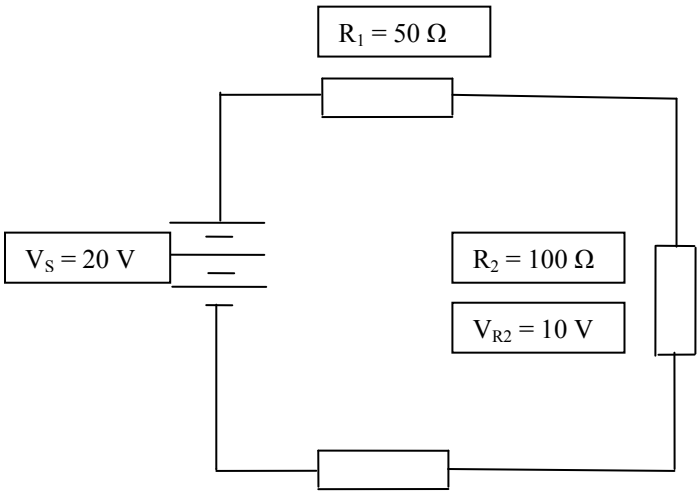
DC ELECTRICAL FUNDAMENTALS TRIAL END-SEMESTER TEST

- This test is **closed** book, calculator permitted.
- Time permitted 1½ hours.
- Answer questions in the spaces provided.
- **60 MARKS TOTAL (70% pass)**
- Clearly label all currents, resistors and voltage drops in the circuits and state any assumptions in order to obtain a full mark
- When calculating values, show clearly all steps, starting with the formula, then substituting with numbers and finally show the measuring units of the obtained result. Otherwise **NO MARKS** are given

Q1) In the circuit below find the unspecified values. **[5 marks]**



Q2) In the voltage divider below find the following voltages: **[5 marks]**

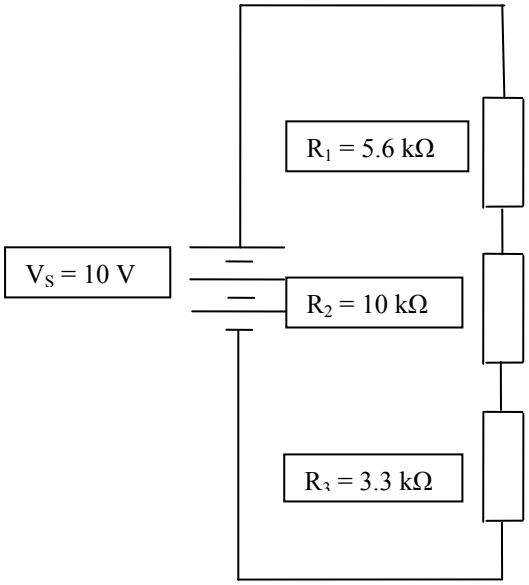
$V_{AD} = ?$

$V_{BD} = ?$

$V_{CD} = ?$

$V_{CB} = ?$

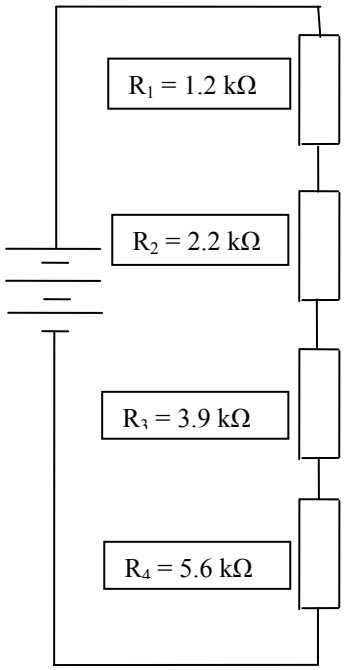
$V_{CA} = ?$



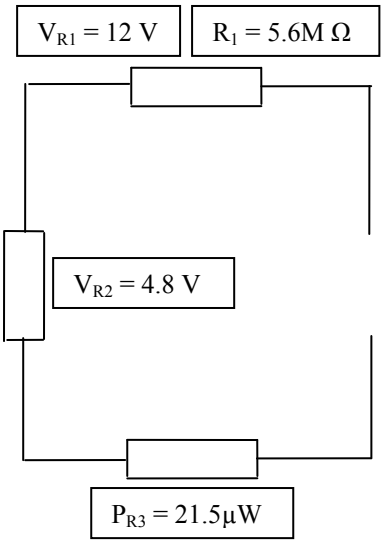
Q3) A string of five series resistors is connected across a 12 volts battery. Zero volts are measured across all of the resistors except R_2. What is wrong with the circuit? What voltage will be measured across R_2? **[3 marks]**

