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Question Bank

Subject code : 79713

Subject Name :Electronics Paper IX

Paper No.IX (Electronics Instrumentation I and Mechatronics)

Que.No.1 : Select the correct alternative (One mark each)

- 1) -----level of mechatronic system incorporates advanced feedback function into control strategies.
 - a) Primary
 - b) Secondary
 - c) Third
 - d) Fourth
- 2)level of mechatronic system introduces intelligence, fault detection and isolation capability system.
 - a) Primary
 - b) Secondary
 - c) Third
 - d) Fourth
- 3) The systems like Hydraulic, pneumatic, rotational or translational systems are the examples of ----- system.
 - a) Mechanical
 - b) Electrical
 - c) Electronic
 - d) Information
- 4) Electrical motors, generators, transformers and relay are the part of ----- system.
 - a) Mechanical
 - b) Electrical
 - c) Electronic

d) Information

5) Microprocessor and microcontroller based systems are the part of ----- system.

a) Mechanical

- b) Electrical
 - c) Electronic
 - d) Information
- 6) -----system make use of various transducers, signal conditioning element and output devices.
- a) Mechanical
 - b) Electrical
 - c) Electronic
 - d) Instrumentation and control
- 7) -----system is the combination of communication, signal processing and control systems and numerical methods.
- a) Mechanical
 - b) Electrical
 - c) Electronic
 - d) Information
- 8) -----produces motion, or causes friction in mechatronic system.
- a) Actuators
 - b) Sensors
 - c) Graphical display
 - d) Input signal conditioning and interfacing
- 9) Servo motor is the example of ----- .
- a) Actuators
 - b) Sensors
 - c) Graphical display
 - d) Input signal conditioning and interfacing
- 10) -----detects the state of system parameters, inputs and outputs.
- a) Actuators
 - b) Sensors
 - c) Graphical display
 - d) Digital control architecture
- 11) Amplifiers, Filters, ADC, V to I and I to V are the examples of ----- .

- a) Actuators
- b) Sensors
- c) Graphical display
- d) Input signal conditioning and interfacing

12) PWM, power transistor, power amplifier and power Op.Amp. are used in -----
 --- --.

- a) Input signal conditioning and interfacing
- b) Output signal conditioning and interfacing
- c) Digital control architecture
- d) Graphical display

13) provides visual feedback to the user.

- a) Actuators
- b) Sensors
- c) Graphical display
- d) Input signal conditioning and interfacing

14) Which is the first aspect which needs to be considered in the Mechatronics design process?

- a) Hardware integration and simulation
- b) Conceptual design
- c) Mathematical modeling
- d) Modeling and simulation

15) In the level of integration of Mechatronics system, an example of the first level is _ a)
 Fluid valves

- b) Automatic machine tools
- c) Industrial robots

- a)
- b)
- c)
- d)

d) Microprocessors

16) Microprocessor based electrical motors are used for _____

Prediction of fault in the system

Correction before a fault occurs

Actuation purpose in robots

Providing intelligence

17) Which phase of a mechatronics system consists of hardware designing?

a) Prototyping

b) Modeling

c) Simulation

d) Deployment

18) What is the function of “analysis” in the modeling and simulation phase?

a) Database for maintaining project information

b) Sub models for eventual reuse

c) Contains Numerical methods

d) To produce high-level source code

19) Describing the behavior characteristics through block diagram is done in _ _____

a) Modeling and simulation

b) Prototyping

c) Deployment

d) Design optimization

20) Prototyping involves _____

a) Conceptual design

b) Replacing non-computer systems with actual hardware

a)

b)

c)

d)

- c) Database for maintaining project information
- d) Sub models for eventual reuse

21) A servo motor is a typical example of ___

- a) Electronics system
- b) Mechanical system
- c) Computer system
- d) Mechatronics system

22) What is the function of an input signal conditioning unit?

- To produce control signals
- To signal amplification and conversion
- To perform mechanical work
- To produce electrical signals

23) The main function of Actuator is _____

- a) To produce motion
- b) Detect input
- c) Detect output
- d) Detect the state of the system

24) What converts physical input into output, among the basic parts of a measuring system? a) Transducer or sensor

- b) Signal conditioning
- c) Intelligence
- d) Display

25) The analog to digital conversion in a measurement system takes place inside _____

- a) transducer

- a)
- b)
- c)
- d)

- b) signal processor
- c) display
- d) led

26) Which type of error always has the same and consistent value?

