Level 2 Electronic Systems (7267-424)

e-Quals
Assignment guide for Candidates
Assignment A

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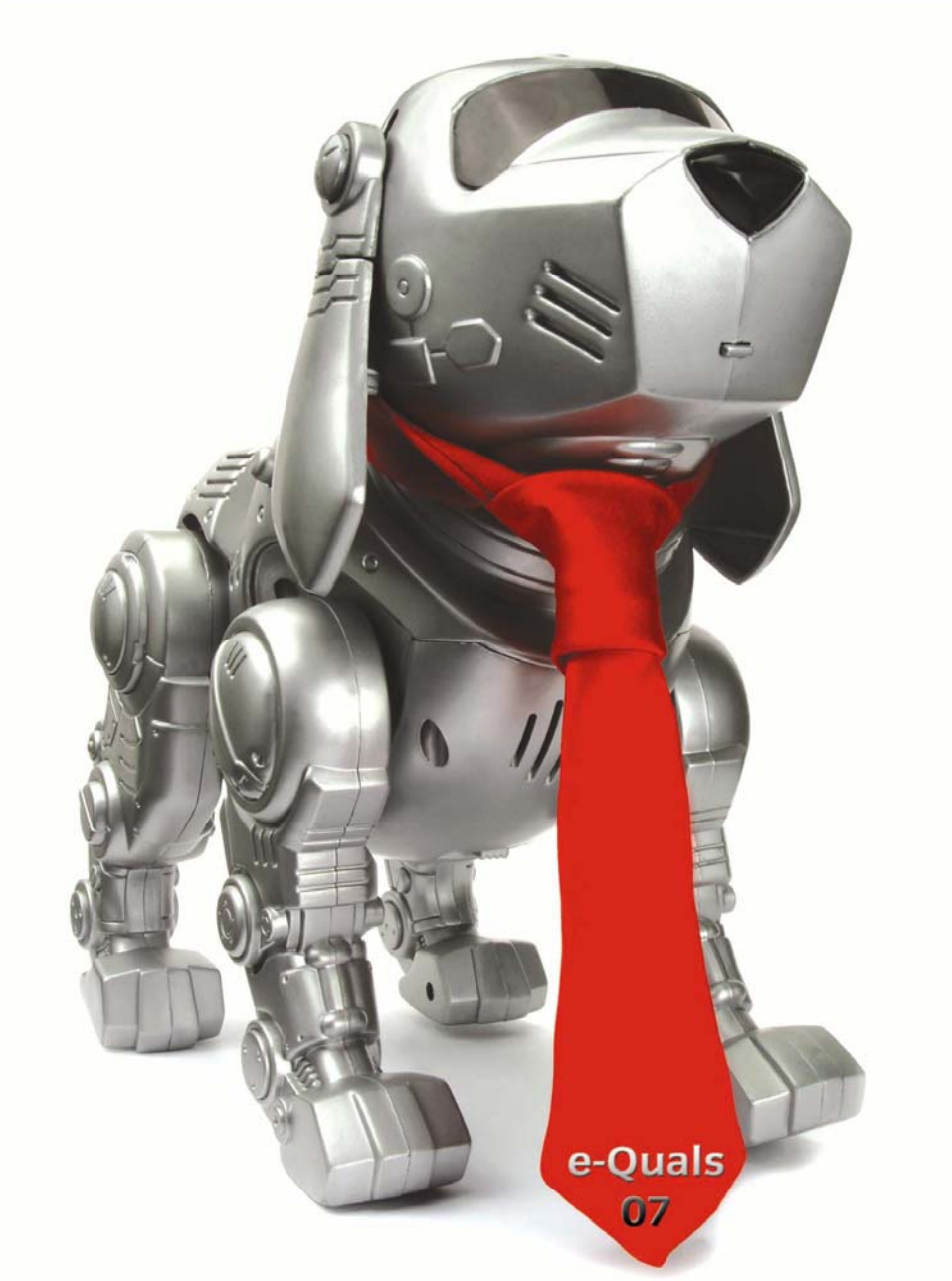
January 2010
Version 1.0



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City & Guilds
1 Giltspur Street
London EC1A 9DD
T +44 (0)20 7294 2800
F +44 (0)20 7294 2400
www.cityandguilds.com
learnersupport@cityandguilds.com

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Level 2 Electronic Systems (7267-424) Assignment A

Introduction – Information for Candidates

About this document

This assignment comprises all of the assessment for Level 2 Electronic Systems (7267-424).

