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Year	: 2nd Year	Date	: 20.05.2012
Course No.	: TA C222	Max. Marks	: 45
Course Title	: Measurement Techniques II	Weightage	: 15%
		Duration	: 50 minutes

Q1.   Give two examples of positive displacement flow meters.   **[2 M]**

Water is discharging from a tank through a convergent-divergent mouth piece. The exit from the tank is rounded so that the losses there may be neglected and the minimum diameter is 6 cm. The head of the tank above the center-line of the mouth piece is 4 m. Take atmospheric pressure = 760 mm of Hg. What is the discharge?   **[7 M]**
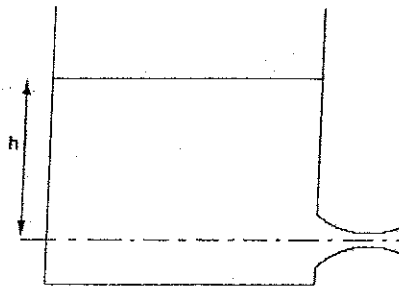

Q2.   A wall 20 cm thick is to be constructed from a material which has an average thermal conductivity of 1.5 W/m-K. The wall is to be insulated with material having an average thermal conductivity of 0.4 W/m-K so that heat loss per m^2 will not exceed 1KW. Assuming that the inner and outer surface temperatures of the insulated wall are 500°C and 25°C respectively, calculate the thickness of insulation required.   **[8 M]**

For the figure shown below, determine the pressure difference between pipes A and B. Take Z_1 = 0.45 m; Z_2 = 0.225 m; Z_3 = 0.675 m and Z_4 = 0.3 m. Neglect pressure due to pressure of air column in the inclined tube.   **[6M]**
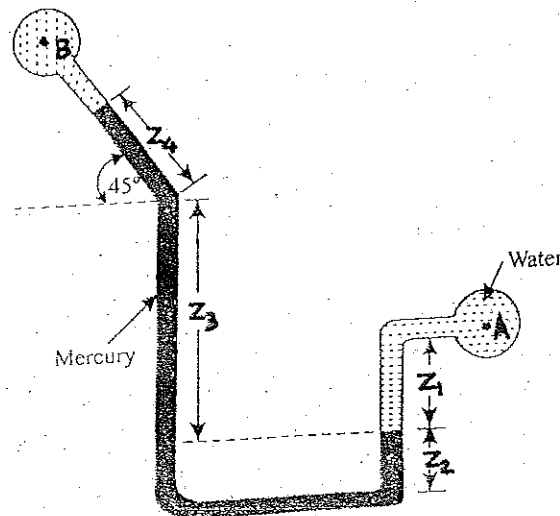
Q3. A copper-constantan thermocouple is connected to a potentiometer whose terminals are at 25°C. The potentiometer reading shows 5 mV. What will be the junction temperature? (*Use table 8.3a*) **[7 M]**

Two Strain gauges are connected to the cantilever beam as shown in Fig. Q3b. Explain the working principle of these strain gauges used in the meaurement of force with a neat circuit diagram. **[7 M]**
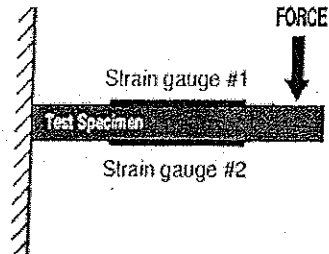
Q4. Differentiate between plane surveying and geodetic surveying. **[2 M]**

Mention any two limitations of GPS. **[2 M]**

Find the distance to the staff from the stadia hair reading shown in Fig.Q4c. Use the tacheometric distance equation with appropriate value of multiplier constant. Assume additive constant to be zero. **[4 M]**
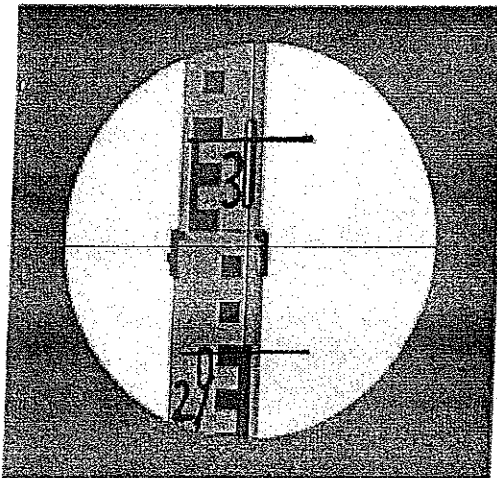
Table 8.3a Thermal emf in absolute millivolts for commonly used thermocouple combinations, according to ITS(90) (Reference junction of 0°C)[†]

Temperature, °C	Copper vs. Constantan (T)	Chromel vs. Constantan (E)	Iron vs. Constantan (J)	Chromel vs. Alumel (K)	Platinum vs. Platinum-10% Rhodium (S)	Nicosil vs. Nisil (N)
−150	−4.648	−7.279	−6.500	−4.913		−1.530
−100	−3.379	−5.237	−4.633	−3.554		−1.222
−50	−1.819	−2.787	−2.431	−1.889	−0.236	−0.698
−25	−0.940	−1.432	−1.239	−0.968	−0.127	−0.368
0	0	0	0	0	0	0
25	0.992	1.495	1.277	1.000	0.143	0.402
50	2.036	3.048	2.585	2.023	0.299	0.836
75	3.132	4.657	3.918	3.059	0.467	1.297
100	4.279	6.319	5.269	4.096	0.646	1.785
150	6.704	9.789	8.010	6.138	1.029	2.826
200	9.288	13.421	10.779	8.139	1.441	3.943
300	14.862	21.036	16.327	12.209	2.323	6.348
400	20.872	28.946	21.848	16.397	3.259	8.919
500		37.005	27.393	20.644	4.233	11.603
600		45.093	33.102	24.906	5.239	14.370
800		61.017	45.494	33.275	7.345	20.094
1000		76.373	57.953	41.276	9.587	26.046
1200			69.553	48.838	11.951	32.144
1500					15.582	
1750					18.503	