1. **The sampling oscilloscope is able to respond and store [01D01]**
   - **a. rapid bits of information and present them in a continuous display**
   - b. slowly varying bits of information and present them in continuous display
   - c. rapid bits of information and present them in a discrete display
   - d. samples and display in digital form

2. **The sample frequency used in sampling oscilloscopes is [01D02]**
   - **a. lower than one hundredth of the signal frequency**
   - b. twice that of signal frequency
   - c. equal to signal frequency
   - d. not related to signal frequency

3. **In dual trace oscilloscope, the display will show a continuous line for each channel when the chopping rate is [01M01]**
   - a. much slower than fly back period
   - b. much slower than the hold-off period
   - c. much faster than the vertical sweep rate
   - **d. much faster than the horizontal sweep rate**

4. **The disadvantage of a sampling oscilloscope is that [01M02]**
   - a. it can measure only high speed events
   - **b. it can only make measurement on repetitive waveform signals**
   - c. it requires sweep speeds of the order of 10ps per division
   - d. it require a bandwidths of 15 GHz

5. **The sampling oscilloscopes are overcome the limitations of conventional high frequency oscilloscopes by [01M03]**
   - a. using higher band width amplifiers
   - **b. converting high frequency signal into low frequency signal using sampling techniques**
   - c. using highly effective displays
   - d. using highly sensitive displays

6. **The dual trace oscilloscope cannot capture [01S01]**
   - **a. two fast transient events**
   - b. high frequency signals
   - c. low frequency signals
   - d. dc voltages

7. **The alternate mode of dual trace oscilloscope cannot used for [01S02]**
   - a. letting each channel for one cycle of the horizontal sweep
   - **b. displaying very low frequency signals**
   - c. switching alternates between channels A and B
   - d. displaying high frequency signals

8. **The common operating modes of dual trace oscilloscope are [01S03]**
   - a. internal and external mode
   - b. X and Y mode
   - **c. alternate and chopped mode**
   - d. ac and dc mode

9. **At a high frequency of the order of 100kHz to 500kHz , the dual trace oscilloscope operate in [01S04]**
   - a. X and Y mode
   - b. alternate mode
   - c. dc mode
   - **d. chopped mode**

10. **A sampling oscilloscope is used to examine [01S05]**
    - a. dc signals
    - b. high hold off signals
    - **c. very fast signals**
    - d. very slow signals

11. **In variable persistence storage oscilloscope, the image traced on its CRT will be retain by using [02M01]**

a. storage shift register
b. constant signal output
c. storage mesh in addition to phosphor screen
d. resonance circuit

12. The digital storage oscilloscope is more accurate than analog storage oscilloscope because [02M02]
a. the time base is generated by a crystal clock
b. collects data after it has been triggered
c. it operate in a baby sitting mode
d. constant refresh time

13. The attenuation factor of the voltage divider used in CRO is [02M03]
a. 1:10
b. 1:100
c. reciprocal of the voltage divider ratio
d. twice that of voltage divider ratio

14. The attenuator of CRO is loaded when the [02M04]
a. vertical amplifier resistance is much larger than the attenuator resistance
b. horizontal amplifier resistance is much lower than the attenuator resistance
c. horizontal amplifier resistance is much larger than the attenuator resistance
d. vertical amplifier resistance is much lower than the attenuator resistance

15. If the bandwidth of an oscilloscope is given as direct current to 10MHz, what is the fastest rise time a sine wave can have to be accurately reproduced by the instrument? [02M05]
a. 10_{ns}
b. 5_{ns}
c. 35_{ns}
d. 100_{ns}

16. The following oscilloscope is used for the capture and storage of transients and the steady display of a very low frequency signals [02S01]
a. dual trace oscilloscopes
b. dual beam oscilloscopes
c. storage oscilloscopes
d. sampling oscilloscopes

17. The bistable storage oscilloscopes depend for their operation, on the principle of [02S02]
a. bridge balance
b. photo conductive
c. resonance
d. secondary emission

18. The advantage of storage oscilloscope over digital oscilloscope is [02S03]
a. lower writing speed
b. higher bandwidth
c. more accuracy
d. larger retain time

19. The high amplitude signals are measured using CRO by placing an attenuator between the [02S04]
a. vertical input terminal and the input terminal of the horizontal amplifier
b. vertical input terminal and the input terminal of the vertical amplifier
c. horizontal input terminal and the input terminal of the vertical amplifier
d. horizontal input terminal and the input terminal of the horizontal amplifier

20. The Fast storage oscilloscopes enhance the speed with which they can capture transient information by using [02S05]
a. amplifier at two plates
b. two storage meshes
c. variable persistence tubes
d. bistable storage tube

21. An Isolation probe is used more compared to shielded probe because [03D01]
a. it operates at low frequencies
b. its Q factor is high

c. it avoid the undesirable circuit loading effects
d. its bandwidth is large

22. An Oscilloscope has an input capacitance of 50p^F and resistance of 2 MΩand the voltage divider ratio of 1Ω. The parameters of a high impedance probe are [03D02]
a. C_1 =5.55p^F, R_1 =18 M Ω
b. C_1=3.55p^F, R_1=9 MΩ
c. C_1=2.55pF, R_1=9 M Ω
d. C_1=50pF,R_1=18 M Ω

23. The probe is usually checked by [03M01]
a. measuring the Q of the probe
b. displaying a square wave on the CRT screen
c. measuring the resistance
d. measuring the capacitance

24. The type of the probe used for analyzing the response to modulated signals used in communication is [03M02]
a. coaxial cable
b. direct probe
c. isolation probe
d. detector probe

25. In CRO, an external high impedance probes are used to measure because [03S01]
a. it increase the input resistance and reduce the effective input capacitance
b. it decreases the input resistance and reduce the effective input capacitance
c. it increase the input resistance and increases effective input capacitance
d. it decreases the input resistance and increases the effective input capacitance