- a) Random errors
- b) Systematic errors
- c) Zero errors
- d) Hysteresis errors

27) The largest value for which the instrument output remains zero is _ a) hysteresis error

- b) resolution
- c) sensitivity
- d) dead zone

28) The function of the data transmission element is _____ to transfer data from one element to another

to Modify the data

to process the data

to separate the signal hidden in the noise

- a)
- b)
- c)
- d)

- 29) Which elements among the following is used to modify the data before display?
- a) Data presentation element
 - b) Data transmission element
 - c) Data processing element
 - d) Variable manipulation element
- 30) ----- is the process of comparing an unknown quantity with a accepted standard quantity.
- a) Error
 - b) Sensitivity
 - c) Resolution
 - d) Measurement
- 31) -----errors are mainly due to human mistakes in reading while using an instrument.
- a) Gross errors
 - b) Systematic errors
 - c) Random errors
 - d) None of these
- 32) -----errors can not be treated mathematically.
- a) Gross errors
 - b) Systematic errors
 - c) Random errors
 - d) None of these
- 33) -----errors are obtained due to incorrect adjustment of instrument and computational mistakes.
- a) Gross errors
 - b) Systematic errors
 - c) Random errors
 - d) None of these
- 34) errors are occurred due to shortcoming of the instrument.
- a) Gross errors
 - b) Systematic errors
 - c) Random errors

- d) None of these
- 35) Friction in the bearing of moving components is ----- type of error.
- a) Instrumental
 - b) Environmental
 - c) Observational
 - d) None of these
- 36) The parallax error introduced in reading a meter scale is ----- type of error. a)
- Instrumental
 - b) Environmental
 - c) Observational
 - d) None of these
- 37) ----- errors are due to unknown causes and not determinable in ordinary process of making measurements.
- a) Gross errors
 - b) Systematic errors
 - c) Random errors
 - d) All of the above
- 38) ----- Errors are normally small and follow the law of probability. a) Gross errors
- b) Systematic errors
 - c) Random errors
 - d) All of the above
- 39) ----- of any system which defines the limits between which input can vary a)
- Error
 - b) Range
 - c) Accuracy
 - d) Resolution
- 40) ----- is the maximum value of input minus minimum value of input. a) Error
- b) Span
 - c) Accuracy
 - d) Resolution
- 41) ----- is the difference between the actual value and true value.

- a) Error
- b) Range
- c) Accuracy
- d) Resolution

42) ----- is the degree of exactness of measurement, compared to the expected value

- a) Error
- b) Range
- c) Accuracy
- d) Resolution

43) ----- is the relationship indicating how much output change is there with per unit input.

- a) Error
- b) Sensitivity
- c) Accuracy
- d) Resolution

44) Transducer can give different outputs from the same value of quantity being measured according to whether that that value has been reached by continuously increasing change or a continuously decreasing change. This effect is called -----.

- a) Nonlinearity error
- b) Range
- c) Hysteresis
- d) Resolution

45) ----- of transducer is used to describe its ability to give the output for repeated applications of the same input value.

- a) Stability
- b) Repeatability
- c) Sensitivity
- d) Accuracy

46) ----- of a transducer is its ability to give the same output when used to measure a constant input over a period of time.

- a) Stability
- b) Repeatability

- c) Sensitivity
 - d) Accuracy
- 47) ----- is the range of input values for which there is no output.
- a) Range
 - b) Span
 - c) Dead band
 - d) All of the above
- 48) ----- is a smallest change in a measured value to which an instrument will respond.
- a) Accuracy
 - b) Sensitivity
 - c) Stability
 - d) Resolution
- 49) Resistance temperature Detector (RTD) is _____
- a) a electrical transducer
 - b) a mechanical transducer
 - c) a chemical transducer
 - d) a physical transducer
- 50) Relation between temperature and resistance of a conductor is _ a) $R_t = R_{ref} [1+t]$
- b) $R_t = R_{ref} [1+\alpha t]$
 - c) $R_t = R_{ref} [1-\alpha t]$
 - d) $R_t = R_{ref} [1-t]$
- 51) Most metallic conductors have a _____
- a) neutral temperature coefficient of resistance
 - b) negative temperature coefficient of resistance
 - c) positive temperature coefficient of resistance
 - d) zero temperature coefficient of resistance
- 52) In a temperature sensing element _____
- a) low value of α is required
 - b) $\alpha < 0$ is required

