



ELECTRICAL WORKERS REGISTRATION BOARD

SUMMARY OF

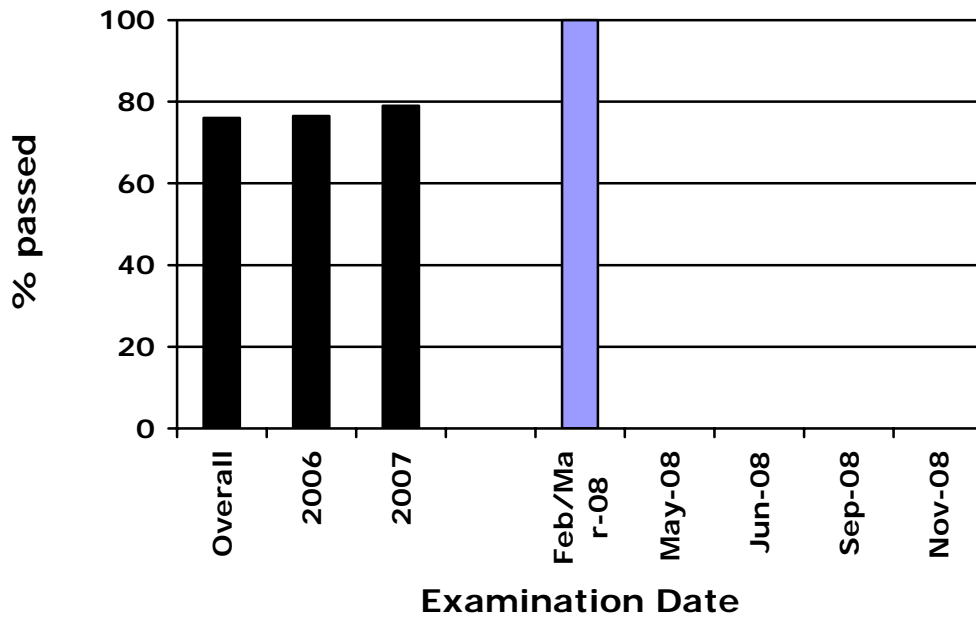
FEBRUARY/MARCH 2008 EXAMINATION ROUND

John Sickels
Registrar

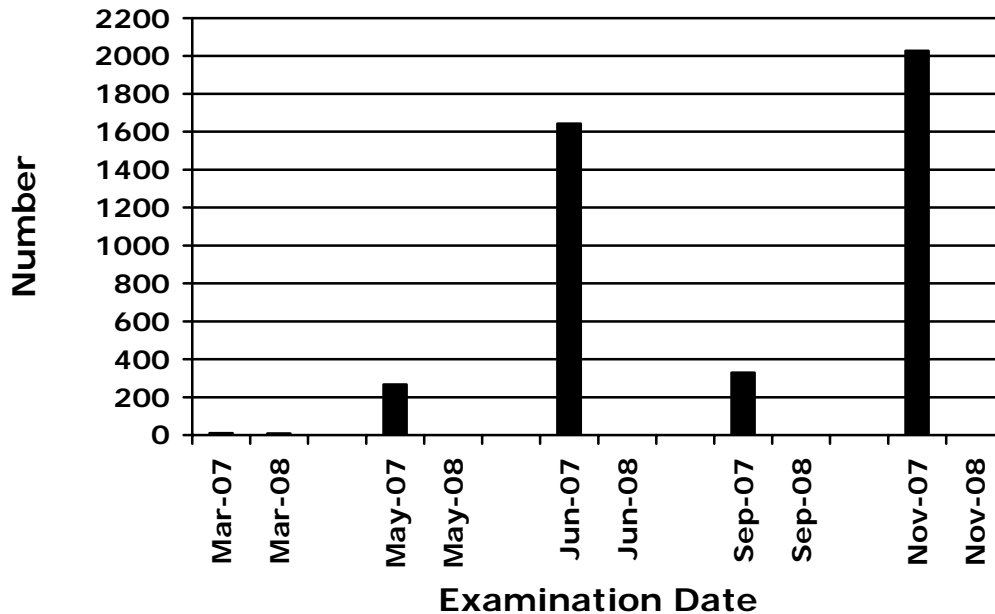
1. Summary of Examinations

	Number of candidates	Number of candidates passed	Percentage passed
ESTA	8	8	100
ESTB	7	7	100
Elec. Regulations	0	0	0
Elec. Theory	0	0	0
Elec. Inspector	0	0	0
TEWC	0	0	0
E Security	0	0	0
Feb/Mar 2008	15	15	100