26. when sinusoidal voltages are simultaneously applied to horizontal and vertical plates of CRT, the resultant pattern is called [03S02]
a. elliptical pattern
b. lissajous patterns
c. figure eight pattern
d. circular pattern

27. When two sinusoidal voltages of equal frequency which are in phase with each other are applied to the horizontal and vertical deflection plates, the pattern appearing on the screen is a [03S03] a. ellipse
b. sinusoidal
c. straight line
d. circle

28. When two sinusoidal voltages of equal frequency which 900 phase displacement r are applied to the horizontal and vertical deflection plates, the pattern appearing on the screen is a [03S04]
a. ellipse
b. sinusoidal
c. straight line
d. circle

29. When two equal voltages of equal frequency but with a phase shift are applied to a CRO, the pattern appearing on the screen is a [03S05]
a. ellipse
b. sinusoidal
c. straight line
d. circle

30. To measure the frequency by CRO using lissajous patterns, the internal sweep generator is [03S06]
a. adjusted to the difference frequency of reference and measured signals
b. switched off
c. adjusted to the frequency of reference source signal
d. adjusted to equal to the measured frequency

31. In the frequency counters which of the following is not used [04D01]
a. decade counter

b. synchronous counter
c. up-down counter
d. BCD counter

32. The controlling torque in single phase power factor meters is provided by [04D02]
a. spring control
b. gravity control
c. stiffness of suspension
d. no control devic

33. In a frequency counter to display the count continuously used the following [04M01]
a. ripple counter
b. AND gate
c. OR gate
d. D type Flip-Flops

34. The following technique is used for frequency counters to display a large number of digits [04M02]
a. display multiplexing
b. storage elements
c. potential divider
d. AND and OR gates

35. The period of the input signal is measured by a point in an input cycle to the same point in the next cycle by using [04M03]
a. AND gate and D flip-flop
b. AND or OR gate and counter
c. input signal is ac coupled and a zero crossing detector triggers a flip-flop
d. op-amp and counter

36. The frequency counter operates on the principle of [04S01]
a. gating the input frequency into the counter for a predetermined time
b. gating the input voltage into the counter for a predetermined time
c. gating the input frequency into the counter for a predetermined voltage
d. secondary emission

37. In the frequency counter, if the AND gate is open for exactly one second, the count accumulated is equal to the [04S02]
a. impedance of the unknown signal
b. average frequency of the unknown input in Hz.
c. average voltage of the unknown input in volts
d. phase of the unknown input

38. To measure the period of a pulse waveform, it is necessary to open and close the count gate at [04S03]
a. falling edge and raising edge of positive going pulse
b. rising edge and falling edge of positive going pulse
c. rising edge and falling edge of negative going pulse
d. positive and negative going pulses used to open and clo

39. To measure the power in AC circuits , the following meter is used [04S04]
a. voltmeter
b. ammeter
c. wattmeter
d. AC bridge

40. The measured value of power in AC circuits is equal to [04S05]
a. middle power of one cycle
b. average power over a cycle
c. instantaneous power
d. VI

41. A bridge circuit works at a frequency of 2 KHz. The following can be used as detectors for detection of null conditions in the bridge [05D01]
a. headphones and vibration galvanometer
b. headphones and tunable amplifiers
c. vibration galvanometers and tunable amplifier
d. tunable amplifiers and vibration galvanometers

42. Wagner's earth devices are used in ac bridge circuits for [05D02]

a. eliminating the effect of earth capacitances
b. eliminating the effect of inter-component capacitances
c. shielding the bridge elements
d. eliminating the effect of stray electrostatic fields

43. For the bridge, $Z_1=200\angle 30^0$ $Z_2 = 150\angle 0^0$ and $Z_3=250\angle -40^0$. In order that the bridge be balanced Z_4 should be [05D03]

a. $120\angle 60^0$
b. $187.5\angle -70^0$
c. $333.3\angle 10^0$
d. $100\angle -40^0$

44. How an AC bridge is used in amplifiers and oscillators ? [05D04]

a. generate an additional amount of power
b. provide a impedance matching
c. provide a feed back
d. path provide filtering

45. The equation under balance conditions for a bridge are: $R_1=R_2R_3/R_4$ and $L_1=R_2R_3/C_4$ where R_1 and L_1 are respectively unknown resistance and inductance. In order to achieve converging balance [05M01]

a. R_1 and C_4 should be chosen as variable
b. R_2 and C_4 should be chosen as variable
c. R_1 and R_2 should be chosen as variable
d. R_4 and C_4 should be chosen as variable

46. For the measurement of inductance and capacitance using AC bridge, the oscillator have [05M02]

a. variable frequency and high power of about kw
b. variable frequency and very high power of about kw
c. fixed frequency and low power of mw
d. fixed frequency and output of about 1 w

47. In order to satisfy both conditions for balance and for convenience of manipulation, the bridge must contain [05M03]

a. a head phone and an oscillator
b. vibration galvanometer and head phones
c. two variable elements in its configuration
d. four fixed elements in its configuration

48. In order that the bridge to be balanced [05S01]

a. $Z_1Z_4 = Z_2Z_3$ and $\angle\theta_1+\angle\theta_4 = \angle\theta_2+\angle\theta_3$
b. $Z_1/Z_4 = Z_2/Z_3$ and $\angle\theta_1+\angle\theta_4 = \angle\theta_2+\angle\theta_3$
c. $Z_1Z_4 = Z_2Z_3$ and $\angle\theta_1 \angle\theta_4 = \angle\theta_2\angle\theta_3$
d. $Z_1Z_4 = Z_2Z_3$ and $\angle\theta_1 - \theta_4 = \angle\theta_2 - \angle\theta_3$

