B.E.DEGREE EXAMINATIONS: APRIL 2011

Sixth Semester

MECHATRONICS ENGINEERING

U07MH601: Sensors and Signal Processing

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

Answer ALL Questions:-

PART A (10 x 1 = 10 Marks)

1. Ultrasound piezocrystal operates in the range of

   A) 20-25MHz   B) 0.5- 10MHz   C) 50-60MHz   D) 0.1-20MHz

2. Smart sensors is also called as

   A) Talent sensors   B) Nano sensors   C) MEMS   D) Intelligent sensors

3. The substrates used for developing thick film over them are

   A) Alumni and copper   B) Alumina and beryllia

   C) Phosphorous and silicon   D) Zinc and lead

4. _____effect of certain crystalline material has been successfully utilized in ultrasound production and sensing

   A) Piezoelectric   B) photoelectric   C) Copper   D) All the above

5. The proximity type of instrument is a

   A) dial gage   B) load cell   C) pyrometer   D) speedometer of a car

6. Notch filter is otherwise known as

   A) Low pass filter   B) high pass filter   C) band reject filter   D) band pass filter

7. The practical use of binary-weighted digital-to-analog converters is limited to:

   A) R/2R ladder D/A converters   B) 4-bit D/A converters

   C) 8-bit D/A converters   D) op-amp comparators

8. The heart of a data acquisition system is

   A) ADC   B) DAC   C) Dataloggers   D) digital filter

9. Digital panel meter(DPM) is well known example for

   A) Single channel DAQ   B) multichannel DAQ   C) data logger   D) Digital filter

10. Laser light is sent to the sensor by

    A) Optical fiber   B) Transmission &distribution

    C) Wireless communication   D) Co-axial cables

PART B (10 x 2 = 20 Marks)

11. Differentiate Accuracy and Precision.

12. Define Hygrometer.

13. What are the features that a Smart sensor should have?

14. What are the steps that have to be taken for manufacturing a Film sensor?

15. Define quantizing process.

16. Draw the circuit diagram of Sample and Hold circuit.

17. What are the parameters stored by the data loggers?

18. What is half binary transmission?

19. Name the components of a CRO.

20. What are the 2 writing patterns of dot matrix displays?

PART C (5 x 14 = 70 Marks)

21. a) Explain the operation of any two types of microphone with neat sketches.

(OR)

b) Explain the static and dynamic characteristics of a sensor.

22. a) Describe how the information coding and processing is done in smart sensor.

(OR)

b) Discuss the role of data communication in smart sensors.

23. a) With the help of circuit diagram explain the operation of Multiplexer and De-multiplexer.

(OR)

b) What are the various operations carried out in signal conditioning process? Explain each one of them briefly.

24. a) Draw the block diagram of multichannel data acquisition system and explain the function of each block.

(OR)

b) Write short notes on (i) Digital filtering   (7)

(ii) Data Logging.   (7)

25. a) Briefly explain   (i) X-Y Recorders   (7)

\   (ii) Magnetic tape recorder.   (7)

(OR)

b) Explain the segmental displays with neat sketches.

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