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 **4 hours**.

Level 2 Electronic Systems (7267-424)

Candidate instructions

Time allowance: 4 hours

Assignment set up:

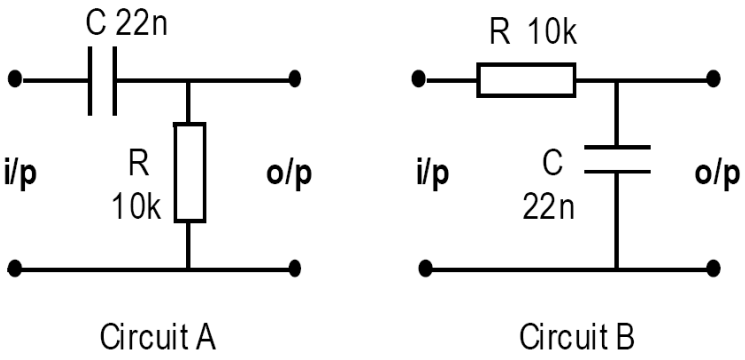
This assignment is made up of **five** tasks

- Task A – Squarewaves and waveshaping – oscilloscope measurements
- Task B – Input and output transducers – transducer recognition
- Task C – Three stage amplifier – multimeter measurements
- Task D – Three stage amplifier – signal measurements
- Task E – Multiple-choice questions

Task A – Squarewaves and waveshaping – oscilloscope measurements

You will be provided with:

- a function generator
- an oscilloscope (dual trace)
- CR circuits as below
- necessary leads.



1 Connect a squarewave signal of 500Hz, 1V amplitude to the input of circuit A. Monitor the circuit inputs and outputs using both channels of the oscilloscope.

Sketch two cycles of the waveforms (time related) on graph paper or other suitable media and scale the axes. For the output waveform, calculate the:

- peak-to-peak voltage
- periodic time.

2 State whether the time constant of the CR circuit is longer or shorter than the periodic time of the waveform.

3 Repeat steps A1 and A2 using circuit B and a squarewave signal of 10kHz, 1V amplitude.

Task B – Input and output transducers – transducer recognition

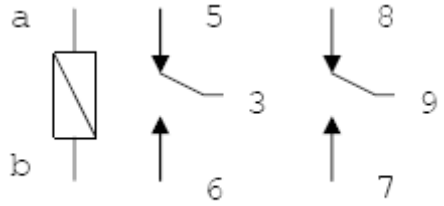
You will be provided with a:

- selection of five input/output transducers each identified by a number
- multimeter.

1 For each transducer:

- state in as much detail as possible the type of component
- draw the circuit symbol indicating terminal numbers, if appropriate
- note any relevant resistance measurement.

