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4th Year – 1st Term – 2018/2019

CSE423a
Measurements

Final Examination

January, 2019

Duration: 2 Hours

12 pages, 90 questions, 40 points

Use the attached bubble sheet to answer the following questions. Fill in the bubble of the choice that best answers the corresponding question. No more than one bubble should be filled in per question.

1- The factors that the observation error depends on are:

- a) Distance of the element from the observer
- b) Ambient lighting
- c) Eyesight, patience and skill of the observer
- d) All of the above
- e) None of the above

2- Is the difference between measured value and true value

- a) Measurement system error
- b) Observation error
- c) Total error
- d) All of the above
- e) None of the above

3- Is the difference between observed value and measured value.

- a) Measurement system error
- b) Observation error
- c) Total error
- d) All of the above
- e) None of the above

4- LCD character displays have power consumption than equivalent LED displays

- a) Lower
- b) Greater
- c) the same
- d) all of the above
- e) None of the above

5- have higher operating voltages and power consumption

- a) electroluminescent displays
- b) Light emitting diode displays
- c) Liquid crystal displays
- d) Cathode ray tube displays
- e) None of the above

6- are not used in graphic displays.

- a) electroluminescent displays LCD
- b) Light emitting diode displays LCD
- c) Liquid crystal displays LCD
- d) Cathode ray tube displays CRT
- e) None of the above

7- The Chart record can record up to variables but the Paperless recorder can record variables.

- a) Two , four
 b) Six , eight
 c) Four, six
 d) Six , four
 e) None of above

✓ Consider an accurate flow measurement system where the true value of flow rate is $11.3 \text{ m}^3 \text{ h}^{-1}$ and the measured value $11.5 \text{ m}^3 \text{ h}^{-1}$. And the total error $0.7 \text{ m}^3 \text{ h}^{-1}$.

$$\begin{aligned} \text{Total error} &= 0.7 \text{ m}^3 \text{ h}^{-1} - \text{True} \\ \text{Measured value} &= \text{observed value} - \text{true error} \\ \text{Measured value} &= 11.5 - 0.7 = 10.8 \text{ m}^3 \text{ h}^{-1} \end{aligned}$$

✓ 8. It's the final element in the measurement system and its function communicating the measured value of the variable to a human observer.

- a) Data presentation element
 b) Sensing element
 c) Signal Conditioning element
 d) Signal processing element
 e) None of the above
- ✓ 9. The value of observation error will equal to
- a) $0.8 \text{ m}^3 \text{ h}^{-1}$
 b) $0.5 \text{ m}^3 \text{ h}^{-1}$
 c) $0.7 \text{ m}^3 \text{ h}^{-1}$
 d) $1 \text{ m}^3 \text{ h}^{-1}$
 e) None of the above

✓ 10. The value of measurement system error is

- a) $0.8 \text{ m}^3 \text{ h}^{-1}$
 b) $0.25 \text{ m}^3 \text{ h}^{-1}$
 c) $0.2 \text{ m}^3 \text{ h}^{-1}$
 d) $0.0354 \text{ m}^3 \text{ h}^{-1}$
 e) None of the above

✓ 11. Digital displays that used to display both character and graphics.

- a) Liquid crystal (LCD).
 b) Cathode ray tube (CRT).
 c) Electro-luminescence (EL).
 d) All of the above
 e) None of the above

✓ 12. Observation error = measured error - observed error

- a) True
 b) False

✓ 13. determines the direction of motion in pointer-scale indicators.

- a) Kirchhoff's current law
 b) Fleming's left hand rule
 c) Fleming's Right-hand rule
 d) b or c
 e) None of the above

✓ 14. When the coil moves in the magnetic field, all the following are true except....

- a) Spring restoring torque TR opposes the main torque.

- b) Back e.m.f is induced in the coil
 c) The resistance of the coil decreases
d) b & c
e) None of the above

✓ 15- Pointer-scale indicators usually have a scale that is
a) cramped at lower end
b) cramped at higher end
 c) uniform
d) cramped at both lower & higher end
e) None of the above

✓ 16- All the following are false about pointer-scale indicators except
a) They don't cause observational errors
b) They need to process measured value and doesn't display in real time
 c) They can be easily affected by noise
d) All of the above
e) None of the above

✓ 17- Color of the led depends on
 a) Fabrication materials
b) Forward voltage
c) Forward current
d) Outer paint

✓ 18- The millicandela is used to measure
a) Forward Current
b) Conductivity
 c) Light intensity
d) Light color

