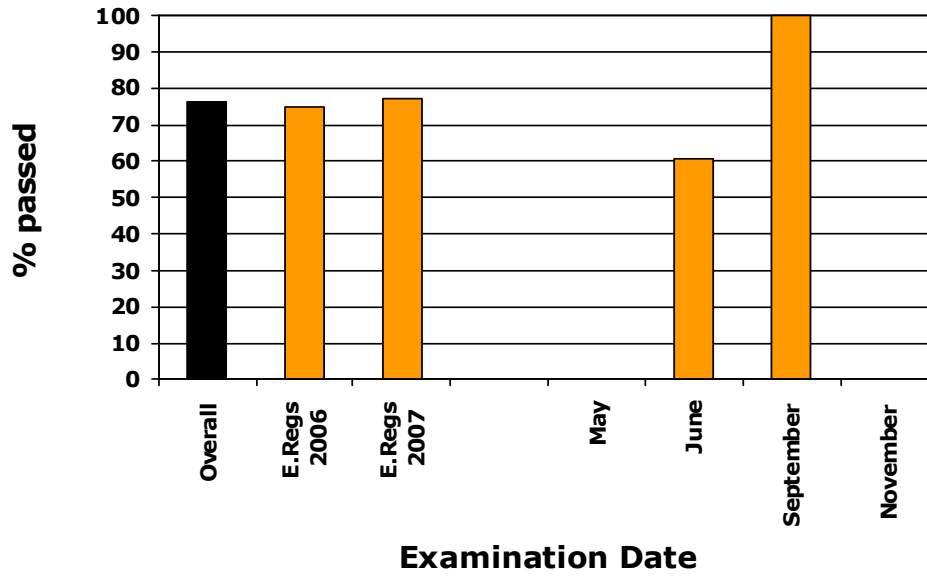
All candidates

Average pass mark 81%
 Median mark 82

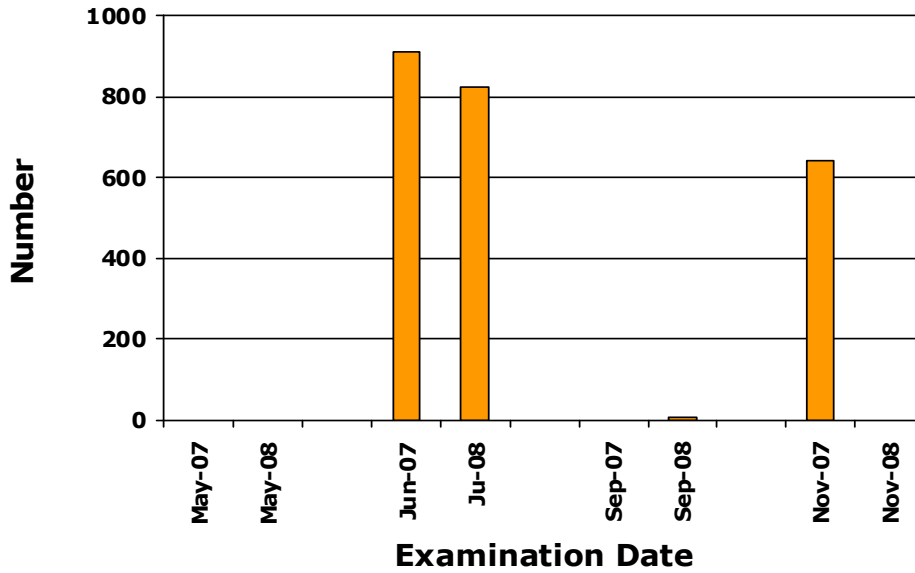
Those who passed

Average pass mark %
 Median mark

2008 PASS RATES - ELECTRICIAN REGULATIONS



2008 CANDIDATE NUMBERS - ELECTRICIAN REGULATIONS



Mark Ranges

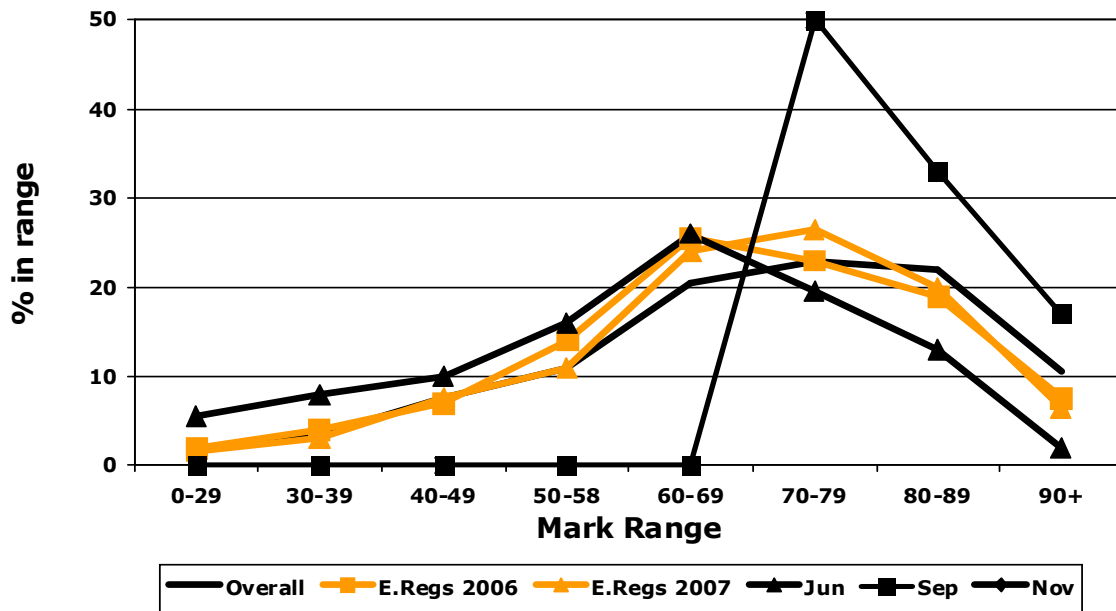
Number of candidates

Range	ER 33				September 2008	
90 - 100	1				1	candidates
80 - 89	2				2	candidates
70 - 79	3				3	candidates
60 - 69	0				0	candidates
50 - 58	0				0	candidates
40 - 49	0				0	candidates
30 - 39	0				0	candidates
0 - 29	0				0	candidates
	6				6	

% of candidates

Range	ER 33				September 2008	
90 - 100	17				17	% of candidates
80 - 89	33				33	% of candidates
70 - 79	50				50	% of candidates
60 - 69	0				0	% of candidates
50 - 58	0				0	% of candidates
40 - 49	0				0	% of candidates
30 - 39	0				0	% of candidates
0 - 29	0				0	% of candidates

2008 MARK RANGE - ELECTRICIAN REGULATIONS



Appendix 4

Electrician Theory

The was no Electrician Theory Examination in this examination round

Appendix 5

Electrical Inspector

20 and 21 June 2007

The was no Electrical Inspector Examination in this examination round

Appendix 6

Tradesperson Electrical Work Certificate

20 and 27 September 2008

TEWC 148, a moderated paper, was used for the plumbers and gasfitters examination of 20 September 2008.

- Parts 1 and 2 (questions 1-9) are completed by plumbers.
- Parts 1 and 3 (questions 1-4 and 10-14) are completed by gasfitters.

Plumber/gasfitters complete TEWC 148A which comprised questions 1 to 4, and 6, 7, 8, 10 and 14 of TEWC 148.