Q4) The following ¼ W resistors are connected in series: 1.2kΩ, 2.2kΩ, 3.9kΩ and 5.6kΩ. What is the maximum voltage that can be applied across the series resistors without exceeding a power rating? Which resistor will burn out first if excessive voltage is applied? **[5 marks]**

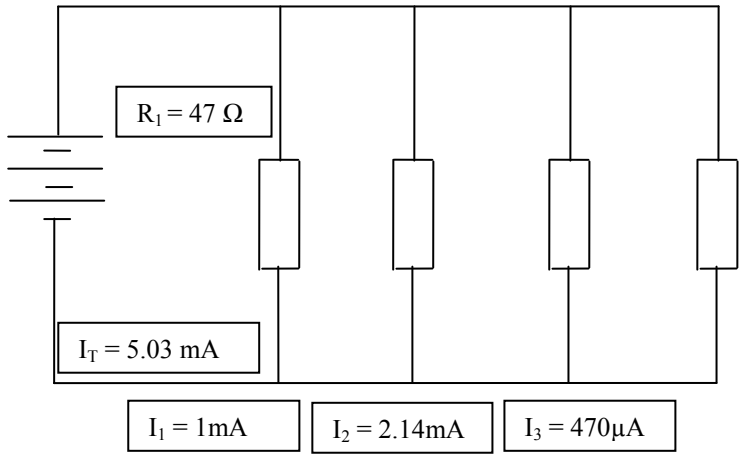
Ans:



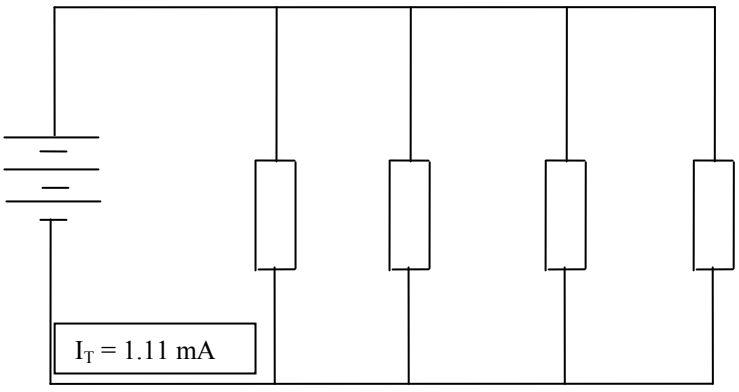
Q5) Find the total resistance in the circuit below. **[5 marks]**



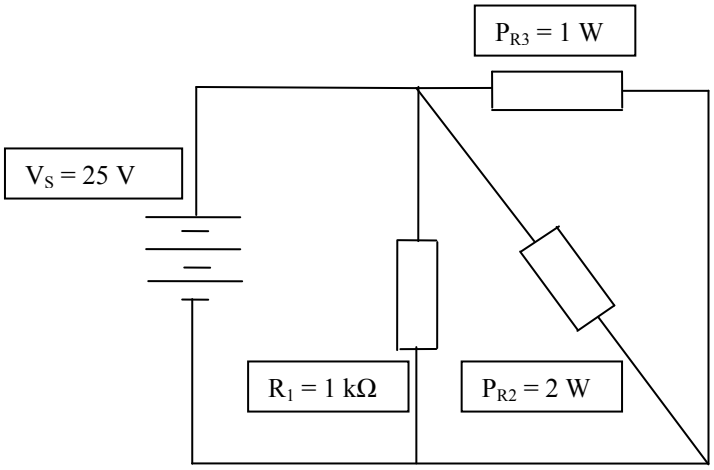
Q6) Find all unspecified values in the circuit below. **[5 marks]**



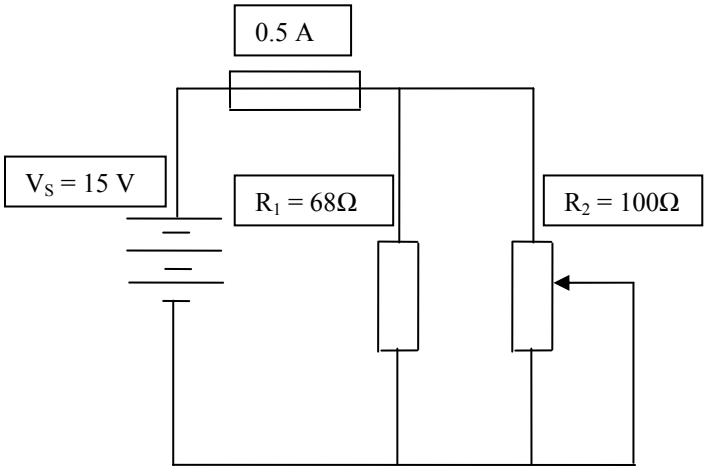
Q7) Four equal-value resistors are connected in parallel. Five volts are applied to the parallel circuit and 1.11 mA are measured from the source. What is the value of each resistor? **[5 marks]**



