Level 3 Test and Measurement (7267-524)

e-Quals
Assignment guide for Candidates
Assignment A

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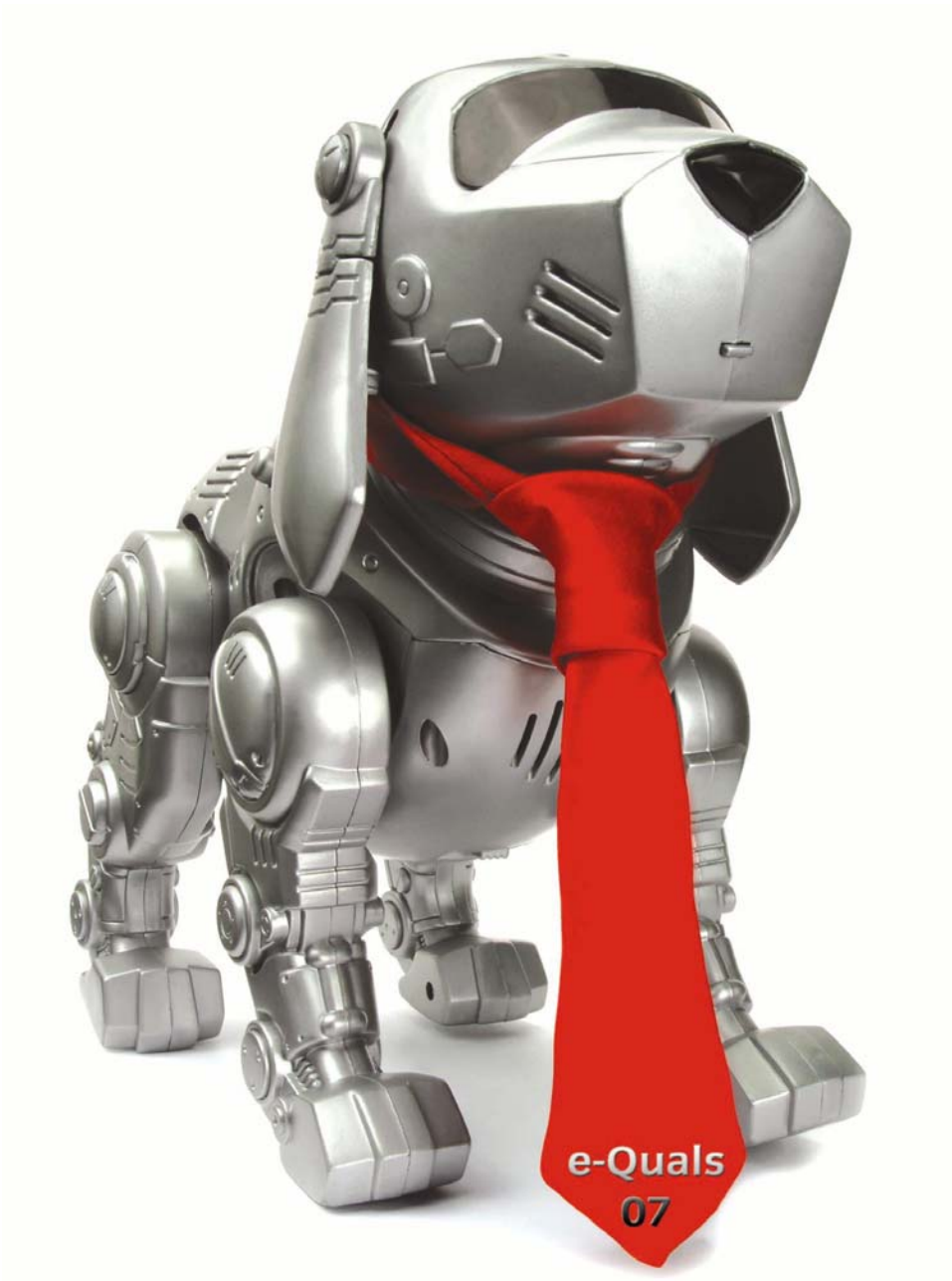

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Level 3 Test and Measurement (7267-524) Assignment A

Introduction – Information for Candidates

About this document

This assignment comprises all of the assessment for Level 3 Test and Measurement (7267-524).

Health and safety

You are asked to consider the importance of safe working practices at all times.

You are responsible for maintaining the safety of others as well as your own. Anyone behaving in an unsafe fashion will be stopped and a suitable warning given. You will **not** be allowed to continue with an assignment if you compromise any of the Health and Safety requirements. This may seem rather strict but, apart from the potentially unpleasant consequences, you must acquire the habits required for the workplace.

Time allowance

The recommended time allowance for this assignment is **3 hours**.