- c) α must be zero
 - d) high value of α is required
- 53) The advantages of the Thermistor is _____
- a) rugged
 - b) very small
 - c) fast response
 - d) All of the above
- 54) Thermistor is/are _____
- a) PTC type
 - b) NTC type
 - c) PTC and NTC types
 - d) None of the above
- 55) LM35 is _____.
- a) Pressure sensor
 - b) Humidity sensor
 - c) Temperature sensor
 - d) Touch sensor
- 56) A _____ is thermally sensitive resistor that exhibits a large change in resistance. a) Thermistor
- b) Resistance Thermometer
 - c) Thermocouple
 - d) Semiconductor based sensor
- 57) _____ measures temperature by correlating the resistance of the RTD with temperature.
- a) Thermistor
 - b) Resistance Thermometer
 - c) Thermo couple
 - d) Semiconductor based sensor
- 58) In _____ two different metals are joined together and potential difference occurs across the junction.

- a) Thermistor
- b) LM35
- c) Thermocouple
- d) Semiconductor based sensor

59) _____ is the most linear and accurate temperature sensor.

- a) LM35
- b) RTD
- c) Thermocouple
- d) Semiconductor based sensor

60) _____is active transducer.

- a. Thermistor
- b. Strain Gauge
- ~~c. Thermocouple~~
- d. RTD

61) _____is a passive transducer.

- a.** Photodiode
- b.** Photo transistor
- c.** Thermocouple
- d. Thermistor**

62) _____is also called as piezoresistive transducer.

- a. Thermistor
- b. capacitive
- c. Strain gauge**
- d. Thermocouple

63) The sensitivity of material with strain in strain gauge is called the ----- -
-.

- a. sensitivity
- b. gauge factor**
- c. accuracy

d. resolution

64) -----is the unit of gauge factor.

- a. **ohm/ μ M**
- b. ohm/ $^{\circ}$ c
- c. volt/ ohm
- d. A/ $^{\circ}$ c

65) -----Transducer operate under energy conversion principle.

- a. **Active**
- b. Passive
- c. Active and Passive
- d. Thermistor

66) LVDT is ----- inductive transducer.

- a) active
- b) passive
- c) active and passive
- d) none of these

67) The temperature coefficient of temperature sensor IC LM 35 is -----.

- a) 100m V/ $^{\circ}$ C
- b) 10m V/ $^{\circ}$ C
- c) 100m A/ $^{\circ}$ c
- d) 10m A/ $^{\circ}$ c

68) External excitation is needed only for ----- transducers.

- a) **passive**
- b) active
- c) both active and passive
- d) none of these

69) LVDT is ----- transducer.

- a) velocity
- b) flow

c)c) displacement

d)d) photo

70) Material used for piezoelectric transducer is ----- --.

a) carbon

b) copper

c) iron

d) quartz

71) The photo conductive material of photoconductive cell is ----- --.

a)cadmium sulphide

b)quartz

c) iron

d) metal oxides

72) Smart Sensors consists____.

a) sensor

b) signal conditioning

c) data processing

d) all of the above

73) Potentiometer is _____type of sensor.

a) position

b) proximity

c) temperature

d) light sensor

74) _____sensor is very useful to measure angular displacement.

a) Potentiometer b) Strain gauge c) Thermocouple d) Photo diode

75) For displacement measurement _____sensor is/are useful.

a) LVDT b) capacitive c) potentiometer d) All of the above

76) In _____ sensor placed three coils one primary and two secondary symmetrically.

a) Strain Gauge b) LVDT c) eddy current sensor d) hall effect sensor

77) _____ is/are proximity type of the sensors.

