

COLLEGE OF ENGINEERING & TECHNOLOGY



Department : Electrical & Control Engineering

Lecturer : Dr. Ahmed Kadry Abdelsalam

Course : Electrical measurements and instrumentation 2

Course Code : EE 312

Marks : 40

Date : 19/1/2016

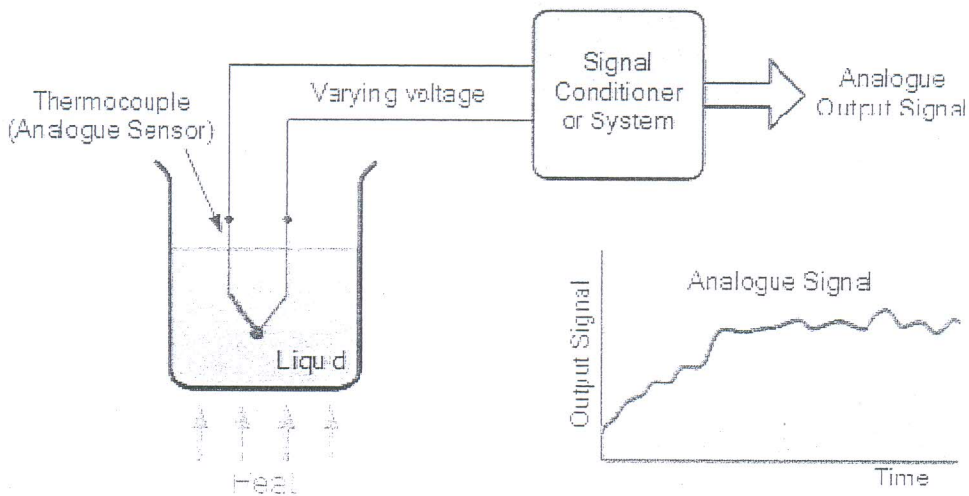
Time : 2 hour

Final Exam

Answer all the following questions

Q1- 15 marks

A temperature sensor has an output/input relation as $0.01\text{v}/^\circ\text{C}$.



For a full range of 100°C , **design** a signal conditioning circuit that adjusts the sensor output to be from -5v to 5v for the full measured range.

Also, **design** a circuit that triggers an alarm when the temperature reaches 90°C . The design **MUST** include all the required passive elements and power supply values.

Members of course Examination Committee:	Signature:	Date:
Lecturer: Dr Ahmed Kadry	<i>[Signature]</i>	20/1/2016
Course Coordinator: Dr Ahmed Elshenaw	<i>[Signature]</i>	20/1/2016
Head of Department: Prof. Hamdy Ashour	<i>[Signature]</i>	19/1/2016

Q2- 5 marks

A two concentric cylinders level sensor is to measure a level from 0 to 5m. The distance between the two cylinders is 0.5cm and the diameter is 5.75cm. The K constant for air is 1 and for alcohol is 26. Calculate the range of change of the sensor capacitance.

Q3- 5 marks

Discuss aided with drawings the **dual slope (A/D) converter** theory of operation.

Q4- 5 marks

A thermistor of a constant β equals 3140°K and a resistance of 1050Ω at 27°C . At a specific temperature, the thermistor resistance is 2330Ω . Calculate this temperature in Kelvin


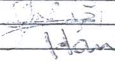
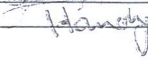
Q5- 5 marks

Illustrate with diagram **Sample&Hold circuit** principle of operation stating its function and construction. Moreover, illustrate how it can be used in case of multiple analogue signals wanted to be measured by a single A/D converter

Q6- 5 marks

Compare between **optical** and **total radiation pyrometers** from the following points of view:

- Construction (show with diagrams)
- Theory of operation
- Transducer need
- Range

Members of course Examination Committee:	Signature:	Date:
Lecturer: Dr Ahmed Kadry		20/2/2016
Course Coordinator : Dr Ahmed Elshenaw		20/2/2016
Head of Department: Prof. Hamdy Ashour		20/2/2016