Level 3 Test and Measurement (7267-524)

Candidate instructions

Time allowance: 3 hours

Assignment set up:

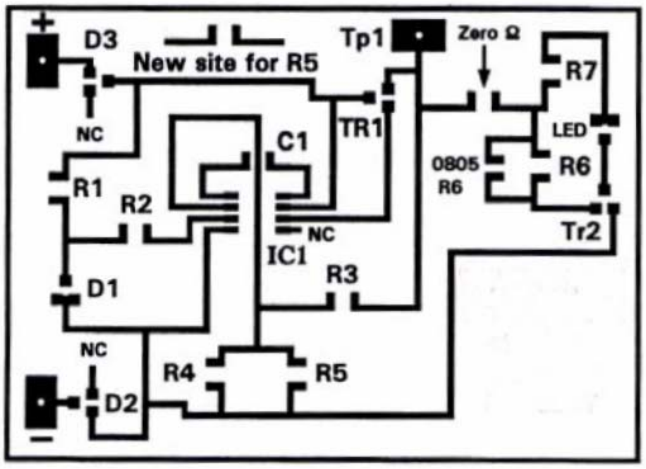
This assignment is made up of **four** tasks

- Task A – SMT component recognition and testing
- Task B – SMT measurements and board rework
- Task C – Basic electrical safety testing
- Task D – Multiple-choice questions

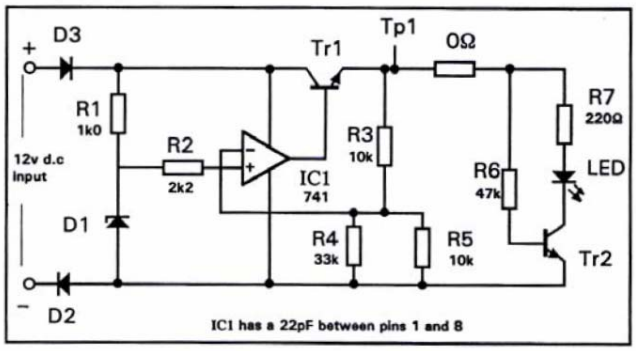
Task A – SMT component recognition and testing

You will be provided with a:

- surface mount board on which a number of components are mounted (diagrams shown below)
- some additional components
- digital test meter
- access to component reference data.



Warning:
This diagram is **not** drawn to scale.



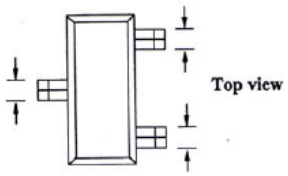
1 State the case type **and** device type for each of the following components on the supplied board:

- D1
- D2
- Tr1

2 Identify the 100nF capacitor from the additional components provided, and secure it to your answer sheet using tape.

3 With reference to the integrated circuit on the supplied board, state how the correct pin orientation is identified.

4 Below is shown the SO23 case outline for the red LED used on the board. Sketch this on your answer sheet and correctly label the terminals.



Task B – SMT measurements and board rework

You will be provided with a:

- surface mount board with mounted components
- hand tools and test equipment to carry out the tasks listed
- additional components:

Component	Value	Package code
Replacement resistor for R6	47k	0805
Print jumper (0Ω link)	0Ω	1206
Capacitor	22pF	0805
Capacitor	22pF	1206
Capacitor *	100nF	1206
Vero pins x 3	none	none

* This component will have been selected and removed in Task A.

1 List the tools and test equipment required to carry out Tasks B2 to B12.

2 Solder vero pins to each of the following points on the surface mount board:

- +
- –
- TP1.

3 Connect the circuit to a 12V d.c. supply. Measure and record the voltage at Tp1 with respect to the negative supply terminal. Disconnect the 12V supply.

4 De-solder R5 from the board and extract any surplus solder from the pads, leaving them ready to accept a new component if required.

5 Re-solder R5 in the position marked ‘New site for R5’.

6 Measure and record the resistance between the copper strips of the new site for R5.

7 Reconnect the supply, measure and record the voltage at Tp1. Disconnect the supply.

8 Solder the 0R print jumper (0Ω link) in the indicated position.

9 Reconnect the supply and check that the LED is lit, then take necessary measurements and calculate the current flowing through the LED. Show all your working. Disconnect the supply.

10 De-solder and remove R6.

11 Replace R6 with the additional resistor of the same value but different package coding (0805). The new resistor must be soldered onto the adjacent smaller pad.

12 Reconnect the supply, take necessary measurements and calculate the power dissipated by the new R6. Show your working. Disconnect the supply.

13 State with reasons whether the new R6 is a suitable replacement resistor.

Task C – Basic electrical safety testing

You will be provided with **two** portable appliances which you must test with regard to mains safety with the necessary test equipment.

1 The following symbol is shown on a portable electrical appliance. State the meaning of the symbol and how protection is achieved against electric shock.

2 Using appropriate test equipment, carry out safety tests on **two** portable appliances and complete a report form for each.

Task D – Multiple-choice questions

Your assessor will now give you a multiple-choice answer sheet containing **10** multiple-choice questions. Answer **all** of the questions and hand your answer sheet back to your assessor.

When you have finished working:

- Sign each document above your name and label all removable storage media with your name.
- Hand all paperwork and removable storage media to your assessor.

If the assignment is taken over more than one period, all paperwork and removable media must be returned to the test supervisor at the end of each sitting.

End of assignment

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