2008 - PASS RATES - OVERALL



2008 - CANDIDATE NUMBERS - OVERALL



Mark Ranges

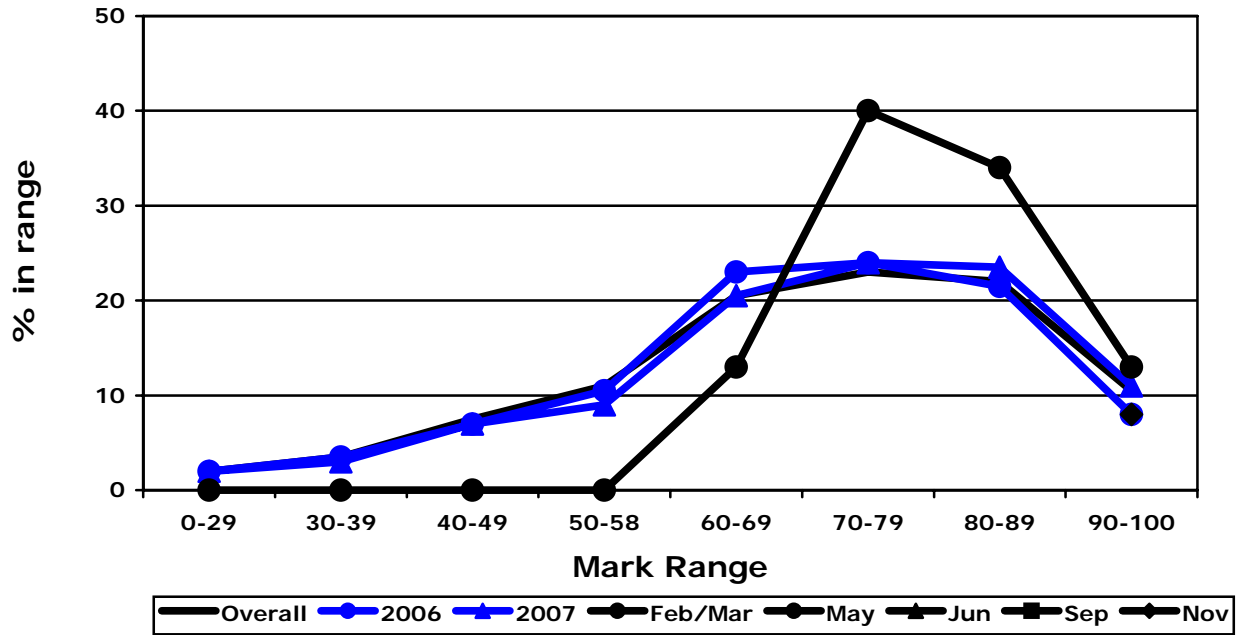
Number of candidates

Range	ESTA	ESTB	ER	ET	EI	TEWC	ES	Feb/Mar 2008	
90 – 100	2	0						2	candidates
80 – 89	3	2						5	candidates
70 – 79	2	4						6	candidates
60 – 69	1	1						2	candidates
50 – 58	0	0						0	candidates
40 – 49	0	0						0	candidates
30 – 39	0	0						0	candidates
0 – 29	0	0						0	candidates
	8	7						15	

% of candidates

Range	ESTA	ESTB	ER	ET	EI	TEWC	ES	Feb/Mar 2008	
90 – 100	25	0						13%	of candidates
80 – 89	37.5	28.5						34%	of candidates
70 – 79	25	57						40%	of candidates
60 – 69	12.5	14.5						13%	of candidates
50 – 58	0	0						0%	of candidates
40 – 49	0	0						0%	of candidates
30 – 39	0	0						0%	of candidates
0 – 29	0	0						0%	of candidates

2008 MARK RANGE - OVERALL



2. General Comments

The fact that all candidates passed the examinations is a tribute to the training and experience provided by the RNZAF. Apart from one question in the Electrical Service Technician B Examination, candidates did very well in all questions.

3. Moderation

The moderation went well with all moderators having valuable input into the examination papers. Both papers were moderated by secure email.

In this examination round, moderators were requested to look closely at the structure of questions that comprised a preamble and several parts containing the actual questions. The objective was to ensure that, wherever possible, all information relating to a question was contained in that part rather than the preamble.

4. Marking

There were no problems with the marking.

5. Electrical Service Technician A

The candidates for this examination were well prepared. No candidate knew that practising licences were issued for only one year by the Electrical Workers Registration Board. They all responded that the licence could be issued for a maximum of 5 years under the Electricity Act.

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

6. Electrical Service Technician B

Again, the candidates for this examination were well prepared. All candidates, bar one, had difficulty with question 9 – fault location. This was because they used the technique of repeatedly replacing a fuse to locate a fault – which is hazardous. Only one candidate gained more than 7.5 marks for this question, while three candidates gained less than five.

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

7. Electrician Regulations

There was no Electrician Regulations examination in this round.

8. Electrician Theory

There was no Electrician Theory examination in this round.

9. Electrical Inspector

There was no Electrical Inspector examination in this round.

10. Tradespersons Electrical Work Certificate

There was no Tradesperson Electrical Work Certificate examination in this round.

11. Electronic Security Alarm Installer

There was no Electronic Security Alarm Installer examination in this round.

Appendix 1

Electrical Service Technician A

14 March 2008

ESTA 1036, a moderated paper, was used for the examination of 14 March 2008.