49. For the bridge abcd, arm ab consists of resistance in series with an inductance, arm bc and ad consist of pure resistance. In order to achieve balance are cd should consist of [05S02]

a. pure resistance
b. inductance in series with capacitance
c. a variable resistance in series or parallel with a variable capacitance
d. a pure resistance in parallel with a inductance

50. An AC bridge in its basic form, consists of [05S03]

a. four arms and shielding the bridge element
b. four arms, a source of excitation and balance detector
c. Wagner's earth device and four arms
d. four arms and source of excitation

51. A suspension type galvanometer having a sensitivity 0.5μA per scale division is used to measure [06D01]

a. inductance
b. dc resistance

c. ac resistance
d. frequency

52. In a voltage sensitive Wheatstone, having a resistance, R, the resistance of one of the arms is changed to R+ΔR where ΔR < < R. The Wheatstone bridge is supplied with an input voltage of ei. The output voltage on account of unbalance is [06D02]

a. $\left(\frac{\Delta R}{4+2\Delta R/R}\right)ei$

b. $\left(\frac{\Delta R/R}{3+2\Delta R/R}\right)$

c. $\left(\frac{\Delta R}{4+2\Delta R/R}\right)$

d. $\left(\frac{\Delta R/R}{4+2\Delta R/R}\right)ei$

53. The advantage of Hay's bridge over Maxwell s inductance-capacitance bridge is [06M01]

a. it can be used for measurement of inductance of low Q coils
b. it can be used for measurement of inductance of high Q coils
c. it can be used for measurement of inductance of low and medium Q coils
d. its equations for balance do not contain any frequency term

54. The expression for unknown inductance of high Q coils using Hay's bridge is [06M02]

a. $L_1 = \frac{R_1}{w^2 R_4 C_4}$

b. $L_1 = \frac{R_2}{w^2 R_4 C_4}$

c. $L_1=R_2R_3/C_4$

d. $L_1=R_2R_3C_4$

55. In the Wein's bridge, to balance the harmonics [06M03]

a. a vibration galvanometer is used
b. high voltage supply is used
c. a square wave is used as input
d. a filter is connected in series with the null detector

56. Frequency can be measured by using [06S01]

a. Maxwell's bridge
b. Hay's bridge
c. Schering bridge
d. Wien's bridge

57. The following bridge is used in harmonic distortion analyzer [06S02]

a. Wein's bridge
b. Campbell's bridge
c. Maxwell's bridge
d. Hay's bridge

58. Why the sinusoidal voltage is required to balance the Wein s Bridge? [06S03]

a. it required a high voltage as supply
b. because of its frequency sensitivity
c. harmonics will sometimes produce masking
d. a filter is used to balance the bridge

59. The expression for frequency using Wein s bridge is [06S04]

a. $\frac{C_1C_2}{2\pi\sqrt{R_1R_2}}$

b. $\frac{R_1 R_2}{2\pi\sqrt{C_1 C_2}}$

c. $\frac{1}{2\pi\sqrt{R_1 R_2 C_1 C_2}}$

d. $\frac{R_2 C_2}{2\pi\sqrt{R_1 C_1}}$

60. To measure both dc and ac resistances which of the following bridge is used? [06S05]

a. Wheatstone bridge

b. Wien's bridge

c. Hay's bridge

d. Maxwell's bridge

61. The major disadvantage of Maxwell s inductance-capacitance bridge is [07D01]

a. the two balance equations are dependent and frequency independent

b. the two balance equations are independent and frequency independent

c. the bridge is limited to measurement of low Q coils

d. this yields simple expression for unknowns

62. Sometimes a fixed capacitor is used in Maxwell s bridge instead of a variable capacitor because [07D02]

a. fixed capacitors have a high degree of accuracy

b. variable capacitors are functions of frequency

c. fixed capacitors available in all ranges

d. variable capacitors are expensive

63. The major advantage of Maxwell s inductance-capacitance bridge is [07M01]

a. the two balance equations are dependent and frequency independent

b. the two balance equations are independent and frequency independent

c. the bridge is limited to measurement of low Q coils

d. the bridge requires a variable standard capacitor

64. The arms of Maxwell's inductance-capacitance bridge contains the following :

L_1 = unknown inductancece

R_1 = effective resistance of inductor L_1

$R_2R_3R_4$ = known non-inductive resistances

C_4= variable standard capacitor

The balance equations for this bridge is [07M02]

a. $L_1 = R_2 C_4$ and $R_1 = \frac{R_2}{R_4}(R_2 R_3)$

b. $L_1 = \frac{R_3}{R_4}$ *and* $R_1 = \frac{R_3}{R_4} R_2$

c. $L_1 = \frac{R_3 R_2}{R_4} C_4$ *and* $R_1 = \frac{R_3 R_2}{R_4}(R_2)$

d. $L_1 = R_2 R_3 C_4$ *and* $R_1 = \frac{R_3 R_2}{R_4}$

65. Maxwell's bridge is used to measure the inductance of a [07S01]

a. low Q coils

b. high Q coils

c. medium Q coils

d. low and high Q coils

66. Maxwell's Inductance bridge circuit measures an inductance by [07S02]

a. comparison with a variable standard resistance

b. equating resistance of arm 2 and arm 3
c. equating the total impedance of arm 1
d. comparison with a variable standard self-inductance

