Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

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

END SEMESTER EXAMINATIONS, APRIL - 2018

SUBJECT: INDUSTRIAL INSTRUMENTATION [ICE 2202]

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

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

1A.	Explain the operation of 3-lead wire RTD with a circuit diagram and necessary equations. Also comment on its accuracy as compared to 2-lead wire RTD.	**5**
1B.	A thermistor has a resistance of 10kΩ at 25^{o}C and 1kΩ at 100^{o}C.The range of operation is 0^{o}C-150^{o}C.The excitation voltage is 5V and a series resistor of 1k Ω is connected to the thermistor. Calculate the power dissipated in the thermistor at 150^{o}C.	**3**
1C.	In thermocouple, cold junction compensation is done by thermistor circuit with value of 1.048mV. The voltage corresponding to unknown temperature is 16.264mV.What must be the voltage at other end of the thermocouple. Also write a necessary equation for the same.	**2**
2A.	A multi-tube manometer using air, water, mercury and gasoline is used to measure the pressure of gasoline in a vessel as shown in Fig. Q2A. Calculate the gauge pressure in the gasoline vessel.	**5**
2B.	With neat figure, explain the operation of Knudsen gauge.	**3**
2C.	Explain the operation of LVDT as a secondary transducer for the measurement of pressure.	**2**
3A.	Venturi-meter is used for measurement of flow rate .Derive the expression for the volumetric flow rate for the same flowmeter with its construction details. Also comment on the pressure variations upstream and downstream of throat with proper justification.	**4**
3B.	A multiphase flow is formed by mixing oil, water and gas. What are the different ways for the measurement of individual flow rates of the three components?	**3**
3C.	What is Doppler effect? Explain the operation Doppler based ultrasonic flowmeter .Also state its drawbacks.	**3**
4A.	Define the term dew point temperature. Write a technique used for the measurement of the same. Also comment on its relationship with relative humidity.	**4**
4B.	Explain the level measurement technique based on capacitance principle for measurement of conducting and non-conducting fluid.	**4**
4C.	The instrument shown in Fig. Q4C is used for the measurement of flow. Name the type of flowmeter and write its two applications.	**2**
5A.	Derive the expression for viscosity using falling sphere resistance method	**4**

5B. Explain the measurement of speed using DC tachometer. List its drawback **3**

5C. What is stroboscope? Explain its operation for measurement of speed. **3**

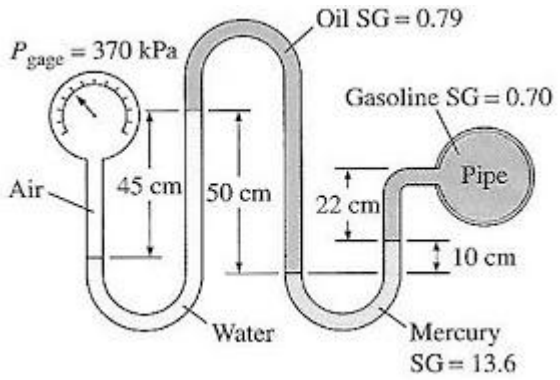

FIG.Q2A

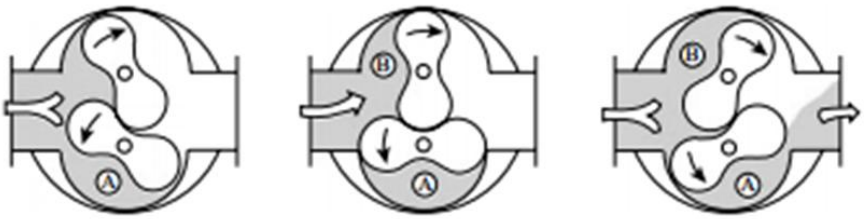

FIG.Q4C

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