

B.E DEGREE EXAMINATIONS: APRIL/MAY 2014

(Regulation 2009)

Sixth Semester

MECHATRONICS ENGINEERING

MCT113: Sensors and Signal Processing

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Which of the following is not a self-generating type of transducer
 - a) thermocouple
 - b) LVDT
 - c) Photo voltaic cell
 - d) Bourdon tube of a pressure gauge
2. The smallest change in the value of input variable being measured, that will cause a change in the output signal of the instrument is termed as:
 - a) hysteresis
 - b) drift
 - c) resolution
 - d) threshold
3.are processed for communication by a software processor and a suitable interface system communicates between the processor and the bus.
 - a) Parasitic effects
 - b) Data communication
 - c) Coded data
 - d) none of the above
4.processing differs from thick film technology mainly in the film deposition techniques
 - a) thick film sensor
 - b) Thin film sensor
 - c) Sputter deposition
 - d) Chemical vapor deposition (CVD)
5. Notch filter is otherwise known as
 - a) Low pass filter
 - b) high pass filter
 - c) band reject filter
 - d) band pass filter
6. 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
7. Digital panel meter(DPM) is well known example for
 - a) Single channel DAQ
 - b) multichannel DAQ
 - c) data logger
 - d) Digital filter

8. The heart of a data acquisition system.
 - a) ADC
 - b) DAC
 - c) Data loggers
 - d) digital filter
9. The machine interpretable outputs from an analog transducer can be had from
 - a) magnetic tapes
 - b) punched cards and tapes
 - c) teletypewriter
 - d) all the above.
10. The LED for their display require
 - a) voltage of 1.2V and a current of 20mA
 - b) voltage of 25V and a current of 20mA
 - c) voltage of 1.2V and a current of 100mA
 - d) voltage of 25V and a current of 100mA

PART B (10 x 2 = 20 Marks)

11. Compare accuracy and precision.
12. What are primary and secondary transducers?
13. State Parasitic effects.
14. What are the features that a Smart sensor should have?
15. Where do you apply sample and hold system.
16. Differentiate Digitizer and modulator.
17. What is a data acquisition? Give the functional blocks of a data acquisition system.
18. Define acquisition time and conversion time.
19. List the important features of CRTs.
20. Compare common anode and common cathode displays.

PART C (5 x 14 = 70 Marks)

21. a) (i) List the types of nuclear radiation sensors and explain gieger – multer counter.
(ii) How pre polarized micro phone works and explain the types of microphones based on their directionality.
(OR)
 - b) (i) Explain the static and dynamic characteristics of sensor with a neat sketch. (8)
 - (ii) Draw the block diagram of sound level meter and explain the individual blocks. (6)
22. a) (i) Explain the role of Film, MEMS and Nano sensors and its recent technology. (10)
(ii) Name some sensors used in Environmental Monitoring. (4)
(OR)
 - b) Discuss the information coding / processing in smart sensor.

23. a) (i) What do you mean by a charge amplifier and instrumentation amplifier? (4)
(ii) Explain the operation of instrumentation amplifier with neat sketch. (10)

(OR)

- b) (i) How real world signals are interfaced with computer and explain the significance of each process. (7)
(ii) Explain the operation of Multiplexer with neat sketch. (7)

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

(OR)

- b) (i) Discuss the data transmission system with suitable diagram. (10)
(ii) Write a note on data logging. (4)

25. a) Define recorders and classify its types and explain with neat sketch.

(OR)

- b) Explain the segmental displays with a neat sketch.