67. The arms of Maxwell's inductance bridge contains the following : L_1 = unknown inductance of resistance R_1 L_2= variable inductance of fixed resistance r_2 R_2 = variable resistance connected in series with inductor L_2 R_3,R_4 = known non-inductive resistances The balance equations for this bridge is [07S03]

a. $L_1 = \frac{R_4}{R_3} L_2 \; and \; R_1 = \frac{R_2}{R_4}(R_2 R_3 + r_2)$

b. $L_1 = \frac{R_3}{R_4} \; and \; R_1 = \frac{R_3}{R_4}(R_2 R_4 + r_2)$

c. $L_1 = \frac{R_3 R_2}{R_4} L_2 \; and \; R_1 = \frac{R_3 R_2}{R_4}(R_2 + r_2)$

d. $L_1 = \frac{R_3}{R_4} L_2 \; and \; R_1 = \frac{R_3}{R_4}(R_2 + r_2)$

68. Maxwell's Inductance-Capacitance bridge circuit measures an inductance by [07S04]
a. comparison with a variable standard resistance
b. equating resistance of arm 2 and arm 3
c. equating the total impedance of arm 1
d. comparison with a standard variable capacitance

69. The expression for Q factor of Maxwell's Inductance-Capacitance Bridge [07S05]
a. wL_2/R_1
b. wC_4R_1
c. wL_1/R_1 or wC_4R_4
d. wL_1/R_4 or wC_4R_1

70. The Maxwell s bridge is limited to measurement of coil of Q values [07S06]
a. Q >10
b. 10< Q<100
c. 1 < Q < 10
d. Q < 1

71. To measure the properties of insulating material, which of the following bridge is used [08D01]
a. Maxwell's bridge
b. Hay's bridge
c. Schering bridge
d. Owen's bridge

72. Which of the following circuit is used to make the plate area definite for the measurement of relative permittivity using Schering bridge? [08D02]
a. earth screen
b. guard circuits
c. wagner earth device
d. potential divider

73. Which of the following is true when Anderson s bridge is compared to Maxwell's bridge [08M01]
a. more complex and balance equations are simple
b. less complex and balance equations are simple
c. more complex and balance equations are not simple
d. it is suitable only for high Q coils

74. To measure the relative permittivity of dielectric material, which of the following bridge is used [08M02]
a. Maxwell's bridge
b. Hay's bridge
c. Schering bridge
d. Owen's bridge

75. To measure the dissipation factor, the following bridge is used [08M03]
a. Maxwell's bridge
b. Hay's bridge
c. Schering bridge
d. Owen's bridge

76. Anderson's bridge is used to measure the [08S01]
a. self-inductance interms of a standard inductance
b. self-inductance interms of a standard capacitance
c. self-capacitance interms of a standard capacitance
d. self-capacitance interms of a standard inductance

77. Schering Bridge is used to measure the [08S02]
a. frequency
b. resistance
c. inductance
d. capacitance

78. The balance conditions for a Schering bridge is [08S03]
a. $r_1=R_3$ $/C_4C_2$ and $C_1 = C_2$ (R_3/R_4)
b. $r_1=R_3$ C_4/C_2 and $C_1 = C_2$ (R_4/R_3)
c. $r_1=R_3$ C_4C_2 and $C_1 = C_2$ (R_2R_3)
d. $r_1=R_3$ C_4C_2 and $C_1 = C_2$ (R_4/R_2)
(C_1 is capacitor whose capacitance is to be determined, r_1 is as series, resistance representing the loss in the capacitor C_1, C_2 a standard capacitor, R_3 non-inductive resistance, C_4 is a variable capacitor, R_4 is a variable , non-inductive resistance in parallel with C_4)

79. Kelvin bridge is used to measure the [08S04]
a. high frequencies
b. high capacitances
c. low resistances
d. low inductances

80. The Kelvin bridge is also called double bridge because [08S05]
a. it measures low and high resistance values
b. vibration galvanometer is used for balance
c. all arms consist of pure resistances
d. it contains a second set of ratio arms

81. Use of high quality components in bridge circuit will normally have the advantages of all except ([09D01]
a. high-accuracy calibration
b. freedom from stay conductance effects
c. minimum of residues in components
d. reduce eddy current errors

82. To avoid the Eddy current errors in the bridge uses the [09D02]
a. proper bridge layout
b. small inherent inductance or capacitance
c. large conducting masses near the bridge network
d. good quality components

83. In order to avoid the errors caused due to inter-capacitance between high and low arms of bridge , which of the following is used [09M01]
a. insulating materials
b. high voltage source
c. very sensitive detectors
d. earthed screens

84. Mutual -inductance effects causes errors in ac bridge circuit due to [09M02]
a. electrostatic fields between conductors at different potentials
b. residues in components
c. imperfect insulation
d. magnetic coupling between various components of the bridge

85. To eliminate the unwanted harmonics which of the following is used [09M03]

a. inherent inductance
b. wave filter
c. head pones
d. good components

86. To avoid the stray conductance effects in the bridge circuit by [09M04]
a. using large conducting masses near the bridge network
b. various bridge components and other pieces of apparatus mounted on insulating stands
c. using small inherent inductance or capacitance
d. using Wagner Earthing devices

87. Stray-conductance effects causes errors in ac bridge circuit due to [09S01]
a. electrostatic fields between conductors at different potentials
b. residues in components
c. imperfect insulation
d. magnetic coupling between various components of the bridge

88. Stray-capacitance effects causes errors in ac bridge circuit due to [09S02]
a. electrostatic fields between conductors at different potentials
b. residues in components
c. imperfect insulation
d. magnetic coupling between various components of the bridge

89. The existence of small amount of series inductance or shunt capacitance in nominally non-reactive resistors causes [09S03]
a. provide a bridge balance
b. errors in ac bridge circuit
c. amplify the input signal given to the bridge
d. filtered the noise in the bridge

90. Wagner Earthing devices are used to remove all the [09S04]
a. earth capacitances from the bridge networks
b. residual errors
c. eddy current errors
d. mutual inductance effects

