B.E. DEGREE EXAMINATIONS: JUNE 2010

Second Semester

ELECTRONICS AND INSTRUMENTATION ENGINEERING

EIE101: Transducer Engineering

Time: Three Hours   **Maximum Marks: 100**

Answer ALL Questions:-

PART A (10 x 1 = 10 Marks)

1. The following error is caused by the loading effect of instruments

   a)Observational errors   b)Environmental errors   c)Instrumental errors   d)Total error

2. Flow rate is measured with the help of ----------- Transducer

   a)Pitot tube   b)Manometer   c)Capillary Tube   d)Hydrometer

3. ----------------time is defined the time required to the measurement system begin to respond

   a)Rise time   b)Dead Time   c)Fall Time   d)Measuring lag

4. Frequency response is obtained with the help of which input

   a)Step input   b)Ramp input   c)Sinusoidal input   d)Impulse iput

5. InRTD Platinum is used for the below temperature range

   a)-260˚-110˚   b)0-220˚   c)0-180˚   d)120˚-360˚

6. The ratio of mass of water vapour to the volume is called as

   a)Absolute humidity   b)Relative humidity   c)Specific humidity   d)Specific gravity

7. LVDT consists of_____ windings

   a)2primary,2 Secondary   b)1primary,2 Secondary

   c) 2primary,1 Secondary   d) 1primary,1 Secondary

8. Maximum angle measured by capacitive angular displacement transducers is

   a)180˚   b)90˚   c) 120˚   d) 360˚

9._____ is the synthetic group of crystal

   a)Quartz   b)Rochelle salt   c)Tourmaline   d)Lithium Sulphate

10. Smart Sensor is also called as

   a)Calibration sensor   b)Intelligent sensor   c)Ranging sensor   d)Special Sensor

PART B (10 x 2 = 20 Marks)

11. Draw the functional block diagram of measurement systems.

12. Define error, and classify its types.

13. Define active and passive transducers.

14. Define order of a system with example.

15. Differentiate RTD and Thermistors.

16. A strain gauge having a gauge factor of 4 is used or testing machine. If gauge resistance in 100 ohms and strain is $20x10^{-6}$, how much will be the resistance of strain gauge change.

17. What is the working principle of capacitive transducer?

18. What are the different magnetostrictive transducers?

19. List out the advantages and disadvantages of LVDT.

20. What is Piezoelectric Effect?

PART C (5 x14=70 Marks)

21. a) (i) Define calibration and explain in detail about its types. (7)

(ii) Temperature of metal bath is measured 100 times with variations in apparatus, procedures and persons. The readings are tabulated below. (7)

Temp ºC	397	398	399	400	401	402	403	404	405
Freq.	1	3	12	23	37	16	4	2	2

Find a)Mean ,b)Mode,c) Mean Deviation, d) Std Deviation and Probable error of one reading.

(OR)

b) (i) Explain in detail about types of transducers and give example for each types. (7)

(ii) Three resistors R1=37Ω ±5%, R2 =75Ω ±7% and R3=50Ω ±8% are connected in a circuit.Calculate i)The total resistance in neglecting errors both series and parallel connection ii) The total resistance including errors both series and parallel connection (7)

22. a) Briefly explain First order system with example, and obtain the response of i) Ramp Input, ii) Impulse input.

(OR)

b) Briefly explain Second order transducer system with example. And obtain the response of i)Step input, ii)Sinusoidal input.

23. a) Derive an expression for Gauge factor. Explain any two types of Strain Gauge.　(7+7)

(OR)

b) (i) Explain in detail about POT.　(7)

　(ii) Explain in detail about construction, Principle and working of RTD's.　(7)

24. a) Explain in detail about construction,operations and characteristics of LVDT.

(OR)

b) (i) Explain in detail about operation of capacitive transducers.　(10)

　(ii) Explain the working principle of capacitive Microphone.　(4)

25. a) (i) Explain in detail about Piezoelectric Transducers.　(8)

　(ii) Write short notes on Digital Transducers.　(6)

(OR)

b) Explain the construction and operations of Smart sensors. State its advantages and disadvantages.

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