✓ 19- In 4×4 Pixel Matrix, We need electrical conductors.
a) 16
b) 4
 c) 8
d) 32

✓ 20- In a 8×8 matrix of LEDs after wiring all the anodes together in rows , and cathodes in columns , the required number of I/O pins is reduced to.....
a) 64 I/O pins
 b) 16 I/O pins
c) 46 I/O pins
d) 8 I/O pins

✓ 21- There are two common configurations for LED Dot matrix
 a) CCAR,ACCR
b) RCCA,RACC
c) AACC,RRCC
d) Not Mentioned

✓ 22- In the matrix CCAR , of the LEDs are connected to the rows and are connected to the columns.
 a) Anodes, Cathodes
b) Negative terminals, Positive terminals
c) Cathodes, Anodes

✓ 23- Which part is the responsible of converts the light to electric signals

a) Photo detector

b) Micro-chip

c) LED

d) None of the mentioned

✓ 24- The Li-fi is more secure than Wi-Fi because :

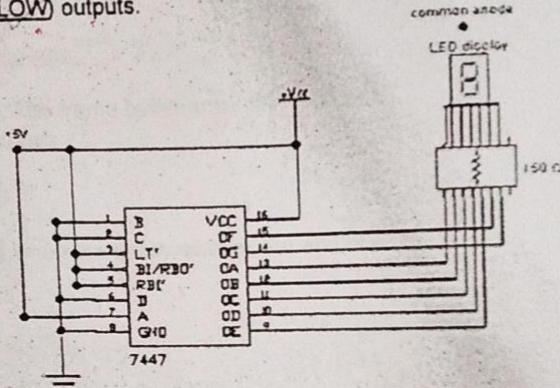
a) It's much faster

b) light is blocked by the walls

c) Coverage distance is lower than Wi-Fi

d) All of the above

✓ 25- The 7447 IC is a BCD-to-7-segment decoder which can drive LED displays and has active (HIGH, LOW) input with active (HIGH, LOW) outputs.



a) HIGH, HIGH

b) HIGH, LOW

c) LOW, HIGH

d) LOW, LOW

e) None of the above

✓ 26- In Dot matrix Each led is addressed by.....

a) Its row number only.

b) Its column number only

c) Its row and column number.

d) its row or column number.

e) None of the above.

✓ 27- Dot-matrix format enables a set of charactersthe 7-segments.

a) Larger than

b) Smaller than

c) Equal to

d) B & C

e) B & C

✓ 28- What determines light intensity in a CRT?

a) Voltage

b) Current

c) momentum of electrons

- ✓ 29- vertical deflection is given by.....
a) $y = Ky$
b) $y = Vy$
c) 1
d) $y = Ky Vy$
- ✓ 30- Sometimes it is difficult to exchange a highly accelerated beam called
a) post deflect acceleration
b) Hard beam
c) Mono accelerating tube
d) None of the above
- ✓ 31- The main major of display-processor is
a) store the picture data
b) transport picture data
c) transform pictures to pixels
d) none of above
- ✓ 32- In raster display system, The frame buffer array represents
a) Lines which will be drawn
b) video history
c) all screen pixels
d) none of above
- ✓ 33- which technique is used when the beam reaches the end of a row ?
a) Horizontal retrace
b) Vertical retrace
c) diagonal retrace
d) none of above
- ✓ 34- The main function of electron gun is
a) Accelerating electron beam
b) Focusing electron beam
c) Both of a and b
d) None of them
- ✓ 35- The electron gun consists of
a) Heater
b) Cathode
c) Accelerating and focusing anodes
d) All of the above
- ✓ 36- The grid which controls the flow of electrons has
a) Negative Biasing
b) Positive Biasing
c) No Biasing
d) None of them
- ✓ 37- The color emitted by an led depends mainly on:
a) type of material used
b) type of biasing applied
c) recombination rate of charge carriers