Q8) Calculate the currents in the circuit below. **[5 marks]**



Q9) To what minimum value can the 100 Ω rheostat be adjusted before the 0.5A fuse blows? **[5 marks]**



Q10) Six light bulbs are connected in parallel across 220 V. Each bulb is rated 75 W. What is the current through each bulb and what is the total current? **[5 marks]**

Q11) A certain parallel circuit consists of only ½ W resistors. The total resistance is 1 kΩ and the total current is 50 mA. If each resistor is operating at one-half its maximum power level, determine the following:

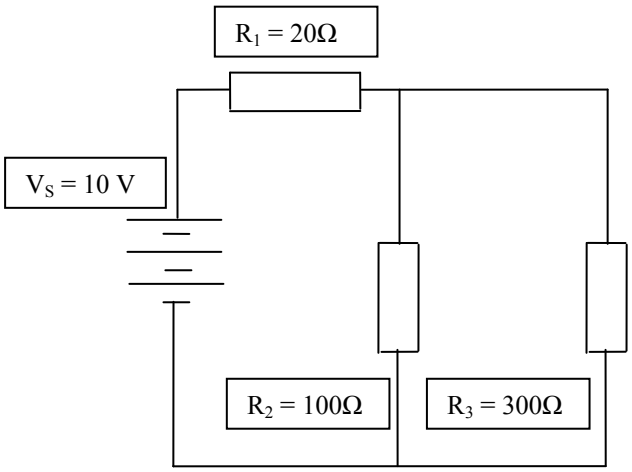
[5 marks]

a.) The number of resistors
b.) The current in each branch
c.) The value of each resistor
d.) The applied voltage

Assume that all resistors are equal value.

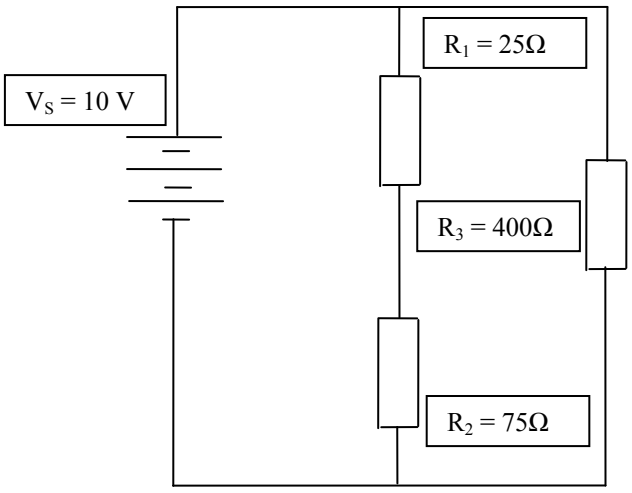
Q12) Calculate all missing values in the combinational circuit below.

[5 marks]



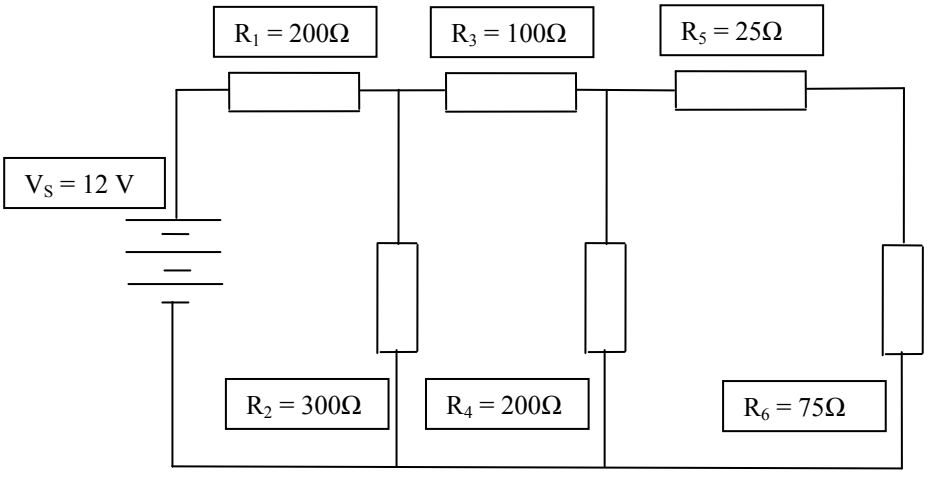
Q13) Calculate all missing values in the combinational circuit below.

