Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2015/2016

COURSE NAME	:	ELECTRONIC INSTRUMENTS AND MEASUREMENTS
COURSE CODE	:	BEF 24002
PROGRAMME CODE	:	BEV
EXAMINATION DATE	:	JUNE / JULY 2016
DURATION	:	2 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

THIS QUESTION PAPER CONSISTS OF **FOUR (4)** PAGES

Q1 (a) (i) Draw building blocks of an electronic instrument.

(3 marks)

(ii) Discuss each block drawn at **Q1(a)(i)**.

(6 marks)

(b) (i) Differentiate between static and dynamic characteristics of an instrument.

(4 marks)

(ii) State types of noise.

(4 marks)

(c) Demonstrate any **two (2)** noises enumerated at **Q1(b)(ii)**.

(8 marks)

Q2 (a) (i) Sketch block diagram of an analogue electronic measurement.

(5 marks)

(ii) Highlight the design considerations of an analogue electronic instrument.

(5 marks)

(b) Draw circuit schematic diagrams of ammeter, voltmeter, ac voltmeter, and ohmmeter by employing basic permanent magnetic moving coil for their operation.

(8 marks)

(c) Analyse the voltage reading and percentage error of each reading obtained with a voltmeter on:

(i) 5 V range
(ii) 10 V range and
(iii) 30 V range

If the instrument has a 20 kΩ/V sensitivity, an accuracy 1% of full scale deflection and the meter is connected across R_b as shown in **Figure Q2(b)**.

(7 marks)

Q3 (a) With the help of a circuit diagram, respective equations and frequency response, explain the working principle of low pass filter (LPF).

(10 marks)

(b) A LPF circuit consisting of a R of 47 kΩ in series with a C of 47 nF is connected across a 10 V sinusoidal supply.

(i) Calculate the output voltage V_{out} at a frequency of 100 Hz and 10 kHz.
(2 marks)

(ii) Calculate the cut off frequency.
(2 marks)

(iii) Calculate the phase shift angle.
(2 marks)

(iv) Discuss on the output voltage result in terms of frequency response.
(2 marks)

(c) With the help of circuit diagram, discuss:

(i) Average reading voltmeter.
(3 marks)

(ii) Peak responding voltmeter.
(4 marks)

Q4 (a) Explain the scope of high impedance probes.
(5 marks)

(b) With the help of a neat diagram, analyze the working principle of thermo couple.
(10 marks)

(c) Explain the internal and external noise sources.
(10 marks)

- END OF QUESTIONS-

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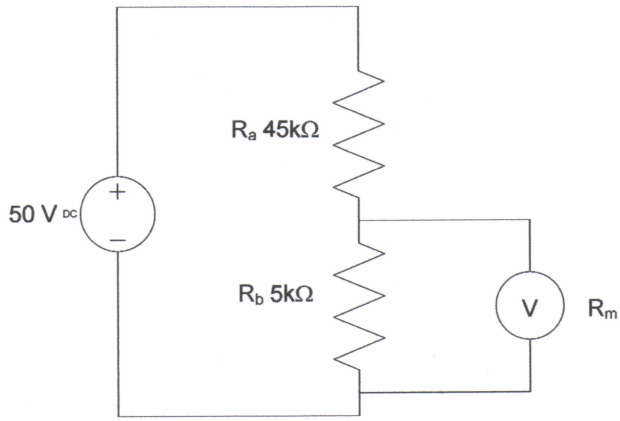

Figure Q2(b)