- d) environmental conditions
e) none of the above
- 38-The specialty of LED is that, LEDs are made from
a) direct gap semiconductors
b) direct gap conductors
c) indirect gap conductors
d) direct gap insulators
e) none of the above
- 39-If the junction temperature of LED is increased the radiant output power
a) Remains the same
b) Increases
c) Decreases
d) all of the above
e) None of the above
- 40-The intensity of the diode light with Current
a) increase, reverse
b) decrease, reverse
c) increase, forward
d) decrease, forward
e) none of the above
- 41-The human eye is more sensitive to the led so it needs low radiant power to appear as bright as led of much higher radiant power
a) (green; red)
b) (red; green)
c) (yellow, green)
d) (yellow, red)
e) None of the above
- 42-Liquid crystal displays (LCDs) are widely used in a range of electronic systems. Which of the following describes the construction of such a display?
a) Two sheets of conducting material separated by a layer of insulating dielectric.
b) Two sheets of polarized glass with a thin layer of oily material sandwiched between them.
c) a pn junction formed using materials such as gallium arsenide or gallium phosphide.
d) None of the above.
- 43-Active matrix display uses as a subpixel controller.
a) Chemical field-effect transistor
b) Diffusion transistor
c) Thin film transistor
d) Spin transistor
- 44-LCDs operate from a frequency ranges from
a) 10Hz to 60Hz
b) 50Hz to 70Hz
c) 30Hz to 60Hz
d) None of the Mentioned
- 45-Disadvantage of LCD :
a) high cost

- b) Response time is very low
c) Provide excellent contrast
d) None of them

46-In CRT, the used to adjust the number of electrons in the beam by altering the potential applied on it.

- a) Cathode
b) Anode
c) Grid
d) Deflection Plates
e) None of the above

47-In Each pixel can be turned on or off to produce graphical images or alphanumeric characters at any position on the screen

- a) fixed format alphanumeric display
b) monochrome display
c) graphic display
d) Raster-type display
e) None of the above

Raster-Type Display is a monochrome display obtained with a non-storage CRT and a standard 312-line. Its electron gun continually scanning in a regular pattern (line by line across entire screen) with constant time to redraw any number of elements.. According to this, Answer the following questions:

48-The period of the Y voltage is relatively than the persistence

- a) shorter
b) equal
c) longer
d) b & c
e) None of the above

49-In a raster-type display constant amplitude deflection voltages are applied

- a) saw-tooth
b) square
c) sinusoidal
d) All of the above
e) None of the above

50-312 horizontal lines are traced out during the movement of the spot from of the screen

- a) bottom to top
b) top to bottom
c) left to right
d) right to left
e) None of the above

51-CRT is not flat screen operating voltage and power consumption .

- a) higher & higher
b) higher & lower
c) lower & lower
d) lower & higher
e) none of the above

52-In the phosphors must be re-energized every time the phosphorescence decays to a certain level

- a) refresh displays
- b) monochrome display
- c) storage displays
- d) non-storage displays
- e) None of the above

53-LCD is a flat screen, ~~higher~~ operating voltage and ~~lower~~ power consumption.

- a) higher & higher
- b) higher & lower
- c) lower & lower
- d) lower & higher
- e) none of the above

54-With no voltage across the electrodes the pixel appears.....

- a) White
- b) Transparent
- c) Black
- d) None of the above

55-The voltage is applied for only 1% of the time, the power required for each pixel is considerably.....

- a) Increased
- b) Reduced
- c) Remained constant
- d) None of the above

56-Monitor which is similar to LCD monitor, but has a phosphorescent film between layers, is ...

- a) Plasma display
- b) Electro luminescent display (ELD)
- c) Paper-white display
- d) Thin-film transistor
- e) None of the above

57-The first layer in EL display is a number of ...

- a) Row electrodes
- b) Column electrodes
- c) Dielectric material
- d) None of the above

58-Chart recorders are built in primary formats

- a) Two
- b) Three
- c) Four
- d) Five
- e) None of the above

59-In ... chart recorder paper that is ejected out of the recorder

- a) Strip
- b) Circular
- c) Roll
- d) a & c
- e) None of the above

60-In Continuous or line recorders, there is...

- a) Separate motor and pen for each variable

- b) Single motor and pen
- c) Horizontal offset
- d) Trace which is a series of dots in different colors

61- Which of the following is not a component in digital recorder?

- a) Displacement sensor
- b) Amplifier
- c) ADC
- d) Micro-controller

e) None of the above

62- The motor used in digital recorder is...

- a) D.C motor
- b) Servo motor
- c) Stepper motor
- d) Gearhead motor
- e) None of the above

63- The disadvantages of chart recorders is ..

- a) High power consumption
- b) Data retrieval isn't easily achieved
- c) Low performance

d) All of the above

e) None of the above

64- The advantages of chart recorders is that ..