A1.1 - Overall Candidate Performance

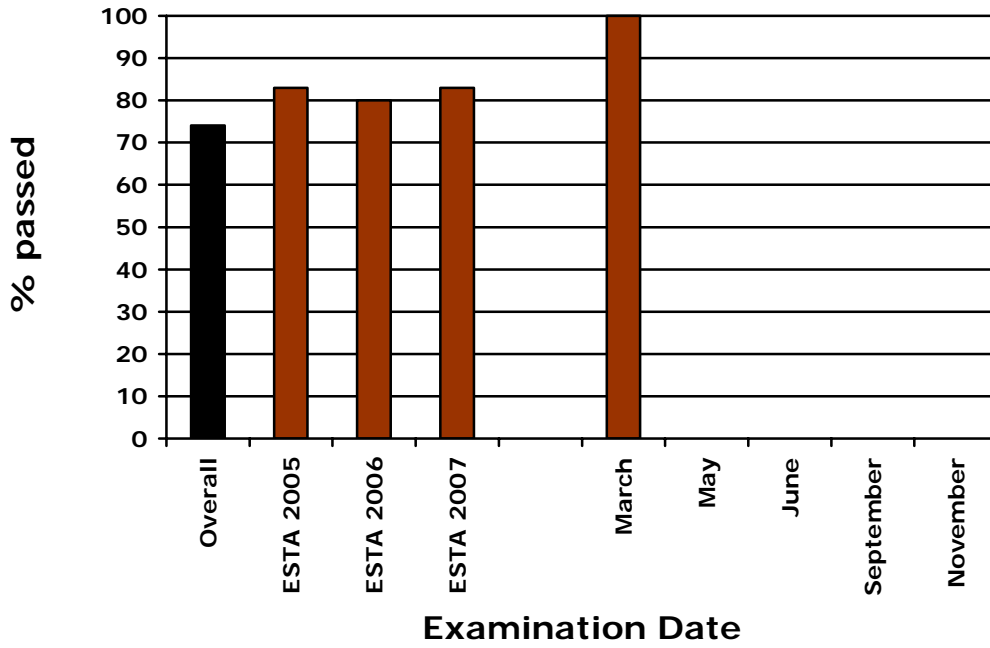
	Number candidates	of	Number candidates passed	of who	Percentage passed
ESTA 1036	8		8		100
March 2008	8		8		100

Candidate performance – ESTA 1036

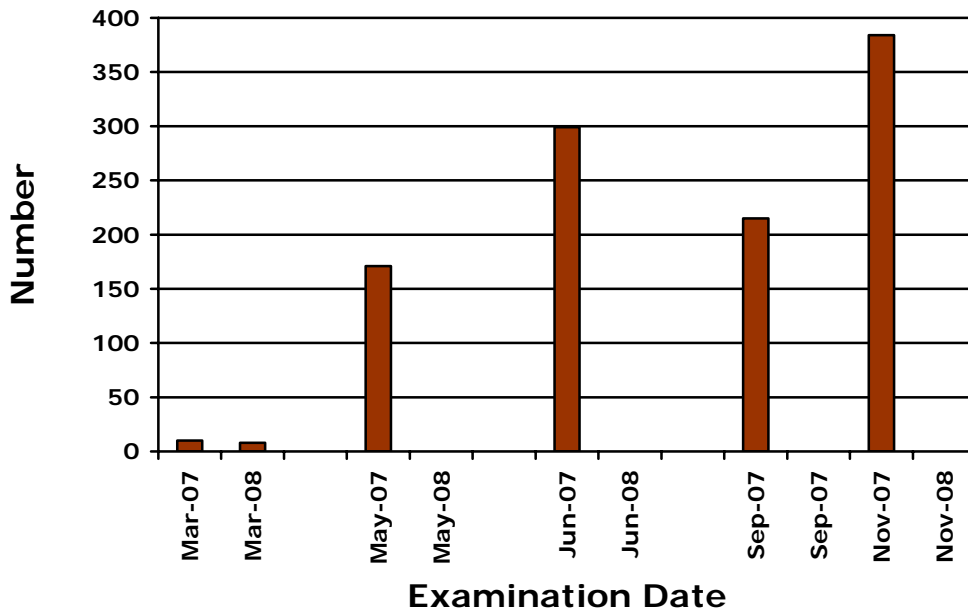
<u>Candidates</u>	<u>Candidates Passed</u>	<u>All candidates</u>	
8	8	Average pass mark	83 %
		Median mark	85
	100%	<u>Those who passed</u>	
		Average pass mark	%
		Median mark	

