

**B.E. DEGREE EXAMINATIONS: APRIL / MAY 2010**

Sixth Semester

**MECHATRONICS ENGINEERING**

U07MH601: Sensors and Signal Processing

**Time: Three Hours**

**Maximum Marks: 100**

**Answer ALL the Questions:-**

**PART A (10 x 1 = 10 Marks)**

1. A transducer converts
  - a) Mechanical energy into electrical energy
  - b) Mechanical displacement into electrical signal
  - c) One form of energy into another form of energy
  - d) Electrical energy into mechanical form
2. The frequency range of ultra sound is
  - a) 20 kHz
  - b) 10kHz
  - c) 15 kHz
  - d) 25kHz
3. Intelligent sensor called as a \_\_\_\_\_
  - a) Smart sensor
  - b) Primary sensor
  - c) Secondary sensor
  - d) Transducer
4. The second step of thick film process is \_\_\_\_\_
  - a) Preparation of substrate
  - b) heating
  - c) coating
  - d) Preparation of coating material
5. The fastest ADC is \_\_\_\_\_
  - a) Successive Approximation
  - b) Flash Type
  - c) Over sampling
  - d) R-2R ladder
6. At low frequencies the capacitive reactance is \_\_\_\_\_
  - a) low
  - b) very high
  - c) medium
  - d) zero
7. For the steady state response necessary that the realized system is called
  - a) stable
  - b) unstable
  - c) linear
  - d) non-linear
8. The speed of full binary transmission is upto \_\_\_\_\_
  - a) 600 bps
  - b) 800 bps
  - c) 500 bps
  - d) 700 bps
9. The switching time of LED is the order of
  - a) 1s
  - b) 1 ms
  - c) 1  $\mu$ s
  - d) 1 ns
10. The source of emission of electron in a CRT is
  - a) PN junction diode
  - b) accelerating diodes
  - c) a barium and strontium oxide coated cathode
  - d) post accelerating anodes

**PART B (10 x 2 = 20 Marks)**

11. What are the basic requirements of a transducer?
12. Write applications of ultrasonic transducers.

13. How nano devices are fabricated?
14. List out the MEMS applications.
15. Define CMRR.
16. What is quantization?
17. What is data logger?
18. What are the elements of digital data transmission?
19. Write the advantages of digital instrument?
20. Write the different types of DVM?

**PART C (5 x 14 = 70 Marks)**

21. (a) Explain the static and dynamic characteristics of sensors.

**(OR)**

- (b) Explain ionization chamber and proportional counters in radiation sensors.

22. (a). i) Describe the properties of smart sensors. (7)

- ii) With neat diagram explain smart transmitter (7)

**(OR)**

- (b) List the four types of micro machining techniques and explain all of them.

23. (a) What is sample and hold circuit? Explain its operation.

**(OR)**

- (b) Draw and explain the binary weighted resistance type digital to analog converter.

24. (a) Explain the different types of digital filter approaches.

**(OR)**

- (b) With neat diagram explain multichannel data acquisition system.

25. (a) Explain the theory and working of liquid crystal diodes. Describe the difference between light scattering and field effect types of LCDs.

**(OR)**

- (b) Explain with suitable circuit diagram the working of an X-Y recorder. Describe its application.

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