a) eddy current b) hall effect c) proximity switch d) all of the above

78) For rotational speed or angular motion measurement _____ sensor is useful.

a) tachometer b) bimetallic strip c) strain gauge d) Pneumatic

79) _____ output depends on temperature.

a) thermocouple b) Thermistor c) LM35 d) All of the above

80) _____ sensor output resistance changes with temperature.

a) Thermister b) Thermocouple c) LM35 d) Bimetallic strip

81) Photo resistor is also called as _____.

a) LDR b) LED c) LVDT d) strain gauge

82) In LVDT, when magnetic core is at the centre then resultant voltage at the secondary of it is _____.

a) positive b) negative c) 0 d) ∞

83) Which type of material can be sensed by inductive proximity sensor?

a) Wooden type

b) **Metallic type**

c) Plastic type

d) Glass type

84) Which metal will have a larger range of detection by inductive proximity sensor? a)

Iron

- b) Aluminium
- c) Copper
- d) Lead

85) Which type of proximity sensor can be used as touch sensor?

- a) **Inductive proximity sensor**
- b) Capacitive proximity sensor
- c) Ultrasonic proximity sensor
- d) Photoelectric proximity sensor

86) Which type of proximity sensor can detect a magnetic substance even if a wall of nonferrous substance is made?

- a) **Magnetic proximity sensor**
- b) Capacitive proximity sensor
- c) Ultrasonic proximity sensor
- d) Photoelectric proximity sensor

87) Hall Effect is a/an _____

- a) Electronic
- b) Magnetic
- c) **Galvanic**
- d) Ionizing

88) Which of the following represents the output of Hall Effect transducer? a) **Hall potential**

- b) Emf
- c) Applied voltage
- d) Lorentz Voltage

89) Hall Effect transducer can be used to measure _____

- a) Magnetic field
- b) Angular displacement
- c) Linear displacement
- d) **All of the above**

90) In which type of system does power transmission take place through compressed air?

- a) Fluid power system
- b) Hydraulic system
- c) **Pneumatic system**
- d) Stepper motors

91) The compressed air flows to the actuator through _____

- a) **pipes and valves**
- b) shafts
- c) motors
- d) flow control valve

92) Which part of the Pneumatic system stores the compressed air?

- a) Air dryer
- b) Air compressor
- c) **Air receiver tank**
- d) Air lubricator

93) What is the function of the flow control valve?

- a) Controls the direction of flow of air
- b) The moisture is separated and removed
- c) It converts the mechanical energy to hydraulic energy
- d) It controls the rate of flow of compressed air

94) The direction control valve controls _____

- a) **direction of flow**
- b) rate of flow
- c) moisture
- d) force and motion

95) PIR stands for _____

- a) Passive Infrared
- b) Pulsating Infrared
- c) Pulsating ratio

d) Pulse is radiation

96) Infra red radiation sources may be _____

- a) Thermal source
- b) Non-thermal source
- c) both **Thermal or non-thermal source**
- d) None of the mentioned

97) In ideal instrumentation amplifier, the CMRR is -----.

- a) **infinite**
- b) zero
- c) 10000
- d) 100

98) In ideal instrumentation amplifier the common mode gain is -----.

- a. infinite
- b) zero**
- c) 10000
- d) 100

99) ----- In ideal instrumentation amplifier the differential mode gain is -----.

- a) infinite**
- b) zero
- c) 10000
- d) 100

100) A Schmitt trigger is-----.

- a) a comparator with only one trigger point
- b) a comparator with hysteresis
- c) a comparator with three trigger point
- d) None of the above

101) Which circuit converts irregularly shaped waveform to regular shaped waveforms?

- a) Schmitt trigger
- b) Voltage limiter
- c) Comparator
- d) None of the mentioned

102) If input triangular wave then output of a schmitt trigger circuit is_____.

- a. Square waveform
- b. Sine waveform
- c. Sawtooth waveform
- Cannot be determined

103) In which configuration a dead band condition occurs in schmitt trigger ____.

- a) Differential amplifier with positive feedback
- b) Voltage follower with positive feedback
- c) Comparator with positive feedback
- d) None of the mentioned

104) What is the alternate method to measure the values of non-sinusoidal waveform other than ac voltmeter?

