Level 3 Electronic Principles (7267-523)

e-Quals
Assignment guide for Candidates
Assignment A

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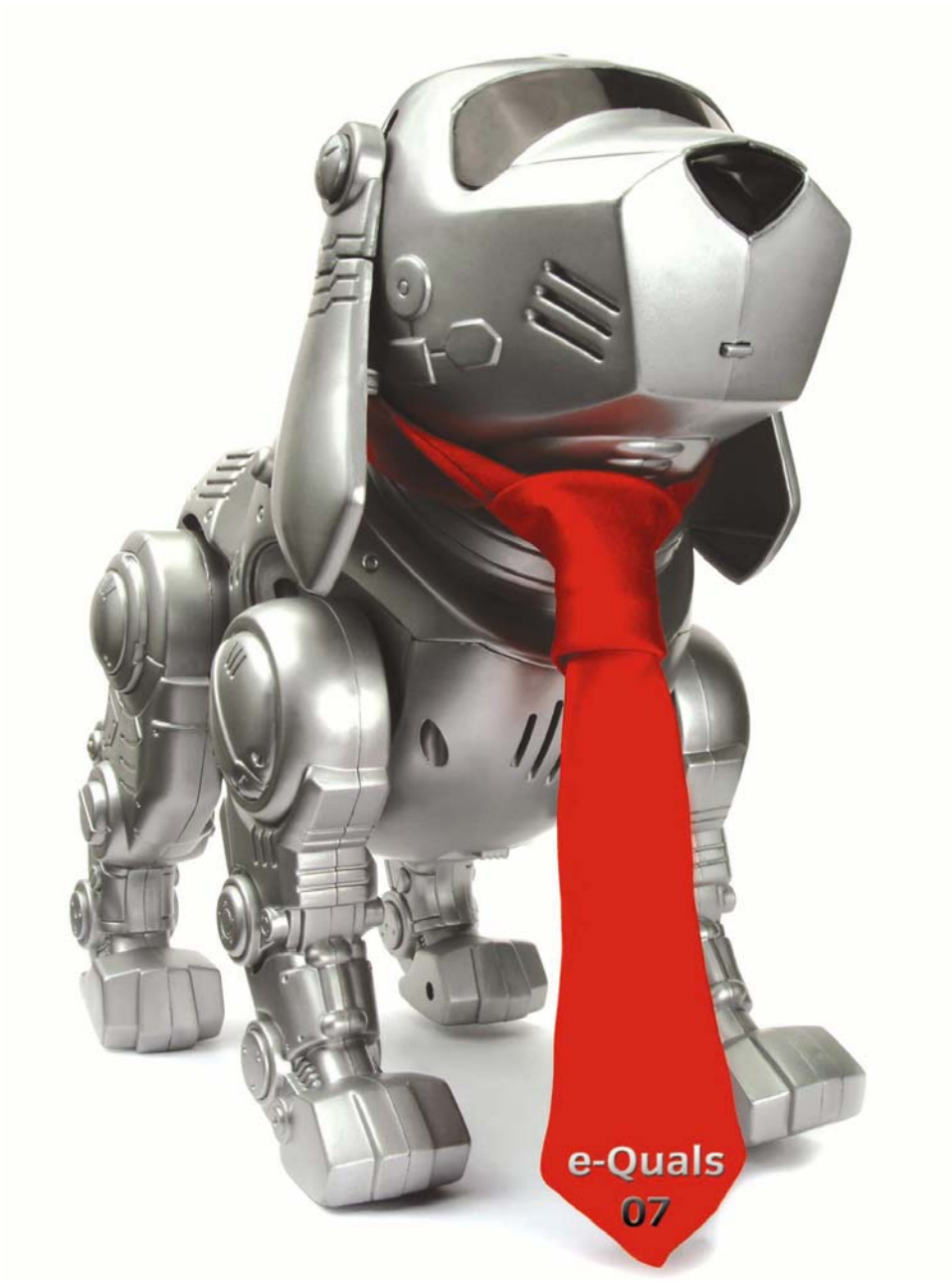

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Level 3 Electronic Principles (7267-523) Assignment A

Introduction – Information for Candidates

About this document

This assignment comprises all of the assessment for Level 3 Electronic Principles (7267-523).

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 Electronic Principles (7267-523)

Candidate instructions

Time allowance: 3 hours

Assignment set up:

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

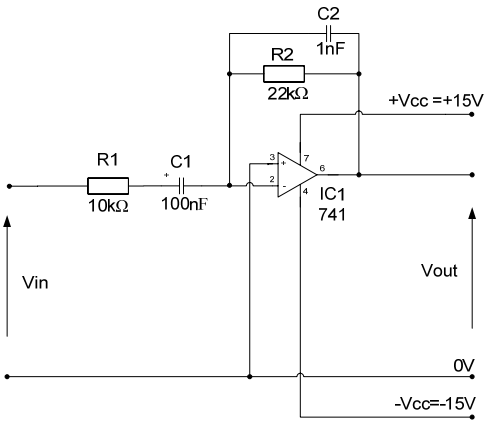
- Task A – Filter frequency response plot
- Task B – Component fault identification
- Task C – Multiple-choice questions

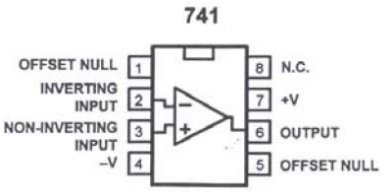
Task A – Filter frequency response plot

You will be provided with a:

- prototype board (breadboard), components and leads
- low voltage power supply, +/- 15V d.c.
- double beam oscilloscope
- low frequency (a.f.) sinusoidal signal generator.

1 Using the components and prototype board provided, construct the circuit shown below.





2 Apply a 1kHz, 1V peak-to-peak sinewave to the input of the circuit and then sketch **two** cycles of the input and output waveforms on graph paper or other suitable media. These should be time related with scaled axes.

3 State the phase relationship between the input and output voltages and state the voltage gain of the circuit.

4 Measure (and record in a table) the output voltage and gain of the circuit at each of the following frequencies. Keep the input, Vin at 1V peak-to-peak in each case:

- 50Hz
- 100Hz
- 200Hz
- 400Hz
- 700Hz
- 1kHz
- 2kHz
- 4kHz
- 7kHz
- 10kHz.

5 On linear/log graph paper, plot the gain (Av) on the linear y-axis against frequency on the logarithmic x-axis.

6 Indicate, on the graph, the -3dB points.

7 State the value of F_l (the lower frequency – 3dB point) and F_u (the upper frequency – 3dB point). Calculate the "bandwidth" of the filter (F_u - F_l).

8 Calculate the values and show your working of F_u and F_l given that:

F_l is the frequency where XC1 = R1
F_u is the frequency where XC2 = R2
and $Xc = \frac{1}{2\pi fc}$

Task B – Component fault identification

You will be provided with:

- a selection of eight semiconductor devices, each clearly marked with its type number and an identification number
- appropriate test equipment
- access to semiconductor data.

1 Using suitable reference data, for each semiconductor, identify each of the following and record the information on the semiconductor test log:

- The device type (eg SCR, BJT, FET, triac).
- The maximum power rating.
- The case type.

2 Using the test equipment, carry out resistance measurements and any other suitable tests to determine whether the device is in working order or unserviceable. Record the results on the semiconductor test log.

Task C – Multiple-choice questions

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