TEWC 149, a moderated paper, was used for the plumbers and gasfitters examination of 27 September 2008.

- Parts 1 and 2 (questions 1-9) are completed by plumbers.
- Parts 1 and 3 (questions 1-4 and 10-14) are completed by gasfitters.

Plumber/gasfitters complete TEWC 149A which comprised questions 1 to 4, and 6 to 10 of TEWC 149.

A3.1 - Overall Candidate Performance

	Number candidates	of	Number candidates passed	of who	Percentage passed
TEWC 148	2		2		100
TEWC 148	6		5		83
September 2008	8		7		87.5

Mark Ranges

Number of candidates

Range	TEWC 148	TEWC 149			September 2008	
90 – 100	2	0			2	candidates
80 – 89	0	0			0	candidates
70 – 79	0	2			2	candidates
60 – 69	0	3			3	candidates
50 – 58	0	0			0	candidates
40 – 49	0	0			0	candidates
30 – 39	0	1			1	candidates
0 – 29	0	0			0	candidates
	2	6			8	

% of candidates

Range	TEWC 148	TEWC 149			September 2008	
90 – 100	100	0			25	% of candidates
80 – 89	0	0			0	% of candidates
70 – 79	0	33			25	% of candidates
60 – 69	0	50			37.5	% of candidates
50 – 58	0	0			0	% of candidates
40 – 49	0	17			12.5	% of candidates
30 – 39	0	0			0	% of candidates
0 – 29	0	0			0	% of candidates

A6.1 - Moderation

Two moderators were used for TEWC 148 and TEWC 149.

Both papers were moderated by secure email. A teleconference with the moderators was held on 29 May. Both papers were "parallel" papers. The same topic (albeit different questions) was covered in the same numbered question in both papers. The content of both papers was considered reasonable in terms of content and time. Both papers presented a similar degree of difficulty.