91. In X-Y plotters, an emf is plotted as a function of [10D01]
a. time
b. frequency
c. another emf
d. current

92. An X-Y recorder have a sensitivity of 10 V/mm, a slewing speed of 1.5m/s and a frequency response about 6 Hz for both the axes. The chart size is 250 x180mm. the accuracy of X-Y recorder is [10D02]
a. 1%
b. 0.3%
c. 0.2%
d. 0.5%

93. In a Q meter, distributed capacitance of coil is measured by changing the capacitance of the tuning capacitor. The values of tuning capacitor are C1 aqnd C2 for resonant frequencies f1 and 2f1 respectively. The value of distributed capacitance is [10M01]
a. $\frac{C_1 - C_2}{3}$
b. $\frac{C_1 - 2C_2}{3}$
c. $\frac{C_1 - 4C_2}{3}$
d. $\frac{C_1 - 4C_2}{2}$

94. In a Q meter, the value of shunt resistance connected across the oscillator is typically in the order of [10M02]

a. Ω
b. mΩ
c. μ Ω
d. kΩ

95. The value of inductance measured using Q meter is [10M03]

a. $\frac{1}{4\pi^2 fC}$

b. $\frac{1}{2\pi f_0 C}$

c. $\frac{1}{2\pi f^2 C}$

d. $\frac{1}{4\pi^2 f^2{}_0 C}$

(f0 is resonant frequency , f is frequency of RF oscillator and C is tuning capacitance)

96. X-Y recorders are record [10S01]
a. one quantity with respect to another quantity
b. one quantity on X axis with respect to time on Y axis
c. one quantity on Y axis with respect to time on X axis
d. from dc to several KHz

97. In a Q meter, distributed capacitance of coil is measured by [10S02]
a. changing the capacitance of the tuning inductor
b. changing the resistance of the tuning inductor
c. changing the resistance of the tuning capacitor
d. changing the capacitance of the tuning capacitor

98. The measured value of Q using Q-meter is compared to the true value [10S03]
a. always larger
b. always equal
c. always smaller
d. sometimes larger

99. LCR meter is used to measure [10S04]
a. resistance only
b. inductance only
c. capacitance only
d. resistance, inductance and capacitance

100. The physical quantity may be plotted against another physical quantity by using [10S05]
a. Q-meter
b. wattmeter
c. X-Y recorder with appropriate transducers
d. LCR meter

101. In a transducer, the experimentally obtained transfer function is different from the theoretical transfer function, the errors result from this difference are called [11D01]
a. zero error
b. Hysteresis error
c. sensitivity error
d. non-conformity errors

102. The lower limit of useful working range of a transducer is determined by [11D02]
a. minimum useful input level
b. constant current source
c. transducer error and noise
d. constant current source

103. In transducer, the observed output deviates from the correct value by a constant factor the resulting error is called [11M01]
a. zero error
b. Hysteresis error

c. sensitivity error
d. non-conformity errors

104. Passive transducers derive the power required for transduction from [11M02]
a. a constant power supply
b. an auxiliary power source
c. physical quantity being measured
d. internal power supply

105. Active transducers derive the power required for transduction from [11M03]
a. a constant power supply
b. an auxiliary power source
c. physical quantity being measured
d. internal power supply

106. Transducer converts [11S01]
a. analog signal into digital signal
b. digital signal into analog signal
c. one form of energy into other form of energy
d. mechanical displacement into mechanical energy

107. An inverse transducer converts [11S02]
a. analog signal into digital signal
b. digital signal into analog signal
c. an electrical energy to any other form of energy
d. an optical signal to any other form of energy

108. one of the following can act as an inverse transducer [11S03]
a. strip chart recorder
b. strain gauge
c. LVDT
d. piezo electric crystals

109. One of the following is an active transducer [11S04]
a. strain gauge
b. photovoltaic cell
c. photo emissive cell
d. selsyn

110. In a resistance potentiometer high value of resistance leads to [11S05]
a. high value of sensitivity
b. low value of error
c. low value of non-linearity
d. high value of selectivity

111. What is the order of minimum displacement that can be measured with capacitive transducers? [12D01]
a. 1cm
b. 1 mm
c. 1µm
d. 1 m

112. Capacitive transducers using the principle of change of capacitance with change of dielectric are normally used for measurement of [12D02]
a. displacement
b. pressure
c. force
d. liquid levels

113. Two inductive transducers working on the principle of change of self inductance L, are connected in a push pull arrangement. If the change of inductance of transducers is ΔL the change of inductance exhibited at the output terminals is [12M01]
a. ΔL
b. ΔL
c. 2ΔL
d. 2ΔL

114. The dynamic characteristics of capacitive transducers are similar to those of [12M02]
a. low pass filters

b. high pass filters
c. notch filters
d. band stop filters

115. A capacitive transducer working on the principle of change of capacitance with change of displacement exhibits non linear characteristics. The response of these transducers can be made linear by using [12M03]
a. non -magnetic material
b. a solid ferror-electric material
c. nickel-iron hydrogen annealed material
d. differential arrangement or use of an opAMP

116. The sensitivity of the capacitive transducer can be increased by making [12M04]
a. the distance between the plates extremely small
b. the distance between the plates extremely large
c. the electric field in the air gap exceeds the break down voltage
d. dielectric constant low

117. Air cored inductive transducers are suitable for [12S01]
a. low frequencies
b. high frequencies
c. same frequencies as iron cored transducers
d. both low and high frequencies

118. The size of air cored inductive transducers as compared with the iron cored transducers [12S02]
a. smaller
b. higher
c. same
d. exactly halved

119. Capacitive transducers are normally used for [12S03]
a. dynamic measurements
b. static measurements
c. transient measurements
d. gauge measurements

120. Capacitive transducers can be used for measurement of liquid level. The principle of operation used in this case is [12S04]
a. change of capacitance
b. change of area of plates
c. change of dielectric strength
d. change of distance between plates

