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B.Tech
(SEM VI) THEORY EXAMINATION 2017-18
INDUSTRIAL INSTRUMENTATION

Time: 3 Hours ***Total Marks: 100***

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 10 = 20**

a) What is probe analyzer?
b) Explain the principle of piezoelectric effect.
c) Enlist the various methods for Temperature measurements.
d) Why cold junction compensation is required for thermocouple?
e) What are bellows and Bourden gauage?
f) Define Meleod gauge & Pirani gauge.
g) State the principle of ultrasonic flow meter.
h) Enlist the various methods for the measurement of level,
i) What is the need for the measurement of moisture?
j) What are absolute viscosity and kinematic viscosity?

SECTION B

2. Attempt any *three* of the following: **10 x 3 = 30**

a) Explain the Pneumatic and hydraulic load cell methods for the measurement of weight.
b) Draw and explain the resistance temp characteristics of conductor and semiconductor. For a certain thermistor β = 3000K and the resistance at 27ºC is known as to be 800Ω. The thermistor is used for temperature measurement and the resistance measured is as 2000Ω. Find the measured temperature.
c) What is a manometer? Enlist the different types of manometer and explain any one type of manometer with proper diagram.
d) A venturi meter is to be fitted in the horizontal section of a 0.25 m pipe line. Calculate the cylindrical throat diameter, if the maximum differential pressure obtained is 0.5 cm for a maximum flow rate of 0.5kg/s for water at 20 ^{0} C. Assume a discharge coefficient of 0.99.
e) Explain the working principle of industrial viscosity meter with diagram.

SECTION C

3. Attempt any *one* part of the following: **10 x 1 = 10**

(a) Give the working principle of LVDT with a neat sketch.

(b) What is load cell? Derive gauge factor for wire wounded strain gauge. Give the application of strain gauge.

4. Attempt any *one* part of the following: 10 x 1 = 10

(a) What is concept of Radiation Pyrometer? Explain working principle of disappearing filament type optical pyrometer.

(b) What is the construction and working principle of thermocouple for the temperature measurement? Explain Reference junction compensation in thermocouple in brief.

5. Attempt any *one* part of the following: 10 x 1 = 10

(a) Explain the working of pitut tube orifice meter and describe why is it used for? A pitut tube is used to measure flow velocity in water of density 1000kg/m^3. Determine the flow velocity at the head of pitut if it produces differential pressure of 10kN/m^2 between its two outlets.

(b) Explain the principle, construction and working of Piezoelectric Transducer.

6. Attempt any *one* part of the following: 10 x 1 = 10

(a) Explain the working of a hot wire anemometer using proper diagram. Explain the Bernoulli's theorem and explain its significance.

(b) Explain the working principle of variable area meters (Rotameter) with a neat sketch.

7. Attempt any *one* part of the following: 10 x 1 = 10

(a) Describe about the electrical method of moisture measurement.

(b) Write short note on thermal drying method for moisture measurement.