[5 marks]



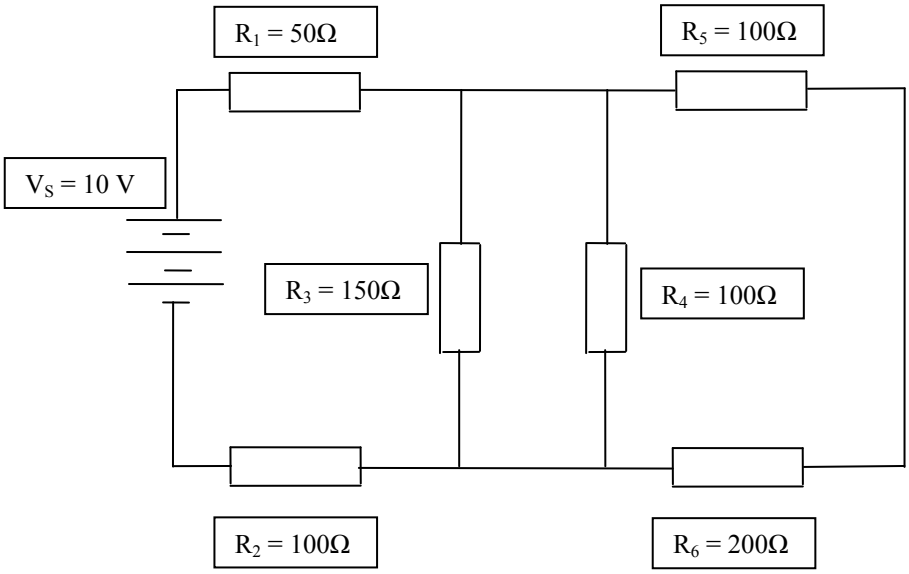
Q14) Calculate all missing values in the combinational circuit below.

[10 marks]



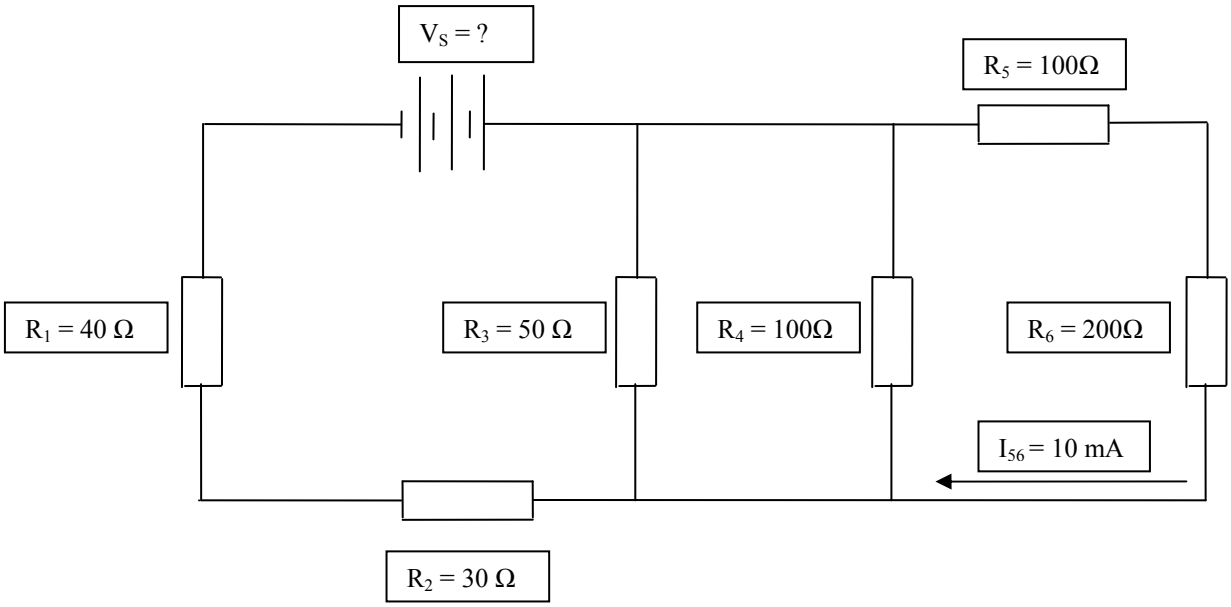
Q15) Calculate all missing values in the combinational circuit below.

[15 marks]



Q16) Calculate all missing values in the combinational circuit below.

[20 marks]



END OF TEST
(Check your work!)