121. In semiconductor strain gauges, when tensile strain is applied [13D01]
a. resistance increases in N type materials
b. resistance increases in P type materials
c. resistance decreases in both P and N type materials
d. resistance increases in both P and N type materials

122. Metal foil gauges use fat end turns in order to [13D02]
a. increase transverse sensitivity
b. reduce transverse sensitivity
c. reduce cross sensitivity
d. increase cross sensitivity

123. The resistive strain gauges are known as piezo resistive gauges because [13M01]
a. there is a change in the value of strength when it is stretched or compressed
b. there is a change in the value of resistivity of the conductor when it is stretched or compressed
c. there is a change in the value of conductivity of the conductor when it is stretched or compressed
d. there is a change in the value of capacitivity of the conductor when it is stretched or compressed

124. A resistance wire strain gauge uses a soft iron wire of small diameter. The gauge factor is +4.2. Neglecting the piezo resistive effects, calculate the poisson s ratio [13M02]
a. 4.2
b. 1.1
c. 1.6
d. 8.4

125. In wire wound strain gauges, the change in resistance on application of strain is mainly due to [13M03]

a. change in diameter of wire
b. change in resistivity
c. change in both length and resistivity
d. change in both length and diameter of wire

126. Metal foil type of strain gauges are superior to wire wound metal strain gauges because they have a [13M04]

a. higher heat dissipation capacity and larger surface area
b. larger heat dissipation capacity and lower surface area
c. lower heat dissipation capacity and larger surface area
d. higher heat dissipation capacity and lower surface area

127. When a guage is subjected to a positive strain, its length and area of cross-section are [13S01]

a. both increases
b. both decreases
c. increases and decreases respectively
d. decreases and increases respectively

128. The gauge factor is defined as [13S02]

a. $\frac{\Delta R/R}{\Delta L/L}$

b. $\frac{\Delta L/L}{\Delta R/R}$

c. $\frac{\Delta R/R}{\Delta A/A}$

d. $\frac{\Delta A/L}{\Delta L/A}$

(where R is resistance, A is area of cross-section and L is length of the gauge)

129. The gauge factor can be written as in this the third term indicates [13S03]

a. resistance change due to change of length
b. resistance change due to change in area
c. resistance change duet piezo resistive effect
d. per unit change in area

(where v is poissonratio, ρ is resistivity and ε is strain)

130. If the change in the value of resistivity of a material when strained is neglected, the gauge factor is [13S04]

a. $1+2\nu+\frac{\Delta\rho/\rho}{\varepsilon}$

b. $1+2\nu$

c. $1+\frac{\Delta\rho/\rho}{\varepsilon}$

d. $2\nu+\frac{\Delta\rho/\rho}{\varepsilon}$

131. A pizo-electrical transducer has an output voltage of 3V at no load conditions. It has a capacitance 250 pF. It is connected to load capacitance of 125 pF. Find the voltage across the load at high frequencies? [14D01]

a. 1.5 V
b. 2V
c. 9V
d. 6V

132. The output voltage of a LVDT is 1.5V at maximum displacement. At a load of 0.5M Ω the deviation from linearity is maximum and it is 0.003V from a straight line through origin the linearity at the given load is [14D02]

a. - 0.2%

b. -0.003%
c. 0.2%
d. 0.003%

133. An LVDT has [14M01]
a. an infinite resolution and a low sensitivity
b. a low resolution and a high sensitivity
c. an low resolution and an infinite sensitivity
d. an infinite resolution and a high sensitivity

134. Ceramic materials are used for piezo-electric transducers because they are [14M02]
a. polycrystalline in nature
b. non-magnetic in nature
c. ferro-electric in nature
d. high permeability

135. Quartz and Rochelle salt belong to [14M03]
a. synthetic group of piezo-electric materials
b. natural group of piezo-electric materials
c. non-magnetic material
d. a solid ferro-electric material

136. In an LVDT, the two secondary windings are connected in differential to obtain [14S01]
a. reference point for the displacement of the core
b. higher output voltage
c. lower error
d. smaller size

137. In LVDT the core is made up of a [14S02]
a. non-magnetic material
b. a solid ferro-electric material
c. high permeability, nickel-iron hydrogen annealed material
d. low permeability, ferro-electric material

138. In LVDT, if the supply voltage contains harmonics then the voltage at null point is [14S03]
a. unity
b. zero
c. ten
d. infinity

139. Piezo-electric transducers are [14S04]
a. passive transducers
b. active transducers
c. active and inverse transducers
d. passive and inverse transducers

140. The Piezo-electric transducers are mainly used for measurement of [14S05]
a. voltage
b. displacement
c. resistance
d. temperature

141. The resistance value of a thermistor is 5 KΩ at 25^0C and its resistance temperature coefficient is $0.04/^0$C . A measurement with a lead resistance of 10Ω will cause an error of [15D01]
a. $0.01/^0$C
b. 0.05^0C
c. 0.1^0C
d. $0.02/^0$C

142. A thermocouple produces a voltage of 50_{mv}. Its internal resistance is 50 Ω The resistance of its leads is 10Ω. Its output is read by PMMC meter having an internal resistance of 120Ω. The output voltage indicated is [15D02]
a. 40_m V
b. 12_mV
c. 50.4_mV
d. 33.3 $_m$V

143. The emf produced in a thermocouple circuit is given by [15M01]

a. $E = \alpha(\Delta\theta)$

b. $E = \alpha(\Delta\theta)/(b(\Delta\theta)^2$

c. $E = \alpha(\Delta\theta) + b(\Delta\theta)^2$

d. $E = b(\Delta\theta)^2$

(where a,b are constants and Δθ is difference in temperature between the hot thermocouple junction and the reference)

