AE INDUSTRIES - ELECTRICAL

1. **A passive network has -**
   1) Current sources but no voltages sources
   2) Voltage sources but no current sources
   3) Both current and voltage sources
   4) No voltage or current sources

2. **An a.c. voltage source 100 sin ωt is connected to the load resistor R of 50 Ω. The average power in the load resistor R is :**
   1) 100 watts
   2) 200 watts
   3) 400 watts
   4) 1600 watts

3. **In a series RLC circuit, the voltage across the inductance is maximum at -**
   1) at $\omega = \omega_r$
   2) at $\omega < \omega_r$
   3) at $\omega > \omega_r$
   4) None of these

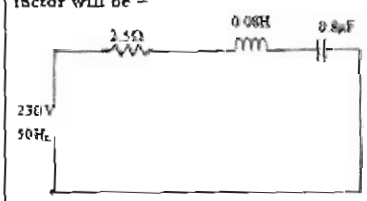
4. **Dual of quantities current, link, mesh are -**
   1) Voltage, tree branch, node
   2) Voltage, tree, node pair
   3) Voltage, node, tree
   4) Link, tree branch, pair

5. **A 10μF capacitor is connected across a 10 volt battery. The steady state current is :**
   1) 10 Amp
   2) 106 Amp
   3) 1 Amp
   4) Zero

6. **If the two windings having self inductances L_1 and L_2 and a mutual inductance H are connected in series with opposite polarity, then the total inductance of series combination will be -**
   1) $L_1 - L_2 + 2M$
   2) $L_1 + L_2 - 2M$
   3) $L_1 + L_2 + 2M$
   4) $L_1 + L_2 - M$

7. **The circuit whose properties are same in either direction is known as -**
   1) Bilateral circuit
   2) Irreversible circuit
   3) Tank circuit
   4) Universal circuit

8. In the circuit shown below, the power factor will be –



A.	Lagging
B.	Unity
C.	Zero
D.	Leading

9. **Which of the following statements is true ?**
   1) Ceramic capacitors must be connected in the correct polarity
   2) Mica capacitors are available in capacitance values of 1 to 10 microfarad
   3) Air capacitors very expensive
   4) Electrolytic capacitor must be connected in the correct polarity

10. **Which of the following statements is true ?**

1) Kirchhoff's voltage law is applicable for d.c.only
2) Kirchhoff's current law is applicable for a.c.only
3) Both Kirchhoff's current law and voltage law are applicable for both d.c. and a.c
4) Both Kirchhoff's current law and voltage law are applicable for d.c. only

11. **'Crawling' in an inductor motor is due to -**

1) Time harmonics in supply
2) Slip ring rotor
3) Space harmonic produced by winding currents
4) Insufficient starting torque

12. **The armature resistance of a 200 V shunt motor is 0.4 ohms and no load armature current is 2A. With load, its armature current is 50A and speed is 1200 rpm. The no load speed would be -**

1) 1470 RPM
2) 1440 RPM
3) 1330 RPM
4) 1250 RPM

13. **Power input to a transformation no load at rated voltage comprises predominantly -**

1) Copper loss
2) Hysteresis loss
3) Core loss
4) Eddy current loss

14. **Which one of the following statements regarding capacitor start, capacitor run single-phase induction motor is correct ?**

1) One of the capacitor is in the circuit during starting and both are in the circuit during running
2) Both the capacitor are in the circuit during starting and one of them is in the circuit during running
3) Both the capacitor are in the circuit during starting and running
4) One of the capacitor is in the circuit during starting and other is in the circuit during running

15. **The efficiency of a 100 kVA transformer is 0.98 at full load as well as at half full load. For this transformer at full load the copper loss is :**

1) Less than core loss
2) Equal to core loss
3) More the core loss
4) None of these

16. **The starting torque of the three phase induction motor can be increased by -**

1) Increasing rotor reactance
2) Increasing stator resistance
3) Increasing rotor resistance
4) Decreasing stator reactance

17. **The sparking at the brushes in the d.c. generator is attributed to -**

1) Quick reversal of current in the coil under commutation
2) Armature reaction
3) High resistance of brushes
4) Reactance voltage