2 Candidates gained 95 or more marks.

2008 PASS RATES - ESTA



2008 - CANDIDATE NUMBERS - ESTA



Mark Ranges

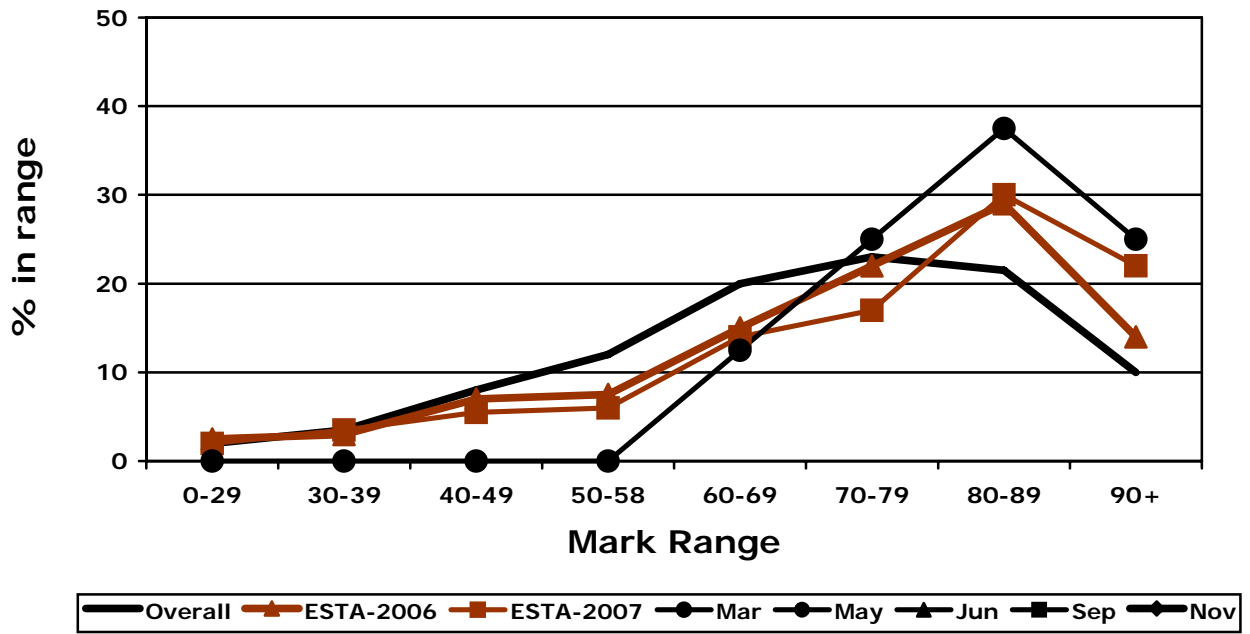
Number of candidates

Range	ESTA 1036					March 2008	
90 – 100	2					2	candidates
80 – 89	3					3	candidates
70 – 79	2					2	candidates
60 – 69	1					1	candidates
50 – 58	0					0	candidates
40 – 49	0					0	candidates
30 – 39	0					0	candidates
0 – 29	0					0	candidates
	8					8	

% of candidates

Range	ESTA 1036					March 2008	
90 – 100	25					25%	of candidates
80 – 89	37.5					37.5%	of candidates
70 – 79	25					25%	of candidates
60 – 69	12.5					12.5%	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 - ESTA



A1.2 - Overall Marking Analysis- ESTA 1036

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.

	Topic No.	Topic	Year	Q.No.	Subject	75-100% (%)	50 – 70% (%)	0 – 45% (%)
Q 1	-	10, 2 mark questions				87.5	12.5	0
Q 2	K4.46	<u>Testing and inspection methods</u>			IR testing and earth leakage testing, IR testing and avoid damage to semiconductor devices, IR test of concrete mixer	75	25	0
			Sep 2006	6	IR test not damage semi-conductors, IR test on concrete mixer, IR test on appliance with MOV surge protection	47.5	35	17.5
			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

	Topic No.	Topic	Year	Q.No.	Subject	75-100% (%)	50 – 70% (%)	0 – 45% (%)
Q 3	P2.13 P3.13	<u>Legislation</u> Registration <u>Legislation</u> Practising licences			Name of licence, date of expiry, where application made. Three classes of worker can do PEW. Refresher courses	87.5	12.5	0
			Sep 2007	8	Name of licence, date of expiry, where application made. Three classes of worker can do PEW. Refresher courses	75	19	6
			Sep 2007	8	Name of licence, date of expiry, where application made. Three classes of worker can do PEW. Refresher courses	65.5	15.5	19
			Nov 2007	3	Name of licence, date of expiry, where application made. Three classes of worker can do PEW. Refresher courses	63	15	22

	Topic No.	Topic	Year	Q.No.	Subject	75-100% (%)	50 – 70% (%)	0 – 45% (%)
Q 4	H1b.28 H1c.31	<u>Protection and Control</u> RCD characteristics <u>Protection and Control</u> Selection of control and protection equipment			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
			May 2006	6	Explain RCD operation on fault, what is a PRCD. Under-rated and over-rated fuses, HRC advantages	61	23	16
			Jun 2006	8	Explain RCD operation on fault, what is a PRCD. HRC advantages, not bridging HRC fuses	35	36.5	28.5
			Jun 2007	2	How RCD operates on fault, meaning of PRCD, why not permitted to use fuse wire on HRC fuse	37	40	23
			Sep 2007	9	How RCD operates on fault, meaning of PRCD. Three disadvantages of rewirable fuses. Why not permitted to use fuse wire on HRC fuse	47	22	31
			Sep 2007	9	How RCD operates on fault, meaning of PRCD. Three disadvantages of rewirable fuses. Why not permitted to use fuse wire on HRC fuse	42.5	36	21.5
			Nov 2007	5	What thermal overload detects, HRC fuse characteristics, how RCD operates, define PRCD	57	24	19

	Topic No.	Topic	Year	Q.No.	Subject	75-100% (%)	50 – 70% (%)	0 – 45% (%)
Q 5	D1.12	<u>System theory</u> - 3 – phase systems			Name parts of sine wave, define Hertz. Danger if appliances used in earthed situation. PEC effect on safety, PEC testing	75	25	0
	D3.21	<u>System theory</u> - Earthing of installations fittings and appliances						
			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

