Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2017/2018

COURSE NAME	:	ELECTRONIC INSTRUMENTS AND MEASUREMENTS
COURSE CODE	:	BEF 24002
PROGRAMME CODE	:	BEV
EXAMINATION DATE	:	JUNE/JULY 2018
DURATION	:	2 HOURS AND 30 MINUTES
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

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

Q1 (a) (i) Draw the block diagram of an electronic instrument.

(3 marks)

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

(6 marks)

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

(4 marks)

(ii) State **four (4)** types of noises.

(4 marks)

(c) Shortly explain the generation and their respective sources of generation of any **two (2)** noises, enumerated at **Q1(b)(ii)**.

(8 marks)

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

(5 marks)

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

(5 marks)

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

(8 marks)

(c) 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(c)**, analyse the voltage reading and percentage error of each reading obtained with a voltmeter on; 5 V, 10 V, and 30 V ranges.

(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 resistance, R of 47 kΩ in series with a capacitance, 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 a circuit diagram, discuss:

(i) Average reading voltmeter.

(3 marks)

(ii) Peak responding voltmeter.

(4 marks)

Q4 (a) Explain the construction features of high impedance probes.

(5 marks)

(b) With the help of a neat diagram, summarize the working principle of thermocouple.

(10 marks)

(c) (i) Define the noise.

(2 marks)

(ii) Name its **two (2)** sources.

(2 marks)

(iii) Discuss any **two (2)** but different from explained at **Q1(c)**.

(6 marks)

- END OF QUESTIONS-

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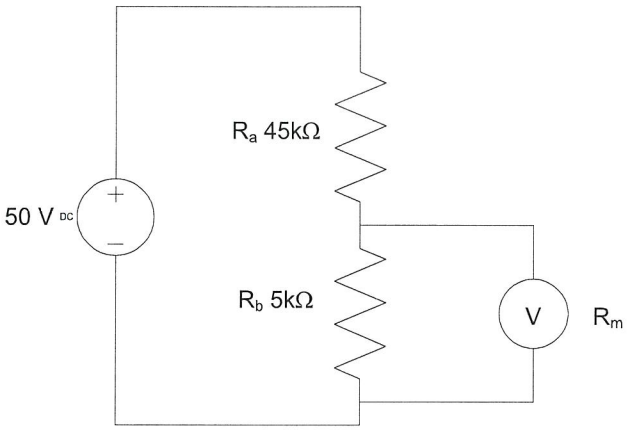

Figure Q2(c)