18. **As the load in increased, the speed of d.c. shunt motor will -**

1) Increase slightly
2) Reduce slightly
3) Remains constant
4) Reduce drastically

19. **The armature reaction of an alternator will be completely magnetizing when -**

1) Load power factor is unity
2) Load power factor is zero leading
3) Load power factor is 0.7 lagging
4) Load power factor is 0.7 leading

20. The coupling angle or load angle of synchronous motor is defined as -

1) Angle between two consecutive rotor teeth 2) Angle between two consecutive stator teeth

3) Angle between rotor teeth and stator teeth 4) Angle between rotor and stator poles

21. The open loop transfer function of a system with unity feedback is :

$$\frac{2s^2+6s+5}{(s+1)^2(s+2)}$$

The characteristic equation of the closed loop system is :

A.	$2s^2+6s+5=0$
B.	$(s+1)^2(s+2)=0$
C.	$2s^2+6s+5+(s+1)^2(s+2)=0$
D.	$2s^2+6s+5-(s+1)^2(s+2)=0$

22. The open loop transfer function of a unity feedback system is :

$$G(s)=\frac{K}{s(s+2)(s^2+4s+5)}$$

The range of K is :

A.	$0<k<8$
B.	$0< k <18.88$
C.	$-1<k<18.88$
D.	$-1<k<8$

23. For a transfer function G(s) = S the bode plot will be -

1) Zero magnitude and zero phase shift 2) 20db/decade and phase shift π

3) 20db/decade and phase shift $\pi/2$ 4) None of these

24. Signal flow graph is used to obtain the -

1) Stability of the system 2) Transfer function of the system

3) Controllability of the system 4) Observability of the system

25. The first two rows of Routh's tabulation of a fourth-order system are

s^4	1	10	5
s^3	2	20	

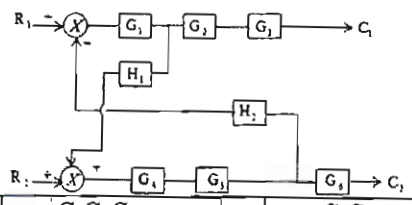
The number of roots of the system lying on the right half of S-plane is :

A.	0
B.	2
C.	3
D.	4

26. **The transfer function of a system is its -**

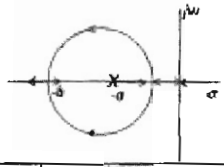
1) Impulse response
2) Parabolic response
3) Step response
4) Ramp response

27. The value of $\frac{C_1}{R_1}$ for the block diagram shown below is :



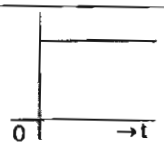
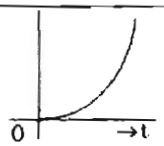
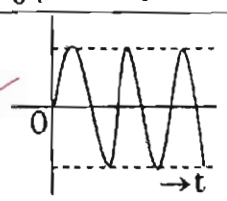
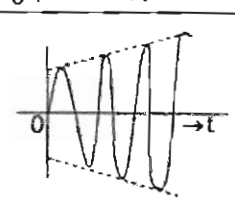
A.	$\frac{G_1G_2G_3}{1+G_1G_4G_5H_1H_2}$	B.	$\frac{G_1G_2}{1+G_4G_5H_1H_2}$
C.	$\frac{G_4G_5G_6}{1+G_1G_2G_3H_1H_2}$	D.	$\frac{G_4G_5}{1+G_1G_2G_3H_1H_2}$

28. The root locus plot of a unity feedback system is shown below :

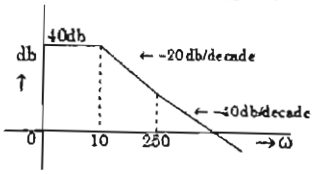


A.	$\frac{K}{s+(s+a)(s+b)}$
B.	$\frac{K(s+a)}{s(s+b)}$
C.	$\frac{Ks}{(s+a)(s+b)}$
D.	$\frac{K(s+b)}{s(s+a)}$

29. The impulse response of a system whose roots on the imaginary axis of s-plane is :

A.		B.	
C.		D.	

30. The aysmptotic bode magnitude plot of a control system is shown below :



The transfer function is given by -

A.	$\frac{40}{s+(s+250)}$	B.	$\frac{100}{\left(1+\frac{s}{10}\right)\left(1+\frac{s}{250}\right)}$
C.	$\frac{100}{(s+10)(s+250)}$	C.	$\frac{100s}{(s+10)(s+250)}$