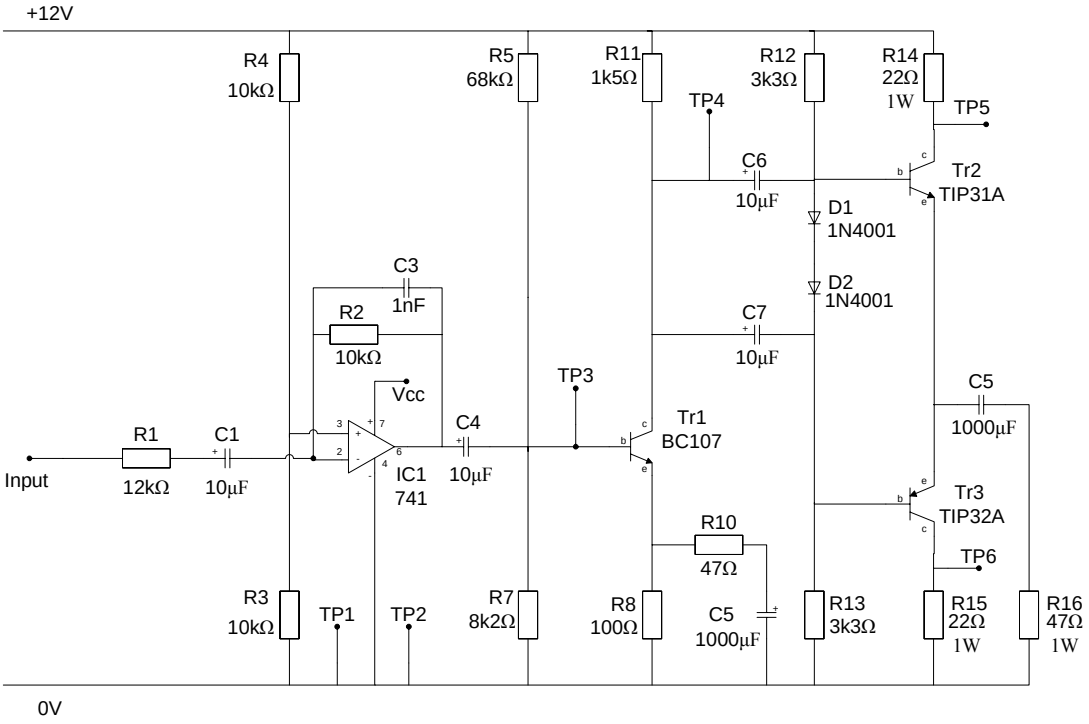
Record your findings in a table of the form shown below.

Identification Number	Type of component	Circuit symbol (with terminal identification)	Resistance measurement
1	Miniature double pole double throw relay		Coil resistance 72Ω

Task C – Three stage amplifier – multimeter measurements

You will be provided with a:

- three stage semiconductor amplifier
- low voltage d.c. power supply
- low frequency signal generator
- multimeter.



1 Set the output of the d.c. power supply to 12V and connect it to the circuit board. Then use the multimeter to measure and record the d.c. voltages at each of the following points with respect to the 0V line:

- TP3.
- TP4.
- TP5.
- TP6.
- Junction of TR2 and TR3 emitters.

2 Measure the voltage across R11 and calculate the collector current of TR1. Show all working.

3 Measure and record the current taken from the supply by the circuit using the multimeter.

Task D – Three stage amplifier – signal measurements

You will be provided with a:

- three stage semiconductor amplifier (see above)
- low voltage d.c. power supply
- low frequency signal generator
- dual-trace oscilloscope.

1 Set the output of the d.c. power supply to 12V and connect it to the circuit board. Then connect a sinewave of 1kHz, 50mV peak-to-peak to the amplifier input.

2 Monitor TP3 and TP4. Set the oscilloscope to show two cycles of the waveforms. Adjust the oscilloscope controls so that the two waveforms do not overlap. Sketch the waveforms in time-relationship on graph paper, or any suitable media, and add suitable axes scales.

3 State **each** of the following:

- Peak-to-peak voltage of the signal at TP3.
- Peak-to-peak voltage of the signal at TP4.
- The phase relationship between TP3 and TP4.

4 Monitor the input waveform and the waveform across R16 simultaneously. Use the waveforms peak-to-peak voltages to calculate the gain of the amplifier.

5 Short out the two diodes D1 and D2. Have your assessor check this.

6 Sketch the waveform across R16 on graph paper, or any suitable media, and add suitable axes scales. Name the type of distortion present in the waveform.

Task E – Multiple-choice questions

Your assessor will now give you a multiple-choice answer sheet containing **seven** 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

Published by City & Guilds
1 Giltspur Street
London
EC1A 9DD
T +44 (0)20 7294 2468
F +44 (0)20 7294 2400
www.cityandguilds.com

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