LAGOS CITY POLYTECHNIC, IKEJA

SCHOOL OF ENGINEERING AND APPLIED SCIENCE

DEPARTMENT OF ELECT/ELECT ENGINEERING

2015/2016 SEMESTER EXAMINATION

COURSE TITLE: ELECTRICAL MEASUREMENT AND CONTROL III **NO OF QUESTION: 6**

COURSE CODE: EEI 311 **TIME: ALLOWED: 2½ HRS**

FOR WHOM: HND YR I EE P/T **INSTRUCTIONS: Answer any Four Questions**

1. (a) (i) Explain the function of a transducer in engineering measurement.
(ii) List three different types of transducers used in the measurement of physical quantities and state the physical quantity each is used to measure.
(b) Briefly explain the following as applied to signal from the transducer.
(i) Signal conditioning
(ii) Scaling
(iii) Calibration

2. (a) (i) List 3 types of temperature transducers and indicate which is active and which is passive.
(ii) Explain what happens in (i) active transducer and (ii) passive transducer.
(b) Briefly explain the following as applied to signal from the transducer.
(i) Signal conditioning
(ii) Scaling
(iii) Calibration
(c) Write down the mathematical expression for calculating the emf produced from the junctions of two dissimilar metals kept at temperatures T_1 and T_2 ($T_1 > T_2$).
Determine. The emf produced for a thermocouple whose junction are kept at 10°C and 90°C, respectively. Thermoelectric constant at 10°C is 50μv/°C and that at 90°C is 100μv/°C.

3. (a) (i) What does the term RTD stand for in resistance thermometers?
(ii) Explain briefly the working of RTDs and name the two major types of resistance thermometer.
(b) One of the applications of RTD is overcurrent protection of electrical load in a circuit
The curcuit below shows are of the arrangements for such use. Explain fully how the circuit works to provide overcurrent protection.
(c) The shunt winding of a motor has a resistance of 80Ω at 15°C. Find the its resistance at 90°C. (Resistance temperature coefficient of copper is a 0.004/°C at 0°C).

4. (a) Describe the principles of pressure measurement using the following devices. State the advantages and disadvantages of using these devices.
(i) Liquid column manometer
(ii) Bellows
(iii) Bourdon tube.
(b) A U-tube manometer shown is used to measure the pressure of oil of specific gravity 0.85 flowing in a pipe line. Its left end is connected to the pipe and the right limb is open to the atmosphere. The centre of the pipe is 100mm below the level

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