31. **HRC fuses provide best protection against -**
1) Short circuits
2) Lightning
3) Sparking
4) Fire

32. **Problem of stability occurs in -**
1) DC line only
2) AC line only
3) Both AC and DC
4) None of these

33. **The main criterion for selection of the size of a distribution for a radial distribution system is :**
1) Voltage drop
2) Corona loss
3) Temperature rise
4) Capital cost

34. **The load carrying capability of a long AC transmission line is :**
1) Always limited by the conductor size
2) Limited by stability considerations
3) Reduced at low ambient temperature
4) Decreased by the use of bundled conductors of single conductors

35. **Ring main distribution is preferred to a radical system because -**
1) Voltage drop in the feeder is less and supply is more reliable
2) Voltage drop in the feeder is less and power factor is high
3) Power factor is high and supply is more reliable
4) Power factor is high and system is less expensive

36. **In a distribution system, if the synchronous capacitors are to be used for improving the power factor, the correct location would be -**
1) At the sending end
2) At the receiving end
3) In the middle of the transmission line
4) Both at the sending end and receiving end

37. **The critical value of surge impedance of range transmission line is :**
1) 500 ohms
2) 75 ohms
3) 400 ohms
4) 1000 ohms

38. **Sheath is used in the cables to -**
1) Provide strength to the cable
2) Prevent the entry of moisture into the cable
3) Provide proper insulation
4) Increase current carrying capacity of the cable

39. **Ferranti effect states that under certain conditions the sending end voltage is :**

1) More than the receiving end voltage
2) Equal to the receiving end voltage
3) Less than the receiving end voltage
4) Abnormally high

40. **The equal area criterion of stability is applicable to -**

1) Three machine system with infinite bus bar
2) Multimachine system only
3) Two machine system with infinite bus bars
4) One-machine system and infinite bus bars

41. **Buchholz relay is used for -**

1) Protection of a transformer against all internal faults
2) Protection of a transformer against external faults
3) Protection of a transformer against both internal and external faults
4) Protection of induction motors

42. **A large size alternator is protected against overloads by providing -**

1) Over current relays
2) Temperature sensitive relays
3) Thermal relays
4) A combination of (a) and (b)

43. **Mho relay is normally used for the protection of -**

1) Long transmission lines
2) Medium length lines
3) Short length lines
4) No length criterion

44. **Ring main distribution system is preferred to a radial system, because -**

1) It is less expensive
2) Voltage drop in the feeder is less
3) Power factor is higher
4) Supply is more reliable

45. **The arc voltage produced in the circuit breaker is always -**

1) In phase with the arc current
2) Lagging arc current by 90°
3) Leading arc current by 90°
4) Lagging arc current by 45°

46. **The material used for the fuse must have -**

1) Low melting point and low specific resistance
2) High melting point and high specific resistance
3) Low melting point and high specific resistance
4) Low melting point

47. **The torque produced in induction type relay is :**

1) Proportional to square of current
2) Proportional to the current
3) Inversely proportional to the square of the current
4) Inversely proportional to the current

48. **Van de Graaf generators are useful for -**

1) Very high voltage and high current applications
2) Very high voltage and low current applications
3) Constant high voltage and current applications
4) Medium voltage and high current applications

49. **The protection from negative sequence currents is provided for -**

1) Transformers
2) Generators
3) Transmission line
4) Motors

50. **A line trap in carrier current relaying tuned to carrier frequency presents -**

1) High impedance to carrier frequency but low impedance to power frequency
2) Low impedance to both carrier and power frequency
3) High impedance to both carrier and power frequency
4) Low impedance to carrier frequency but high impedance to power frequency

51. **In a FET as V_{GS} is changed from zero the increasing reverse bias, the value of g_m**