- a) Clipper
- b) Clamper
- c) Peak detector
- d) Comparator

105) The resistor in the peak detector are used to ____.

- a. To maintain proper operation
- b. Protect op-amp from damage
- c. To get shaped non-sinusoidal waveform
- d. None of the mentioned

106) In the sample and hold circuit, the period during which the voltage across capacitor is equal to input voltage ____.

- a. Sample period
- b. Hold period
- c. Delay period
- d. Charging period

107) During which period the op-amps output of sample and hold circuits is processed? a.

Delay period

- b. Sample and hold period
- c. Sample period
- d. Hold period

108) Sample and hold circuit are used in

- a. Analog to Digital modulation
- b. Digital to analog modulation
- c. Pulse position modulation
- d) All of the mentioned

109) Which of the following functions does the antilog computation required to perform continuously with log-amps?

- a. $\ln(x)$
- b. $\log(x)$
- c. $\sinh(x)$
- d. All of the mentioned

110) How to provide saturation current and temperature compensation in log-amp?

- a. Applying reference voltage alone to two different log-amps
- b. Applying input and reference voltage to same log-amps
- c. Applying input and reference voltage to separate log-amps
- d. None of the mentioned

111) Voltage to current converter is also called as

- a. Transconductance amplifier
- b. Transresistance amplifier
- c. Voltage amplifier
- d. All of the above

112) Current to voltage converter is also called as

- a. Transconductance amplifier
- b. Transresistance amplifier
- c. Voltage amplifier
- d. All of the above

113) What are the features of instrumentation amplifier?

- a. Low noise
- b. High gain accuracy
- c. Low thermal and time drift
- d) All of the mentioned

114) What instrument is used to amplify output signal of transducer

- a. Peaking amplifier
- b. Instrumentation amplifier

- c. Differential amplifier
- d. Bridge amplifier

115) General purpose op-amps are used in applications as

- a. Instrumentation amplifier
- b. Differential instrumentation amplifier
- c. Inverting instrumentation amplifier
- d. Non-inverting instrumentation amplifier

116) In sample and hold circuit, time period during which capacitor is charging is called as

- (a) Hold period
- (b) Sample period
- (c) Both
- (d) None of these

117) In precision rectifier, diode becomes forward biased at the voltage _____

- (a) 0V
- (b) 0.3 V
- (c) 0.7 V
- (d) 1 V

118) In an instrumentation amplifier using transducer bridge, which device measure the change in physical energy _____.

- a. Resistive transducer
- b. Indicating meter
- c. Capacitive transducer
- d. Inductor circuit

119) -----Schmitt trigger circuit is also called as -----comparator.

- a. Zero b) Positive c) Negative_d) Regenerative

120) For sine or triangular input waveform the output of Schmitt trigger circuit is --

waveform.

- a. Sine b) Triangular c) Sawtooth d) Square

121)

Voltage follower is also called as

—

- (a) Non-inverting buffer
- (b) Inverting amplifier
- (c) Inverting buffer
- (d) Non-inverting amplifier

122)

High value of

CMRR in Instrumentation amplifier means _____-

- (a) Low A_c
- (b) Low A_d
- (c) Low Z_i
- (d) Low bandwidth

123)

Voltage to current

converter op-amp is also called as _ (a)

- Transconductance amp.
- (b) Trans resistance amp.
- (c) Voltage follower
- (d) Bridge amplifier

124)

The transconductance of

amplifier is the ratio of

- (a) o/p current to I/p voltage
- (b) I/p voltage to o/p current
- (c) o/p voltage to I/p current
- (d) o/p voltage to I/p voltage

125)

Bridge amplifier uses op-amp in

- (a) Differential mode.
- (b) Inverting mode
- (c) Non-inverting mode
- (d) Voltage follower mode

126)

I-to-V convertor called as

- (a) Trans-resistance amp.
- (b) Trans-conductance
- (c) Log amp
- (d) Antilog amplifier

127) In log amp. Feedback element used is

- (a) Diode
- (b) Resistor
- (c) Capacitor
- (d) none
- (e) none

128) Input to antilog amp. Is applied through _____

- (a) Diode
- (b) Resistor
- (c) Capacitor
- (d) none

129) Clipper circuit means

- (a) To remove some part from positive or negative half cycle
- (b) To remove noise
- (c) To shift input level with some point
- (d) None of these