	Topic No.	Topic	Year	Q.No.	Subject	75-100% (%)	50 – 70% (%)	0 – 45% (%)
Q 6	L1.40/54 L4.56	<u>Isolation Equipment and Personal safety</u> <u>Safe use of equipment</u>			Why recommend main switch turned off, cause of fault, isolating transformers, protective devices	62.5	25	12.5
			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
Q 7	H6.43	<u>Selection of fittings and Appliances</u>			Use of bayonet caps, microgap switches, specific inspections of plug and flexible cord and appliance	75	25	0
			Sep 2004	15	Use of bayonet caps, terminating ES lampholders, microgap switches	53	22.5	24.5
			Nov 2005	14	Use of bayonet caps, terminating ES lampholders, microgap switches	58	23	19

	Topic No.	Topic	Year	Q.No.	Subject	75-100% (%)	50 – 70% (%)	0 – 45% (%)
Q 8	H3d.41	<u>Cables and Cords</u> Specifications			Effect of cord would on drum. Measures to prevent cord failing, why voltage drops in cord, current ratings	50	50	0
			Sep 2007	2	Core & colour coding of cords, cord wound on drum	93	5	2
			Sep 2007	7	Fitting plug to flexible cord. Appliance controlled by thermostat, What makes simmerstat and thermostat operate	56	38	6
			Nov 2007	8	Effect of cord would on drum, why voltage drops in cord, current ratings	56	27	17

	Topic No.	Topic	Year	Q.No.	Subject	75-100% (%)	50 – 70% (%)	0 – 45% (%)
Q 9	H10.66	<u>Fault diagnosis</u>			Situation that cause transpositions. Faulty washing machine, calculate fault current, whether fuse will blow.	75	12.5	12.5
			May 2007	2	Effect of transposition of neutral. Faulty washing machine - calculate current and power in PEC and whether fuse would blow	73	12	15
			Jun 2007	3	Faulty heater, calculate current and shock voltage, explain danger to user, effect of transposition	41.5	40	18.5
			Jun 2007	3	Faulty dishwasher, calculate current and power in PEC and whether fuse would operate, effect of transpositions	64	22.5	13.5
			Sep 2007	3	Faulty vacuum cleaner. Calculate fault current, whether fuse will blow, power dissipated.	50	34	16
			Sep 2007	3	Faulty heater. Draw circuit diagram, calculate fault current, whether fuse will blow. Phase, neutral transpositions.	56.5	20.5	23
			Nov 2007	4	Faulty heater. Calculate fault current, whether fuse will blow, power dissipated. Phase, neutral transpositions.	62.5	16	21.5

A1.3 - Moderation

Three moderators were used for ESTA 1036.

ESTA 1036 was moderated by secure email. A teleconference with the moderators was held on 7 February

A1.4 - Marking

One marker was used for ESTA 1036.

A1.5 - Amendments to ESTA 1036

The significant amendments to <u>ESTA 1036</u> arising from the moderation and marking were as follows:			
No.	Question (Moderation)	Answer (Moderation)	Answer (Marking)
1(h)	-	Amended to align with correct choice in the question	
1(j)	-	Amended to align with correct choice in the question	
2(a)(iv)	Editorial amendment	-	
2(b)	Words "insulation resistance test" underlined	Last bullet point deleted as not being relevant to question	
2(c)(i)	Marks added	Editorial amendment	
2(c)(ii)	-	Editorial amendment	
2(c)(iii)	-	-	
3(a)(iii)	-	Additional option added	
4(a)	-	Last bullet point amended to be more accurate.	
4(b)	-	Additional option added	
5(a)	Reference to "50 Hz" added	-	
5(a)(ii)	-	Additional option added	
6(a)(i)	-	Additional option added	
6(b)	Rewritten to make intention clearer	-	
6(c)	-	Additional option added	
7(a)(i)	Amended to include reference to "visual checks" rather than "checks"	-	
7(a)(ii)	Amended to include reference to "visual checks" rather than "checks"	-	
8(a)(i)	Rewritten to make intention clearer	-	
8(b)	Rewritten to make intention clearer	-	

Appendix 2

Electrical Service Technician B

22 February 2008

ESTB 2026, a moderated paper, was used for the examination of 22 February 2008.