1) Increased
2) Decreased
3) Remains constant
4) Falls suddenly to zero

52. **The early effect in a bipolar junction transistor is caused by -**

1) Fast turn-ON
2) Fast turn- OFF
3) Large collector-base reverse bias
4) Large emitter-base forward bias

53. **A signal may have frequency components which lie in the range of 0.001Hz to 10Hz. Which one of the following types of coupling should be chosen in a multistage amplifier designed to amplify this signal ?**

1) RC coupling
2) Transformer coupling
3) Direct coupling
4) Double-tuned coupling

54. **Which one of the following oscillator is used for generation of low frequencies ?**

1) R.C. phase shift
2) Wien bridge
3) L.C. oscillator
4) Blocking oscillator

55. **In LED, light is emitted because -**

1) Recombination of charge carriers takes place
2) Diode gets heated up
3) Light falling on the diode gets amplified
4) Light gets reflected due to lens action

56.

In a BJT α and β are related as -	
A.	$\beta = \frac{\alpha}{1-\alpha}$
B.	$\beta = \frac{\alpha+1}{\alpha}$
C.	$\beta = \frac{\alpha-1}{\alpha}$
D.	$\beta = \frac{\alpha}{1+\alpha}$

57. **As compared to CB amplifier, the CE amplifier, has -**

1) Low current amplifications
2) Higher input resistance
3) Lower input resistance
4) High current amplifications

58. **The probable source responsible for production of signal with harmonic distortion in an the RC coupled transistor amplifier is :**

1) Power supply, V_{cc} 2) Biasing resistors R_1 and R_2

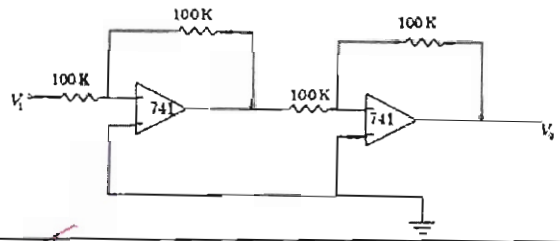
3) Transistor itself 4) Coupling capacitor C_c

59. **A silicon diode operates at a forward voltage of 0.4 V. Calculate the factor by which the current will be multiplied when the temperature is increased from 25°C to 15°C.**

1) 100 2) 204

3) 200 4) 300

60. Name the OP-AMP configuration given below :



A.	Unity gain non-inverting amplifier
B.	Subtractor
C.	Voltage regulator
D.	Unity gain inverting amplifier

61. **The output of a logic gate is "1" when all its input are at logic "0", the gate is either -**

1) A NAND or an EX-OR gate 2) A NOR or an EX-OR gate

3) An AND or an EX-NOR gate 4) A NOR or an EX-NOR gate

62. **In a microprocessor, the register which holds the address of the next instruction to be fetched is :**

1) Accumulator 2) Program counter

3) Stack pointer 4) Instructor register

63. **Which of the following statements is true ?**

1) ROM is a read / write memory 2) PC points to the last instruction that was executed

3) Stack works on the principle of LIFO 4) All instructions affect the flags

64. **Storage of the 1KB means which of the following number of bytes ?**

1) 1000 2) 964

3) 1024 4) 1064

65. **Which of the following is an example of volatile memory ?**

1) ROM 2) RAM

3) PROM 4) HARD DISK

66. **According to Boolean algebra, which of the following relation is not valid ?**

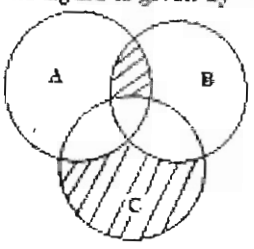
1) X(YZ) = (XY)Z 2) X(Y+Z) = XY + XZ

3) X + XZ = X 4) X(X + Y) = 1

67. **A Schmitt trigger is a digital circuit that produces a _____ output regardless of the input waveform.**

1) Sinusoidal
2) Trapezoidal
3) Triangular
4) Rectangular

68. The boolean expression for shaded area shown in the figure is given by –



A.	$AB + \bar{B}\bar{C}$
B.	$\bar{A}\bar{B}C + AB$
C.	$ABC + A\bar{B}\bar{C}$
D.	$AB\bar{C} + \bar{A}BC + \bar{A}\bar{B}\bar{C}$