130) Positive clipper cuts the ____

- (a) Positive half cycle
- (b) Negative half cycle
- (c) Both
- (d) None of these

131) In sample and hold circuit, time period during which capacitor voltage is constant called as

- (a) Hold period
- (b) Sample period
- (c) Both
- (d) none

132) In sample and hold circuit, time period during which capacitor is charging is called as

-
- (e) Hold period
 - (f) Sample period
 - (g) Both
 - (h) None of these

133) In precision rectifier, diode becomes forward biased at the voltage ____

- (e) 0V
- (f) 0.3 V
- (g) 0.7 V
- (h) 1 V

134)

The operation of log and antilog amplifiers is based on the -----
-- characteristics of a p-n junction.

- a. Non linear
- b) linear
- c) linear and nonlinear
- d) none of these

135) In basic log amplifier, the transistor is used as -----.

- a. The feedback element
- b. The series element with input
- c. Active load at the output
- d. None of these

136) The transconductance amplifier has -----.

- a) zero input impedance and zero output impedance
- b) high input impedance and zero output impedance
- c) high input impedance and high output impedance
- d) zero input impedance and high output impedance

137) The main advantage of the active filter is that it eliminates the need of -----.

- a) capacitor
- b) resistor
- c) inductor
- d) all of the above

138) ----- is the limitation of active filters.

- a) Elimination of inductor
- b) Power is required to operate the active element
- c) High range of quality factor
- d) Gain and frequency adjustment

139)----- filter is having two stop band and single pass band.

- a) High pass
- b) Low pass
- c) Band pass
- d) Band stop

140) ----- filter is having two pass band and single stop band.

- a) High pass
- b) Low pass
- c) Band pass
- d) Band stop

141) The order of active filter depends on the ----- it contains.

- a) the number of resistors
- b) the number of capacitors
- c) the number of RC circuit
- d) the number of active device

142) If n is the order of an active filter, then at the edge of pass or stop band, the roll of rate of frequency response is ----- . a) $20 n$ dB

b) $n/2$ dB

c) 80 dB

d) 100 dB

143)----- type of response has flat pass band and flat stop band. a) Chebyshev

b) Butterworth

c) Elliptic

d) None of the above

144) ----- response is also called as equiripple response. a) Chebyshev

b) Butterworth

c) Elliptic

d) None of the above

145) ----- circuit is also called as regenerative comparator. a) clipping

b) Clamping

c) Schmitt trigger

a) peak detector

146) The relation between capture range and lock range in PLL is ----- . a) lock range = capture range

b) capture range < lock range

c) capture range > lock range

d) all of the above

147) PLL can be used as a ----- filter. a)

Low pass

b) High pass

c) Band pass

d) Band stop

148) When PLL is locked on the input frequency, the VCO frequency is ----- .

a) $< f_0$

b) $> f_0$

c) $= f_0$

d) $= f_{in}$

149) The bandwidth of the low pass filter in the PLL determines the ----- . a) capture range

b) lock range

c) free running frequency

d) phase difference

150) A PLL maintains the lock by comparing ----- . a) the phase of two signals

b) the frequency of two signals

c) the amplitude of two signals

d) none of these

151) If the control voltage to VCO increases the output frequency ----- a)
decreases

b) does not changes

c) increases

d) none of these

152)----- is /are the application of PLL. a)

Frequency multiplier

b) FM Detector

c) Frequency synthesizer

d) All of the above

153) Earthing is necessary to give protection against

a) Danger of electric shock

b) Voltage fluctuation

c) Overloading

d) High temperature of the conductors

154) The advantage of neutral earthing is

a) Freedom from persistent arcing grounds

b) Over voltages due to lightning can be discharged to earth

c) Simplified design earth fault protection

d) All of the above

155) The advantage of neutral earthing

a) Safety of personnel

b) Reduction of earth fault current

c) Elemination of arcing ground

d) None of the above

156) The grounding is provided for -----.

a) only the safety of the equipment

b) only for the safety of the operator

c) both a and b

d) none of these

157) The ground resistance should be designed such that -----.

