2018 September Moderation - Report

Meeting Details

Meeting took place in:	North
AM or PM session?	AM
Which AM Meeting is this report for?	Technologies - Electronics Foundation Level 2
Moderation Leader Name	Jan Phillips
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Minute Keeper	Robert Burtscher
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Attendance

Please enter the name and school for all attendees. This can be copied and pasted from the registration list sent to the Moderation Leader.	Robert Burtscher Launceston College Bruce McIntosh Launceston Christian School Jan Phillips Newstead College Ben Hendriks Elizabeth College Charles Prevost Rosny College Nigel Baptist Don College
Apologies/absences - please enter the names of teachers and their schools who appeared on the moderation leaders list who did not attend the	Nil

meeting.

Criterion 6 ELEMENT 1: Gather data and research information

Rating 'C'	Rating 'B'	Rating 'A'
☒ collects data to test circuits and performs experiments using specified techniques in collecting and recording data	☒ identifies the types of data required to test a circuit and performs experiments using specified techniques in collecting and recording data	☒ accurately identifies the types of data required to test a circuit and performs experiments using selected techniques in collecting and recording data

A test question about a faulty circuit for Element 1

1. Your DMM is showing weird readings on some current ranges. What might have caused this problem and what might you do to test the DMM ranges in doubt?
   C= Broken DMM. Replace it with a new one. Ask teacher to check that measurement is being taken correctly. (ie specific technique)

   B= Using an incorrect scale might have destroyed the DMM. Flat battery in the DMM. Use different DMM's and compare results until the same reading is obtained, look for battery symbol on display.

   A= Measuring voltage while on the mA/uA scale, and so short out the circuit via the DMM. Test DMM by measuring current in a circuit with a known voltage and known resistor and comparing the reading with V=IxR solution.

2. A two LED flasher has only one LED stay on. What might you do to find and fix the fault?
   C= Check the solder joints and tracks for breaks, Replace the 'dead' LED, then keep replacing components till both flash. Measure the resistors ohms.

   B= As part above, plus: Check that the LED's and transistors are the correct way round. Remove and insert the transistors in the DMM hFE scale. Look for a reading in the hundreds.

   A= As part above, plus: Check transistors are NPN. Using a DSO, Observe, in the powered circuit, the voltages across each capacitor, Vbe + Vce for each transistor.

   A+=Replace any transistor showing a Vce drop when the base is over 0.7volts, or zero Vce drop when Vbe is below 0.5volts. Replace any capacitors not cycling voltages after transistors are checked.

3. A transistor turns an LED only dimly on. What might the fault be and what would you do to find and fix the fault?

   t= Check that LED is round the right way.

   C= test the Transistor, LED and resistors with the DMM. Replace with a new ones. Look for poor solder joints/BBrd insertions.

   B= Check that the current limiting resistor to the LED is the correct value. Check that the transistor is the correct type. Check that the current limiting resistor to the Base is not too high in value.

A= Check to see if the transistor has the load incorrectly on the emitter. If so, it will oscillate (HF) the LED which will appear dimmer.

A+= Calculations using ohms law to show resistor values are suitable.

Criterion 6 Element 2: Gather data and research information

Rating 'C'	Rating 'B'	Rating 'A'
☒ outlines basic stages of the design process in electronics	☒ describes basic principles of the design process in electronics	☒ describes and explains principles of the design process in electronics

A transistor circuit design question for Element 2

1. Design a transistor circuit that operates a buzzer when a voltage drops to zero
   t= Student finds a pre-existing circuit.

   C= Block diagram includes reasonable input, processing and output.

   B= Identifies that a variable voltage divider input is needed, that gain via a PNP transistor is needed, and a relay or similar to operate buzzer if over 100mA

   A= A circuit design that incorporates the above. Resistor values not necessary.

   A+= Calculations to support selected chosen values.

Criterion 6 ELEMENT 3: Gather data and research information

Rating 'C'	Rating 'B'	Rating 'A'
☒ carries out basic inquiry/research tasks as directed.	☒ constructs and conducts basic inquiry/research tasks.	☒ plans, constructs and conducts basic inquiry/research tasks.

A virtual construction assignment using Circuit Wizard for Element 3

1. Write and present a journal on the completion of this task: Design a circuit that keeps a motor running for 1 minute after the ignition is switched off, so that the engine oil keeps being pumped up to the turbo until it slows down. (Use capacitors for timing.)
   t= Output turns ON after 1 minute (without plausible explanation)

C= Finds a pre-existing circuit and then uses guess, insert, check and change until the time is near 1 minute. No output connections defined (eg to; a solenoid, mosfet or relay)

B= Works on CWZ to near a minute. Redundant circuitry may be present. Voltage input not 12v, current continues while once motor is off.

A= Works on CWZ. Near a minute. Used calculations to justify initial selections for RC pair. Non-redundant circuitry.

A+= shows recognition that the Cap only has to be charged between 0.5-0.7v to impact the transistor, rather than 1RC.