144. Calculate the thermoelectric sensitivity of a device using bismuth and tellurium as the dissimilar metals. The sensitivity of bismuth is -72$_\mu$V/ ^{0}C and that of tellurium is 500$_\mu$V/ ^{0}C. [15M02]

a. 522$_\mu$V/^{0}C

b. 572 V/^{0}C

c. 36mV/^{0}C

d. 428$_\mu$V/^{0}C

145. A thermistor exhibits [15S01]

a. a negative change of resistance with increase of temperature depending the type of material used

b. a positive change of resistance with increase of temperature depending the type of material used

c. either a negative or positive change of resistance with increase of temperature depending the type of material used

d. either a negative or positive change of resistance with decrease of temperature depending the type of material used

146. Thermocouples are [15S02]

a. active transducers

b. passive transducers

c. output transducers

d. inverse transducers

147. The smallest size thermistor is [15S03]

a. disc

b. rod

c. probe

d. bead

148. In thermocouples the reference junction temperature is [15S04]

a. zero

b. 10^{0}C

c. -100^{0}C

d. 1000^{0}C

149. In a thermocouples, the combination of metals be so chosen that a rise in temperature should always produce a [15S05]

a. linear fall in emf

b. linear rise in emf

c. non- linear fall in emf

d. non-linear rise in emf

150. The following device is used to measure the pressures ranging from 10-1 to 10-3mm of Hg [16D01]

a. bellows and differential transformers

b. pivot torque

c. pirani gauge

d. piezoelectric transducers

151. Which of the following is not used for static and dynamic pressure measurements? [16D02]

a. capacitive transducers

b. photoelectric transducers

c. oscillation transducers

d. piezoelectric transducers

152. The electrical strain gauges attached to a diaphragm is used for [16M01]
- **a. pressure**
- b. velocity
- c. humidity
- d. resistivity

153. In the measurement of pressure, the piezoelectric transducers used as secondary transducers would have a disadvantage of [16M02]
- a. no external power needed
- b. good high frequency response
- c. does not affected by changes in temperature
- **d. cannot measure static pressure**

154. How the pressure measuring devices are used to measure the force? ([16M03]
- a. pressure is twice that of force
- b. pressure is halved that of force
- **c. pressure is force per unit area**
- d. pressure and force are equal

155. Pressure is represented as a stress because [16S01]
- a. both are defined as resistance per length
- **b. force per unit area**
- c. temperature per unit area
- d. power per given input

156. The nanometers , ring and belt type gauges are used to measure the pressure based on the principle of [16S02]
- a. balancing the unknown force by means of applied strain per unit area
- **b. balancing an unknown force with a known force**
- c. balancing of unknown force due to stress in an elastic member
- d. producing strain in the load ring

157. The Force summing devices in the measurement of pressure are used to convert [16S03]
- a. pressure into mechanical energy
- b. mechanical to electrical energy
- **c. pressure into displacement**
- d. pressure into electrical energy

158. The function of secondary transducers in the measurement of pressure is [16S04]
- a. converts pressure into mechanical energy
- **b. converts displacement into electrical parameter**
- c. converts pressure into displacement
- d. increases the strength of electrical energy

159. The function of primary transducers in the measurement of pressure is [16S05]
- a. converts pressure into mechanical energy
- b. converts displacement into electrical parameter
- **c. converts pressure into displacement**
- d. increases the strength of electrical energy

160. The following device is used to measure a angular velocity with a ripple free output [17D01]
- a. Moving Coil type Velocity transducer
- b. Seismic type velocity transducer
- **c. DC tachometer generator**
- d. Drag Cup Rotor AC tachometer generator

161. The following characteristics of lithium chloride is changed when it is exposed to variations in humidity [17M01]
- a. pressure
- b. force
- **c. frequency**
- d. capacitance

162. The disadvantage with measurement of linear velocity compared to a measure of angular velocity is [17M02]
- **a. a fixed reference must be used**
- b. output voltage is proportional to amplitude of the vibration
- c. forms a closed magnetic circuit with a constant air gap

d. frequency of the output is equal to the frequency of vibration

163. To cover the entire range of humidity, which of the following device is used? [17M03]
a. Resistive Hygrometer
b. Aluminium oxide Hygrometer
c. capacitive Hygrometer
d. microwave refractometer

164. The disadvantage of Velocity measurement using Tachometer generators is [17M04]
a. measures angular speed
b. brushes produce an appreciable error
c. direction of rotation is directly indicate the polarity of the output voltage
d. output voltage is typically 10_mV.rpm

165. The most commonly used transducer for the measurement of liner velocity is [17S01]
a. pivot torque
b. strain gauge
c. electro-magnetic transducer
d. pirani gauge

166. In the moving coil type velocity transducer, the velocity of coil is [17S02]
a. inversely proportional to the voltage generated in the coil
b. proportional to the voltage generated in the coil
c. proportional to the applied voltage to the coil
d. inversely proportional to the current applied to the coil

167. The following device is used to measure the relative humidity [17S03]
a. LVDT
b. scintillation counters
c. barometer
d. hygrometer

168. The following characteristics of lithium chloride is changed when it is exposed to variations in humidity [17S04]
a. pressure
b. force
c. resistance
d. capacitance

169. Microwave Refractometer is used to measure the [17S05]
a. humidity
b. velocity
c. liquid leve
d. acceleration

170. The major drawback of a seismic accelerometer using resistance potential divider are [18D01]
a. high resolution and natural frequency
b. high resolution and low natural frequency
c. limited resolution and low natural frequency
d. limited resolution and high natural frequency

171. An accelerometer has a seismic mass 'M', spring constant 'K' and maximum mass displacement 'xm' then the maximum measurable acceleration is [18D02]
a. $\frac{KX_m}{M}$
b. KMX_m
c. $\frac{MX_m}{K}$
d. $\frac{K}{MX_m}$