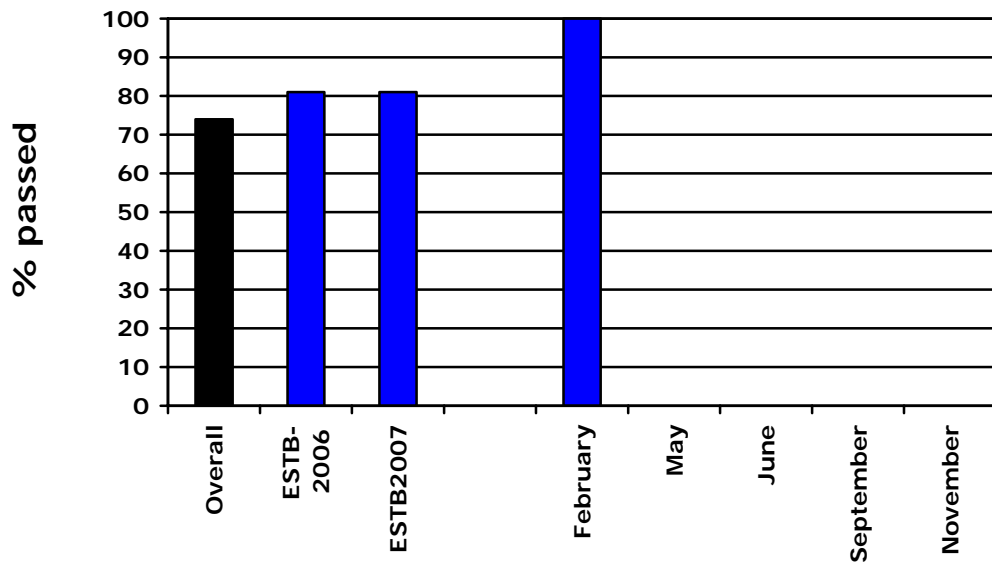
A2.1 - Overall Candidate Performance

	Number candidates	of	Number candidates passed	of who	Percentage passed
ESTB 2026	7		7		100
February 2008	7		7		100

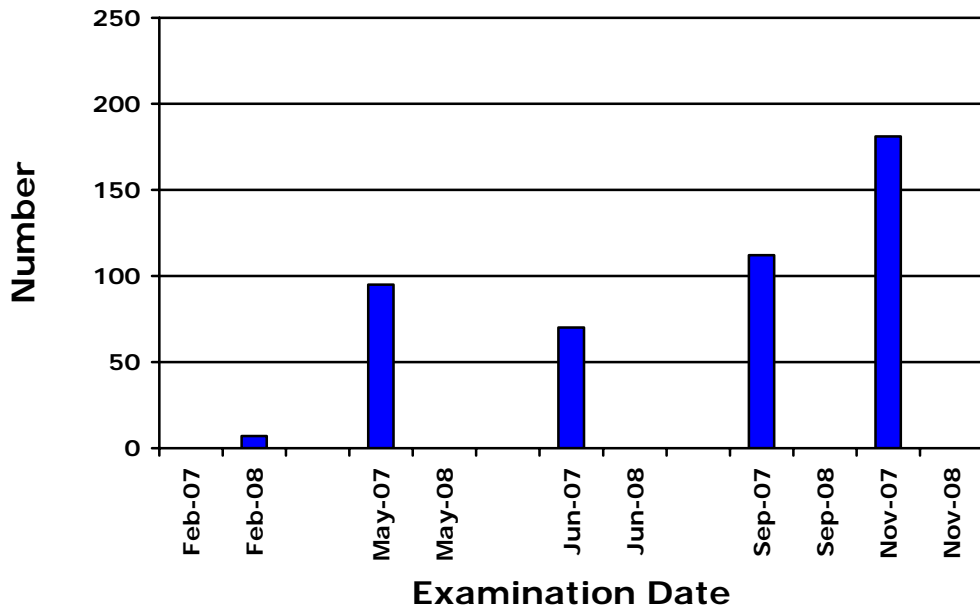
Candidate performance – ESTB 2026

<u>Candidates</u>	<u>Candidates Passed</u>	<u>All candidates</u>	
7	7	Average pass mark	75.5%
		Median mark	77.5
	100%	<u>Those who passed</u>	
		Average pass mark	%
		Median mark	

