

MANIPAL UNIVERSITY

**FIRST SEMESTER ME AUTOMOTIVE EMBEDDED SYSTEMS (ESIGELEC, FRANCE)
DEGREE EXAMINATION – NOVEMBER 2015**

SUBJECT: AES 601 – SENSORS AND TRANSDUCERS

Monday, November 23, 2015

Time: 10:00 – 13:00 Hrs.

Max. Marks: 100

✍ Answer ALL the questions. All questions carry TEN marks.

1. Write short notes on Analogue and Digital sensor with examples.
2. Explain physical principles of sensing.
3. Explain Best fit straight line method and least square best fit straight line methods and justify which is the most robust method.
4. Explain inverting and non-inverting amplifier. Derive an expression for closed loop voltage gain of the non-inverting amplifier by putting simple potential divider network across the non-inverting amplifier with the voltage gain of the circuit being determined by the ratios of R_2 and R_f .
5. Write short note on Oversampling DAC.
6. Describe two techniques of low temperature thermometry elaborating their principle of operation.
7. Describe two types of heat flux sensors and briefly state how they operate. Where are such sensors used in practice?
8. What are the differences between Matteucci effect, Villari effect and Wiedemann effect? How are these three effects used in developing magneto elastic sensors?
9. How does an LVDT measure the displacement? How is the non-linearity attempted to be removed? Discuss the coil structure design with reference to the above.
10. Describe the role of smart sensing in environmental monitoring.

