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**UNIVERSITI TUN HUSSEIN ONN MALAYSIA**

**FINAL EXAMINATION  
SEMESTER II  
SESSION 2010/2011**

COURSE NAME : ELECTRICAL MEASUREMENT  
PRACTICE

COURSE CODE : DAE 15003

PROGRAMME : 1 DAL

EXAMINATION DATE : APRIL / MAY 2011

DURATION : 3 HOURS

INSTRUCTION : ANSWER **FOUR (4)** QUESTIONS  
ONLY

THIS QUESTION PAPER CONSISTS OF SIX (6) PAGES

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**Q1** A power resistor has a value of,  $R = 1k\Omega \pm 10 \%$

(a) (i) State the relative error.  
(ii) State the actual value.  
(2 marks)

(b) (i) Determine the absolute error.  
(ii) Determine the range of measured value.  
(iii) Determine errors.  
(9 marks)

(c) State the difference between accuracy and precision.  
(4 marks)

(d) State a difference between relative error and absolute error.  
(3 marks)

(e) Give five (5) reasons why there are differences between practical (measured) values and theoretical (calculated) values.  
(5 marks)

(f) State a common method to minimize an error.  
(2 marks)

**Q2** (a) Name four (4) meters available in multimeter.  
(4 marks)

(b) List five (5) quantities (electrical signals) that can be measured by using digital multimeter.  
(5 marks)

- (c) With the aid of suitable diagrams, show a major difference between an ohmmeter scale and voltmeter scale in analog voltmeter.

(5 marks)

- (d) Give three (3) comparisons between analog and digital multimeters.

(6 marks)

- (e) Give a reason why digital ohmmeter shows 0.4 / 0.5  $\Omega$  when both probes are shorted at ohm range.

(2 marks)

- (f) State three (3) advantages of analog multimeter.

(3 marks)

- Q3** (a) State the purpose of zero-ohm-adjustment in analog ohmmeter.

(2 marks)

- (b) State three (3) major functions of ohmmeter.

(3 marks)

- (c) With the aid of suitable diagrams, show how to determine the following components are in good and bad conditions by using analog ohmmeter.

- (i) 1 k $\Omega$   $\pm$  10 % resistor
- (ii) 100 nF ceramic capacitor

(16 marks)

- (d) Give two (2) reasons why the range of  $R \times 10k$  of an analog ohmmeter is very important.

(4 marks)

- Q4**
- (a) State two (2) major functions of AC and DC Voltmeter.  
(2 marks)
  
  - (b) Give three (3) examples of the DC supply that can be measured by using DC Voltmeter.  
(3 marks)
  
  - (c) Three (3) bulbs are connected in series and being supplied by a 24 V, 30 A battery. Draw and label completely the circuit diagram and show how to connect the voltmeter to measure the voltage drop across each bulb.  
(5 marks)
  
  - (d) Give three (3) comparisons between digital DC voltmeter and analog DC voltmeter.  
(6 marks)
  
  - (e) State two (2) major differences between Analog Voltmeter and an Oscilloscope to measure DC voltage.  
(4 marks)
  
  - (f) Give a reason why Digital DC Voltmeter indicates negative reading when measuring the DC voltage.  
(2 marks)
  
  - (g) Give a reason why a Voltmeter must be connected in parallel with the load to be measured for measuring the voltage.  
(3 marks)

- Q5**
- (a) State the most suitable range that should be used to measure the unknown values by using analog DC Ammeter.  
(2 marks)
  - (b) State a method to measure AC Current without disconnecting any wires or cables.  
(2 marks)
  - (c) With the aid of suitable diagram, show how to connect DC Ammeters to measure the currents through the three (3) bulbs connected in parallel with each other and supplied by a battery of 12 V, 6 A.  
(6 marks)
  - (d) Give a reason why an Ammeter must be connected in series with the load to be measured for measuring the current. Prove your answer with mathematical equation in a series circuit.  
(5 marks)
  - (e) Give three (3) comparisons between AC Ammeter and Clamp-On Ammeter for measuring AC current.  
(6 marks)
  - (f) Give two (2) comparisons between analog and digital multimeters for measuring currents.  
(4 marks)
- Q6**
- (a) State four (4) sections of an Oscilloscope.  
(2 marks)
  - (b) Draw five (5) types of fundamental waveforms.  
(5 marks)

- (c) Draw  $2\frac{1}{2}$  - cycles of sine waveform. Label completely X-axis, Y-axis,  $V_{P-P}$ ,  $V_P$ ,  $+V_P$ ,  $-V_P$ , T and 2T.

(10 marks)

- (d) State a difference between oscilloscope and AC Voltmeter for measuring AC voltages.

(2 marks)

- (e) State a difference between oscilloscope and frequency counter for measuring frequencies.

(2 marks)

- (f) State four (4) major differences between oscilloscope probes and multimeter probes.

(4 marks)