2008 PASS RATES - ESTB



2008 CANDIDATE NUMBERS - ESTB



Mark Ranges

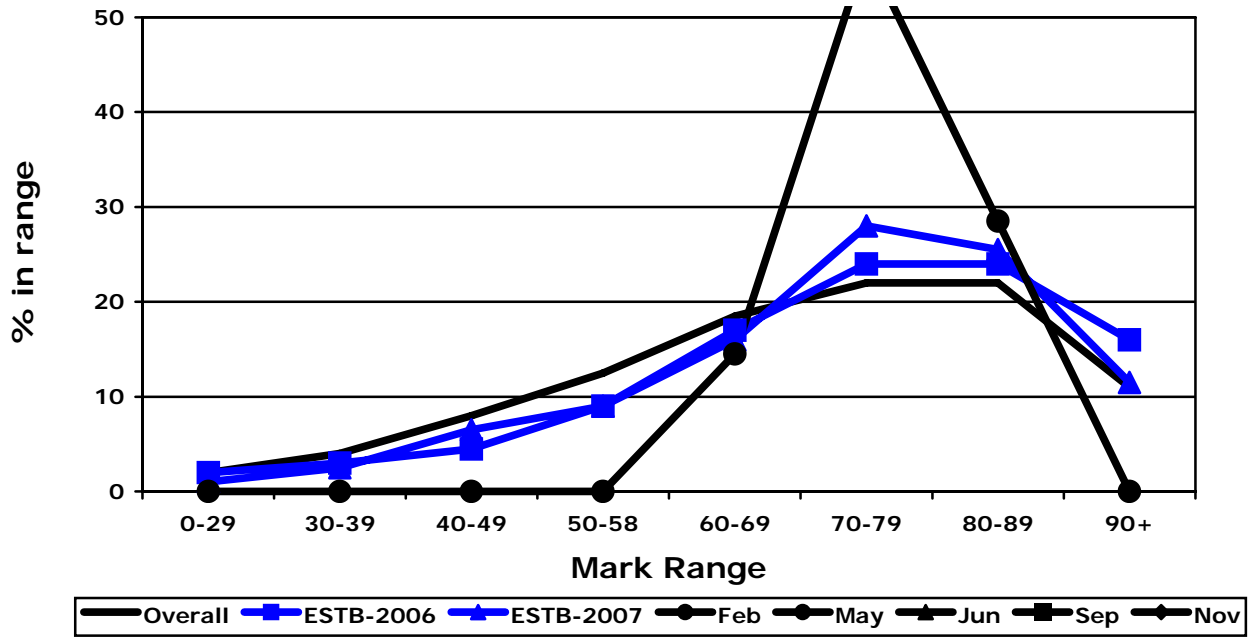
Number of candidates

Range	ESTB 2026			February 2008	
90 – 100	0			0	candidates
80 – 89	2			2	candidates
70 – 79	4			4	candidates
60 – 69	1			1	candidates
50 – 58	0			0	candidates
40 – 49	0			0	candidates
30 – 39	0			0	candidates
0 – 29	0			0	candidates
	7			7	

% of candidates

Range	ESTB 2026			February 2008	
90 – 100	0			0%	of candidates
80 – 89	28.5			28.5%	of candidates
70 – 79	57			57%	of candidates
60 – 69	14.5			14.5%	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 - 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.

	Topic No.	Topic	Year	Q.No.	Subject	75-100% (%)	50 – 70% (%)	0 – 45% (%)
Q 1	-	10, 2 mark questions				72	28	0
Q 2	E4.18	<u>3ph- Motor/Alternators</u> Fault diagnosis			Two causes for faults – sustained overcurrent, overheating motor faulty starter, motor not starting. Reason for using reduced voltage starters	14	72	14
			Jun 2005	7	Faults on motors and starters	42	43	15
			Jun 2006	8	Faults on motors and starters	24.5	37	38.5
			June 2007	8	Purpose of phase failure relay, fault diagnosis, drawing terminal connections	58	32	10
			Sep 2007	2	Two conditions that would cause overload, two causes for faults, reason for using reduced voltage starters	31.5	42.5	26
			Nov 2007	6	Draw and label circuit diagram of 230V motor control circuit, finding motor winding, connecting motor	60.5	25	14.5

	Topic No.	Topic	Year	Q.No.	Subject	75-100% (%)	50 – 70% (%)	0 – 45% (%)
Q 3	L1.40/54	<u>Isolation</u> Equipment and Personal safety			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
			May 2005	7	4 safety precautions when disconnecting appliance, isolation and switching off, continued isolation	60	15	25
			Sep 2006	7	Additional precautions to secure isolation, switching off and isolating, explain prove-test-prove method, PPE	71	21	8
			Sep 2007	3	Four precautions after disconnecting an appliance, why prove-test-prove is used, fours way of ensuring continued isolation	15	65	20
			Sep 2007	3	Why prove-test-prove is used and how it is carried out, difference between switching off and isolation fours 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

	Topic No.	Topic	Year	Q.No.	Subject	75-100% (%)	50 – 70% (%)	0 – 45% (%)
Q4	H3d.41	<u>Cables and Cords Specifications</u>			Flexible cords - four factors when selecting, volt drop and reducing the effect of voltage drop, colour coding	57	43	0
			May 2005	3	Colour coding of conductors, factors in cord selection, plug polarity	27	46	27
			Sep 2005	3	Colour coding of conductors, factors in cord selection	75	22	3
			Sep 2006	2	Flexible cords - selection, colour coding, volt drop, current rating.	81	17	2
			May 2007	9	Factors in selecting cord, colour coding, volt drop in cords, current rating of cords	75	20	5
			Sep 2007	6	Four physical factors when selecting cord, why voltage less and load end of cord, define current rating of cord, colours coding for three-phase cord.	80	20	0
			Sep 2007	6	Six factors when selecting cord, colour coding of single phase cord. Two ways of identifying double insulated appliance	83	14	3
			Nov 2007	7	Flexible cords - volt drop, reduce effect of volt drop, colour coding	69	26	5

	Topic No.	Topic	Year	Q.No.	Subject	75-100% (%)	50 – 70% (%)	0 – 45% (%)
Q 5	H1a.27	Protection and Control Protection characteristics			Current rating of fuses, why fuses blow, characteristics of protection devices, rewirable fuses, operation of thermal type MCB	100	0	0
			Sep 2004	8	Effect on circuit of using over-rated and under-rated fuses and relays, HRC back-up protection, fuse wire in tortuous path	51.5	32	16.5
			May 2005	6	Effect on circuit of using over-rated and under-rated fuses and relays. Describe operation of the 3 types of MCB	60	15	25
			May 2006	9	Term "current rating, over and under rated fuses, how HRC fuses give back-up protection, how RCD works	63	28.5	8.5
			Jun 2006	4	Purpose of fuse, MCB, RCD on switchboard, operation of magnetic/thermal RCD, current ratings, phase failure relays	33.5	41	25.5
			Jun 2007	3	Current rating of fuse, over-rated and under-rated fuses, use of phase failure and phase reversal relays, reloading rewirable fuses	90.5	6.5	3
			Jun 2007	9	How RCD operates when there is no fault and when there is a fault, why tested, operating times of RCDs	61	26	13

