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Total No. of Pages: 02
Total No. of Questions: 09

B. Tech. (AE) (Sem.-6th)
MEASUREMENT AND INSTRUMENTATION
Subject Code: AE-306
Paper ID: [A-0721]

Time: 3 Hrs.

Max. Marks: 60

INSTRUCTIONS TO CANDIDATE:

1. *Section-A is compulsory consisting of ten questions carrying two marks each.*

2. *Section-B contains five questions carrying five marks each and students have to attempt any four question.*

3. *Section-C contains three questions carrying ten marks each and students have to attempt any two questions.*

SECTION–A (10x2=20)

Q1. a) Differentiate precision and accuracy?

b) What is calibration? Name various types of calibration?

c) Define speed of response and fidelity?

d) What are the general considerations of report writing?

e) What is difference between LVDT and RVDT? What are limitations of LVDT?

f) Explain briefly Moire-Fringe?

g) Differentiate hydraulic and pneumatic load cells?

h) How piezo transducers are used for pressure measurement?

i) Explain the working of Hot-Wire Anemometer?

j) Explain the working of solid rod thermometer?

SECTION–B (4x5=20)

Q2. Explain Central Limit Theorem? If in a manufacturing process, the time required to complete a certain electronic component to be studied. The time needed had a mean of 75

min. and standard deviation of 10 min, for the case of 25 randomly selected components in a sample. Determine population mean, and the size of sample if the internal standard error is not to exceed 1 min.
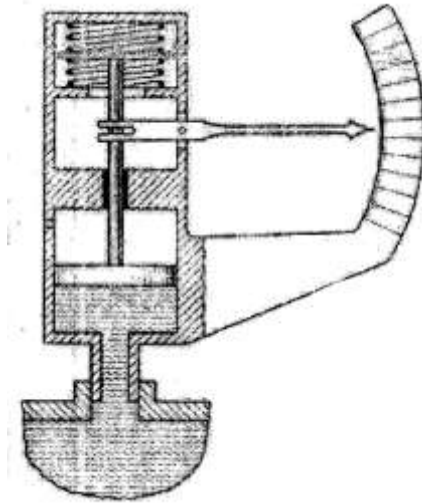
Q3.   Draw the functional elements of the measurement system of Fig1. Pressure gauge.

Q4.   Draw and explain unbonded and bonded resistance strain gauges?

Q5.   Describe the method of measuring torque of rotating shafts using strain gauges.

Q6.   Describe the construction and working of electromagnetic flow meter. List advantages and limitations.

SECTION–C   **(2x10=20)**

Q7.   Derive the expression for time response of 2nd order underdamped system when subjected to a unit ramp input. Show that the nature of the response is the same as that for a unit step input. Find the expression for steady state error.

Q8.   Describe the principle of working, constructional details and of a digital oscilloscope.

Q9.   List various methods can be used for low pressure measurement. Describe the construction, working and theory of McLeod gauge for measurement of vacuum. List advantages and disadvantages.

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