- a) Data can be analyzed directly from paper
- b) sharing of data is easily achieved
- c) it doesn't waste paper

d) It's well suited to recording of continuous processes

e) None of the above

65- 10-bit A-D converter is used, which gives a: (assume $2^{10} = 1000$)

- a) 0.6% measurement resolution

b) 0.1% measurement resolution

c) 1% measurement resolution

d) 0.8% measurement resolution

66- Galvanometric recorders work on the same principle as:

a) Servo systems and pulleys

b) Tape motion

c) Moving-coil meter

d) Potentiometric feedback

e) None of the above

67- potentiometric recorders are suitable for measuring:

a) DC Signals only

b) AC Signals only

c) Both A and B

d) Neither A nor B

68- In Multi-point recorders how many pens are used to record :

a) Only one

- b) Up to 4 pins
c) One for each measured variable.
d) None of the above

68- Chart record is a type of data presentation which display it as a

- a) Digital value
b) Analog pointer scale
c) Continues chart
d) All of the above
e) None of the above

70- The input to a chart record may be

- a) Electrical only
b) Mechanical only
c) Sequence of bits
d) a & b
e) none of the above

71- Is a format of a record chart

- a) Circular
b) Roll
c) Strip
d) All of the above
e) None of the above

72- In analog chart recorder Pulleys role is to

- a) convert angular displacement to a vertical displacement
b) convert angular displacement to a volt for feedback
c) convert vertical displacement to angular displacement
d) convert volt to angular displacement
e) none of the above

73- Paperless recorders use to display the measured value.

- a) Liquid crystal display (LCD).
b) Cathode ray tube display (CRT).
c) Vacuum fluorescent display.
d) Incandescent filaments.
e) None of the above.

74- To select the measured signal to be displayed is used.

- a) Decoder.
b) Encoder.
c) Multiplexer.
d) Demultiplexer.
e) None of the above.

75- The main function of the microprocessor is

- a) To select which signal will be displayed.
b) To Store the measured values.
c) To display the measured values.
d) To generate the row and column address signals.
e) None of the above.

76- Input data is initially stored in

- a) Random Access Memory (RAM)
b) Archive Storage.
c) Read Only Memory (ROM).
d) Cache Memory.
e) None of the above.

✓ 7. The main function of the archive storage is

- a) To store the measured value to be retrieved.
b) To store the data initially during measure process.
c) To store the instructions to be executed.
d) To store the row and column addresses.
e) None of the above.

✓ 8. With the disk and four input variables, each sampled at one-minute intervals, approximately Days of record is obtained.

- a) 120
b) 130
c) 150
d) 160

e) None of the above.

✓ 9. Advantages of paperless recorders.....

- a) Reduces non-compliances
b) Improves process quality
c) Archiving savings
d) All of the above
e) None of the above

✓ 10. what are Disadvantages of paperless recorders

- a) Training Costs
b) Health Concerns
c) IT Expertise Required
d) All of the above
e) None of the above

✓ 11. is a high voltage wire give a static charge to anything nearby:

- a) Ink roller
b) Fuser
c) Photoreceptor drum
d) Corona wire
e) None of the above.

✓ 12. The laser Draws the image onto:

- a) Ink roller
b) Fuser
c) Photoreceptor drum
d) Corona wire
e) None of the above.

✓ 13. Replace electrostatic image with black powder:

- a) Ink roller
b) Fuser
c) Photoreceptor drum

- d) Corona wire
e) None of the above.

84- Makes the toner particles permanently into the fibers of the paper

- a) Ink roller
b) Fuser
c) Photoreceptor drum
d) Corona wire
e) None of the above.

85- Convert data to bitmap image:

- a) Laser
b) Corona wire
c) Printer controller
d) Printer memory
e) None of the above

86- Converts bitmap image to electrostatic image:

- a) Laser
b) Corona wire
c) Printer controller
d) Printer memory
e) None of the above

87- Characters could be in format and graphics in vector format.

- a) ASCII
b) UTF-8
c) UTF-16
d) All of the above
e) None of the above

88- Not one of laser printer pros:

- a) Faster
b) Produce perfect sharp black text
c) High-volume print job
d) No warm-up time
e) None of the above

89- Initially all of the elements are given a charge(photoreceptor drum).

- a) no charging happens on photoreceptor drum
b) negative.
c) positive.
d) a and b
e) none of the above

90- The electrostatic image on the drum surface is then erased by passing it under

- a) the fuser
b) the discharge lamp
c) the photoreceptor drum
d) all of the above
e) None of the above