	Topic No.	Topic	Year	Q.No.	Subject	75-100% (%)	50 – 70% (%)	0 – 45% (%)
Q 6	K2.38	<u>Statutory testing and inspection requirements</u>			Testing to AS/NZS 3760, inspections and tests. Polarity testing	72	28	0
			Mar 2004	9	Testing to AS/NZS 3760	83	8	9
			May 2005	9	Testing to AS/NZS 3760	81	15	4
			Jun 2005	4	Testing to AS/NZS 3760	88	10	2
			Nov 2005	7	Testing to AS/NZS 3760	76.5	5.5	18
			Nov 2006	5	Testing to AS/NZS 3760, polarity	84	13	3
			Jun 2007	4	Testing to AS/NZS 3760, visual checks	81.5	8	10.5
			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

	Topic No.	Topic	Year	Q.No.	Subject	75-100% (%)	50 – 70% (%)	0 – 45% (%)
Q 7	D4.22	<u>System theory</u> - MEN systems			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
			Nov 2005	10	Reasons for earthing MEN system, purpose of neutral, circuit with no neutral	39.5	30.5	30
			Jun 2006	6	System voltages, reasons for earthing MEN system, purpose of neutral, circuit with no neutral, switching of active	33.5	42.5	24
			Sep 2006	8	Why MEN system multiple earthed, why neutral in unbalanced 3 phase load, situation where neutral not required, purpose of PEC conductor, appliances not to be earthed	65	25	10
			May 2007	2	System voltages, circuit with no neutral, MEN systems, frequency and voltage	68.5	23	8.5
			June 2007	7	Define term MEN system, why neutral is required or not required on some 3 phase loads, requirements for switching active	42	37	21
			June 2007	7	Define term MEN system, why system is multiple earthed, sketch and label system diagram	61	39	0

	Topic No.	Topic	Year	Q.No.	Subject	75-100% (%)	50 – 70% (%)	0 – 45% (%)
Q 8	K4.46	<u>Testing and inspection methods</u>			Connecting ammeter in parallel and voltmeter in series, carrying out IR test.	58	28	14
			Jun 2005	9	Insulation resistance testing of single phase machine, other tests and checks	71	21	8
			Nov 2005	8	Insulation resistance testing of 3 phase motor with thermistors	49	25	26
			May 2006	5	Insulation resistance testing of 3 phase motor, test to confirm integrity of PEC	84	14.5	1.5
			Jun 2006	7	Insulation resistance testing of 3 phase motor, test to confirm integrity of PEC	45	39	16
			Jun 2006	9	Why voltmeter should not be connected in series, Why ammeter should not be connected in parallel, safety precautions when testing	28	39	33
			May 2007	5	Effect of connecting voltmeter in series, and ammeter in parallel, safety precautions when testing	43	28.5	28.5
			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

	Topic No.	Topic	Year	Q.No.	Subject	75-100% (%)	50 – 70% (%)	0 – 45% (%)
Q 9	H10.66	<u>Fault diagnosis</u>			Fuse blows on circuit supply appliances. How to locate fault and remedial action	14	43	43
			Sep 2004	10	Locate fault on MCB circuit supplying appliances	48	26	26
			Nov 2004	8	Locate fault on circuit supplying appliances – HRC blows when supply restored	38	39	23
			Nov 2005	4	Locate fault on MCB circuit supplying appliances	48	34	18
			Nov 2007	5	Locate fault on MCB circuit supplying appliances, describe remedial action for each fault	42	36	22

A2.3 - Moderation

Three moderators were used for ESTB 2026.

ESTB 2026 was moderated by secure email. A teleconference with the moderators was held on 7 February

A2.4 - Marking

One marker was used for ESTB 2026.

A2.5 - Amendments to ESTB 2026

The significant amendments to <u>ESTB 2026</u> arising from the moderation and marking were as follows:			
No.	Question (Moderation)	Answer (Moderation)	Answer (Marking)
1(a)	-	Marks allocated	-
1(b)(i)	Editorial amendment	-	-
1(d)	-	Additional option added	2 nd bullet point deleted as not being relevant to question
1(g)	-	-	Additional option added
1(h)	-	Rewritten to make options clearer	-
1(j)	Rewritten to make intention clearer	3 rd bullet point deleted as being not relevant to question	-
2(b)(i)	Additional information added to make intention clearer	Editorial amendment	Additional option added
2(b)(ii)	-	1 st , 2 nd and 4 th bullet points deleted as being not relevant to question Additional option added	-
2(b)(iii)	-	Additional option added	-
3(d)	-	Additional option added	-
4(a)	-	5 th bullet point amended	-
5(b)(ii)	-	Editorial amendment	-
6(c)	-	Correct answer inserted	-
8(a)	Rewritten to make more topical	-	-