Reg. No. | | | | | | | | | |

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

FOURTH SEMESTER B.TECH. (INSTRUMENTATION AND CONTROL ENGG.)

END SEMESTER DEGREE EXAMINATION, APRIL/MAY - 2019

SUBJECT: INTRODUCTION TO INDUSTRIAL INSTRUMENTATION [ICE 3281]

TIME: 3 HOURS MAX. MARKS: 50

Instructions to candidates :*Answer ALL questions and missing data may be suitably assumed.*

1A Draw the functional elements of a measurement system and explain with an example.

1B Explain the input-output configuration of a measurement system.

1C Write a note on Input-Output filtering with suitable block diagram.

(4+3+3)

2A The relation between temperature and resistance of a RTD is listed below. Calculate the linear model and estimate the measured value for a temperature of 35 ºC.

Temperature (ºC)	10	20	30	40	50	60
Resistance (Ω)	20.1	20.2	20.4	20.6	20.8	21.0

2B What are the factors influencing the choice of a transducer? Explain.

2C Explain the working of strain gauges and draw the different forms.

(4+3+3)

3A List the types of filled bulb thermometers and explain the working of all the types with required figure.

3B A temperature measurement system uses K type thermocouple with a Seebeck coefficient of 21.7 µV/ºK for Chromel and -17.3 µV/ºK for Alumel. Design a thermocouple conditioning circuit which can be used to measure an input temperature of 0ºC to 800 ºC, for a required output of 0 to 5V.

(4+6)

4A Write a note on primary sensing elements with necessary figures.

4B Calculate the unknown pressure in mmHg for the details provided in Fig.Q4B.

4C Derive the equation for outflow and velocity of a pipeline using Bernoulli's theorem.

(4+2+4)

5A What is pH? Draw and explain the function of pH electrodes.

5B What are different techniques used for the measurement of thickness. Explain any two measurement techniques with necessary figures.

5C Explain the working of an optical encoder and draw the binary and grey code encoder disc.

(4+3+3)

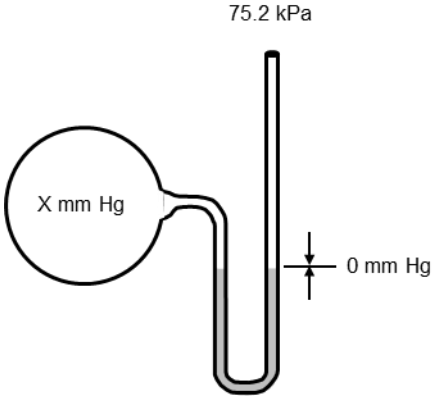

Fig.Q4B

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