- a) grounding resistance should be as low as possible
- b) grounding resistance should be as high as possible
- c) grounding resistance should be zero
- d) none of these

158) The objectives of the earthing or grounding is -----.

- a) to provide as low resistance possible to ground
- b) to provide as high resistance possible to ground
- c) to provide flow of positive, negative and zero sequencing current
- d) none of these

159) Stray capacitance effects can be minimized by _____ a)
making use of an inductance

- b) connecting a resistance in series
- c) shielding and grounding
- d) using a galvanometer

160) Which is the guarding arm? a)

- parallel RC combination
- b) series RC combination
- c) resistance R
- d) capacitance C

161) **Why is an isolator installed?**

- a) To isolate one portion of the circuit from another
- b) As an substitute for the circuit breaker
- c) It used on either sides of the circuit breaker
- d) Both (a) and (c)

162) **For which among the following the current ratings are not required?**

- a) Circuit breakers
- b) Relays
- c) Isolators
- d) Load break switch

Que.No.2 : Attempt any two (Eight marks each)

- 1) Explain the different components of the mechatronic system.
- 2) What is error? Explain different types of the error.
- 3) With the help of construction diagram explain the working principle of LVDT.
- 4) Explain the construction of resistance wire strain gauge and derive the expression for its gauge factor.
- 5) With the help of working principle explain the use of Piezoelectric transducer for measurement of pressure.
- 6) Explain the principle of working of thermocouple. And write short note of thermocouple thermometer.
- 7) What is the principle on which a capacitive transducer works? Give the application of capacitive transducer.
- 8) With the help of working principle explain the Hall effect sensors.
- 9) Explain with circuit diagram and waveforms the working of Schmitt trigger circuit.
- 10) Explain the Instrumentation amplifier and derive the expression for its output voltage.
- 11) Derive the output voltage expression for the bridge amplifier circuit using transducer.
- 12) What is precision diode? With circuit diagram explain precision full wave rectifier circuit.
- 13) With circuit diagram explain how Op.Amp. can be used as a log amplifier.
- 14) Explain positive and negative clipper circuit using Op.Amp.
- 15) With the help of block diagram explain phase locked loop. How PLL can be used as a frequency multiplier.
- 16) Discuss the applications of the PLL as a frequency synthesizer and frequency multiplier.
- 17) Explain the different types of the filter and What are the advantages of active filter over passive filter?

18) With the help of block diagram explain data acquisition system.

Que.No.3 : Attempt any four (Four marks each)

- 1) Define the terms accuracy, error, precision and sensitivity.
- 2) State three types of systematic errors, giving example of each.
- 3) What are the advantages of mechatronics system?
- 4) What are the important features of the mechatronic system?
- 5) State the classification of standards.
- 6) State three major categories of the error.
- 7) What are the advantages of electrical transducer?
- 8) What are the important characteristics of electrical transducer?
- 9) Explain the working principle of the potentiometer sensor.
- 10) Explain the working principle of the capacitive transducer.
- 11) Write short note on thermistor.
- 12) Write short note on eddy current proximity sensor
- 13) Explain the working principle of the strain gauge.
- 14) Write short note on RTD.
- 15) Explain the working principle of thermocouple.
- 16) Explain the working principle of IR sensors.
- 17) Write short note on PIR sensor.
- 18) Write short note on piezoelectric transducer.
- 19) Explain the peak detector circuit using Op.Amp.
- 20) Explain the working principle of sample and hold circuit using Op.Amp.
- 21) With neat circuit diagram and I/O waveform explain positive clipper circuit using Op.Amp.
- 22) Explain how Op.Amp. act as a voltage to current convertor.
- 23) Explain how Op.Amp. act as a current to voltage convertor.
- 24) Write short note on voltage follower circuit using Op.Amp.
- 25) What are the advantages of active filter over passive filter?
- 26) What are the different types of the filter?
- 27) Explain the application of the PLL as a frequency multiplication.
- 28) Explain the need of shielding method in electronic circuits.
- 29) Explain the grounding techniques used in the electronic circuits.
- 30) Draw the labeled block diagram of the PLL.