Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

THIRD SEMESTER B.TECH (INSTRUMENTATION & CONTROL ENGG.)

END SEMESTER EXAMINATIONS, DEC - 2017

SUBJECT: SENSORS AND TRANSDUCERS [ICE- 2105]

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions. Missing data may be suitably assumed.

1A.	Explain the generalized input-output configuration of measurement systems.	**5**
1B.	Explain the input and output characteristics of a transducer.	**3**
1C.	Define the terms (i) Working Standards. (ii) International standards	**2**
2A.	Explain the working principle of Hall effect type of transducer.	**3**
2B.	A Capacitive transducer uses two quartz diaphragms of area 750 mm^2 separated by distance of 3.5mm.A pressure of 900 kN/m^2 when applied to the top diaphragm produces a deflection of 0.6 mm. The capacitance is 370 pF when no pressure is applied to the diaphragms. Find the value of capacitance after the application of pressure of 900kN/m^2.	**4**
2C.	Draw and explain the circuit diagram of an iron- constantan thermocouple.	**3**
3A.	Derive the expression for output voltage of a half bridge strain gauge circuit.	**5**
3B.	Briefly explain the Piezoelectric effect.	**2**
3C.	A quartz piezo- electic crystal having thickness of 2mm and voltage sensitivity of 0.055V-m/N is subjected to a pressure of 1.5 MN/m^2. Calulate the voltage output. If the permittivity of quartz is **40.6×10^{-12}** F/m. Calculate its charge sensitivity.	**3**
4A.	Differentiate between Inductive transducers and Piezoelectric transducers	**4**
4B.	Describe the working and construction of Calomel electrode.	**3**
4C.	Explain the working of syncho transmitters with suitable diagram.	**3**
5A.	Explain in detail about differential arrangement of capacitive transducers.	**4**
5B.	Write any three applications of a Biosensors	**3**
5C.	Explain with neat sketch of LVDT with core position is at $ES_1 = ES_2$.	**3**