172. In the measurement of liquid level using gamma rays, the level of liquid is [18M01]
a. inversely proportional to intensity
b. inversely proportional to absorption

c. proportional to intensity
d. proportional to absorption

173. In the measurement of liquid level using Ultrasonic method, the time between transmitting and receiving a pressure pulse is [18M02]
a. proportional to output voltage
b. inversely proportional to capacitance between two rods
c. inversely proportional to inductance of the rods
d. proportional to the distance between the ultrasonic set and surface of the contents of the tank

174. The measurement of acceleration at high frequencies is measured by [18M03]
a. potentiometric type accelerometer
b. seismic transducer
c. relative hygrometer
d. LVDT accelerometers

175. Resistive methods for level measurement are not used [18S01]
a. continuous record of levels
b. at low voltages
c. in pressurized containers
d. in explosive atmosphere

176. The non conducting liquid level is measured by [18S02]
a. variable dielectric constant capacitive method
b. Resistive method
c. Capacitive voltage divider method
d. variable area capacitive method

177. In Variable dielectric constant capacitive method of measuring liquid level, the capacitance increases with [18S03]
a. decrease in distance between liquid and surface of plate
b. increase in liquid level
c. increase in area of plates
d. decrease in distance between plates

178. Which of the following is used to measure the acceleration ? [18S04]
a. accelerometer
b. hygrometer
c. ultrasonic transducer
d. pirani gauge

179. The seismic-vibration transducer is used for measurement of [18S05]
a. displacement amplitude at frequencies higher than its natural frequency
b. displacement amplitude at frequencies higher than its natural frequency
c. velocity at frequencies lower its natural frequency
d. amplitude at frequencies lower than its natural frequency

180. The function of sample hold circuits in the data acquisition system is [19D01]
a. acquire the data and convert into digital form
b. Amplify the data acquired and reduce the noise
c. record data acquired and reduce the data in the desired form
d. store the analog information

181. The function of program pin board in digital data acquisition system is [19D02]
a. routing the signals to each channel
b. perform analog to digital conversion
c. governs the timing throughout the system
d. connects the inputs in a predetermined order

182. An analog integrated circuits are not preferred in data-acquisition systems because [19M01]
a. output is effective summation
b. reactance is proportional to applied emf
c. over loaded and low accuracy
d. more sensitive

183. The functions of Auxiliary equipment in data acquisition system are [19M02]
a. converts analog to digital form
b. converts physical quantity into an electrical signal
c. linearization and limit comparison of signals

d. provide a hard copy for records

184. Digital data acquisition systems are not used when [19M03]

a. high accuracy is required
b. wide frequency width is required
c. the quantity varies slowly
d. low channel cost is required

185. data-acquisition systems are used to measure [19S01]

a. displacement
b. velocity
c. humidity
d. analog signals

186. In many Industrial processes, it is not possible for the test operator to have a view of the equipment being tested, for this purpose the following is used [19S02]

a. Analog recorders
b. Analog computers
c. cathode ray oscilloscope
d. closed circuit TV

187. The function of data acquisition system is [19S03]

a. acquire the data and convert into digital form
b. reduce the recorded data and stored it
c. Amplify the data acquired and reduce the noise
d. record data acquired and reduce the data in the desired form

188. Analog data acquisition systems are used when [19S04]

a. high accuracy is required
b. wide frequency width is required
c. the quantity varies slowly
d. low channel cost is required

189. Transducers, Amplifiers, Filters, Nonlinear analog functions, Analog multiplexers and sample-holds all these are used in the following system [19S05]

a. radio and TV transmission
b. digital data communication system
c. Digital data acquisition system
d. microwave communication system

190. Radiation pyrometers are used in the temperature range of [20D01]

a. 0-500^{0}C
b. 50-100^{0}C
c. -250 to 500^{0}C
d. 1200-2500^{0}C

191. The lens of an optical pyrometer is clouded so that the transmission factor is 0.8. The instrument indicates a temperature of 1480^{0}C.What is the true temperature? [20D02]

a. 1184.0^{0}C
b. 1580.7^{0}C
c. 1753^{0}C
d. 185^{0}C

192. The true temperature 'T' measured by optical pyrometer interms of apparent absolute temperature'Ta' is [20M01]

a. $T = \varepsilon^{\frac{1}{4}} T_a$

b. $T = T_a - \varepsilon^{\frac{1}{4}} T_a$

c. $T = T_a$

d. $T = T_a + 273$

(ε is emissivity)

193. How the flow meter is used to measure the velocity of air ? [20M02]

a. low conductivity material is used
b. galvanic action of dissimilar metals
c. the sensing thermistor is placed in free air
d. thermistor is sealed in cavity

194. If the thermocouple is incorporate in pyrometers then [20M03]
a. the spool is produced and provide a variable shunt across emf
b. the spool is produced and provide a variable shunt across emf
c. it increases the response speed
d. increases sensitivity

195. The optical pyrometers are used to measure [20S01]
a. resistance
b. displacement
c. temperature
d. velocity

196. The principle of optical pyrometer is [20S02]
a. resonant frequency of quartz crystal
b. the hot junction of two dissimilar metals
c. emf produced in a moving coil
d. brightness of the light of a given color emitted by a hot source

197. Placing an obstruction in the path of fluid causing a change in fluid pressure is the principle of measurement of [20S03]
a. displacement
b. velocity
c. rate of flow
d. fluid pressure

198. In turbine flow meter the output signal frequency is [20S04]
a. inversely proportional to the total quantity
b. inversely proportional to the fluid pressure
c. proportional to the applied magnetic field
d. proportional to the flow rate

199. In Hot wire anemometer a fluid flows over a heated surface, heat is transferred from the surface and therefore its temperature reduces the rate of reduction of temperature is [20S05]
a. equal to the flow rate
b. proportional to the flow rate
c. inversely proportional to flow rate
d. independent of flow rate