A6.2. - Marking

Two markers were used for TEWC 148 and TEWC 149.

A teleconference was held with the markers on 29 September.

A6.3.1 - Amendments to TEWC 148

The significant amendments to TEWC 148 arising from the moderation and marking were as follows:			
No.	Question (Moderation)	Answer (Moderation)	Answer (Marking)
1(b)	Editorial amendment	Answers as per regulations inserted	-
	-	-	Additional option added
1(h)	Editorial amendment	-	-
3	Rewritten to make intention clearer	Amended accordingly	-
4	Rewritten to make intention clearer	Amended accordingly	-
4(a)(ii)	-	-	Amended to be more accurate
5(a)(i)	-	Two additional options added	-
6(a)	Editorial amendment	-	-
6(a)(ii)	-	Editorial amendment	-
6(b)	-	Marks allocated across answers	Additional option added
7(b)	-	Rewritten to be more accurate	-
8(a)(i)	-	Additional option added	-
8(a)(ii)	-	Additional option added	-
8(a)(iii)	-	Additional option added	-
9(b)(i)	-	Rewritten to be more accurate	-
9(b)(ii)	Rewritten to make intention clearer	-	-
9(b)(iii)	-	Rewritten to be more accurate	-
10(a)	-	Two additional options added	-
10(b)	-	Additional option added	-
10(c)	Rewritten to make intention clearer	-	-
10(d)	Rewritten to make intention clearer	Additional option added	-
11(a)	Editorial amendment	-	-
11(a)(ii)	-	Editorial amendment	-
11(b)	-	Marks allocated across answers	-
12(b)	-	Rewritten to be more accurate	-
13(a)(i)	-	Additional option added	-
13(a)(ii)	-	Additional option added	-
13(a)(iii)	-	Additional option added	-

A6.3.2 - Amendments to TEWC 149

The significant amendments to TEWC 149 arising from the moderation and marking were as follows:			
No.	Question (Moderation)	Answer (Moderation)	Answer (Marking)
1(a)	-	Two additional options added	-
1(d)	-	Additional option added	-
1(f)	Rewritten to make intention clearer	1 st bullet point amended to be more accurate	-
1(h)	Editorial amendment	Amended to be more accurate	-
1(i)	Editorial amendment	-	-
1(j)	Rewritten to make intention clearer	Amended accordingly	-
2(a)	Amended to make intention clearer	-	-
2(b)	-	Answers corrected	-
2(c)	-	Answers corrected	-
3	Rewritten to make intention clearer	Amended accordingly	-
4(a)	Editorial amendment	-	-
4(b)	Editorial amendment	Additional option added	-
5(c)	Rewritten to make intention clearer	Amended accordingly	-
6(a)(ii)	-	Additional option added	-
7(a)	Editorial amendment	-	-
7(d)	Rewritten to make intention clearer	Amended accordingly	-
8	Preamble rewritten to make intention clearer	-	-
8(a)	-	3 rd bullet point amended to be more accurate	-
8(c)	Editorial amendment	-	-
9(b)(i)	Rewritten to make intention clearer	-	-
10	Rewritten to make intention clearer	Amended accordingly	-
11(a)(ii)	-	Additional option added	-
12(a)	Editorial amendment	-	-
12(d)	Rewritten to make intention clearer	Amended accordingly	-

The significant amendments to TEWC 149 arising from the moderation and marking were as follows:			
No.	Question (Moderation)	Answer (Moderation)	Answer (Marking)
13	Preamble rewritten to make intention clearer	-	-
13(a)	-	3 rd bullet point amended to be more accurate	-
13(c)	Editorial amendment	-	-
14(b)(i)	Rewritten to make intention clearer	-	-

Appendix 7
Electronic Security
20 September 2008

ES 16, a moderated paper, was used for this examination.

A7.1 - Moderation

Two moderators were used for ES 16.

ES 16 was moderated by secure email.

A7.2. - Marking

Comments

No candidate sat this examination.

A7.3 - Amendments to ES 16

The significant amendments to ES 16 arising from the moderation and marking were as follows:			
No.	Question (Moderation)	Answer (Moderation)	Answer (Marking)
1(e)	Replaced with a more topical question	Amended accordingly	-
2(a)	Amended to be more topical	Amended to be more accurate	-
2(c)	Editorial amendment	-	-
2(d)	Editorial amendment	-	-
3(b)	Replaced with a more topical question	Amended accordingly	-
8(a)	Rewritten to make intention clearer		-
9(b)	-	3 rd bullet point amended to be more accurate	-
10(e)	-	Additional option added	-
10(f)	Rewritten to make intention clearer	-	-