69. **A 5-channel MUX is operating at 1000 channels/second. The sampling rate per second is :**

1) 200/s
2) 50/s
3) 100/s
4) 150/s

70. **The hexadecimal equivalent of $(854)_{10}$ is :**

1) 156
2) 256
3) 356
4) 456

71. **For stable networks, the real part of the poles and zeros of the following point function must be -**

1) Negative
2) Negative or zero
3) Positive
4) Zero

72. **A driving point function can be expressed as p(s)/q(s). The degree of p(s) and q(s) -**

1) Should be the same
2) May differ by a maximum of 2
3) May differ by zero or one
4) Stable response

73. **The poles with greater displacement from the real axis correspond to -**

1) Higher frequencies of oscillations
2) Lower frequencies of oscillations
3) Unbounded output
4) Stable response

74. **The impedance parameters Z_{21} is :**

1) Transfer impedance at port 1 with port 2 open circuited
2) Transfer impedance at port 1 with port 2 short circuited
3) Transfer impedance at port 2 with port 1 open circuited
4) Transfer impedance at port 2 with port 1 short circuited

75.

For a symmetrical network -	
A.	$Z_{11} = Z_{22}$
B.	$Z_{12} = Z_{21}$
C.	$Z_{11} = Z_{22}$ and $Z_{12} = Z_{21}$
D.	$Z_{11}\ Z_{22} - Z_{12}^2 = 0$

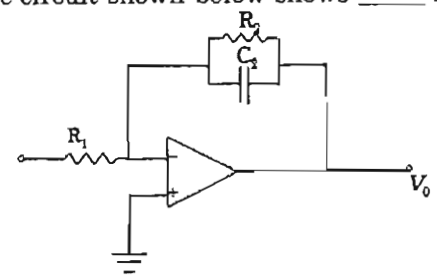
76. **The input and output ports can be interchanged without changing the port voltages and currents, the network is termed as -**

1) Reciprocal
2) Symmetrical
3) Unilateral
4) Bilateral

77. **The condition for reciprocity and symmetry is :**

1) AD - BC = 1 and A = D
2) AB - CD = 1 and B = C
3) AD + BC = 1 and B = D
4) AC - BD = 1 and C = D

78. The circuit shown below shows _____ filter.



A.	Low pass inverting type filter
B.	Non inverting low pass filter
C.	All pass filter
D.	Non-inverting high pass filter

79. **The caver form II of a reactive network synthesis is the successful removal of -**

1) Pole at infinity
2) Zero at infinity
3) Pole at origin
4) Zero at origin

80. **Alternator is a network inserted between source and the load to -**

1) Reduce switching losses
2) Reduce harmonics
3) Increase amplitude
4) Incur desired amount of loss

81. **The reliability of a measuring instrument means -**

1) The life of the instrument
2) The extent over which the characteristics remains linear
3) Degree to which repeatability continues remain within specified limits
4) All of these

82. **Moving coil instrument can be used for measurements at -**
1) High frequencies
2) Low frequencies
3) Only DC
4) Both DC and AC

83. **Which of the following meters cannot measure both AC as well as DC ?**
1) Moving iron meter
2) Thermocouple meter
3) Dynamometer
4) Induction type meter

84. **The dielectric loss of a capacitor can be measured by -**
1) Wien bridge
2) Owen bridge
3) Schering bridge
4) Maxwell bridge

85. **LVDT -**
1) Converts linear motion into electrical signal
2) Translates electrical signal into linear motion
3) Helps measuring temperature
4) Can be used to sense angular displacement

86. **The degree of damping of an analog indicating instrument in :**
1) Slightly more than critical
2) Critical
3) Slightly less than critical
4) Unity

87. **An ammeter with input resistance of 50 ohms given full scale deflection for 50 μA current. The input resistance of a 0 - 1 mA ammeter obtained by connecting a shunt across the 0-50 μA meter will be -**
1) 25 Ω
2) 5 Ω
3) 2.5 Ω
4) 2 Ω

88. **The pair of springs in a PMMC meter provides -**
1) Controlling torque
2) Deflecting torque
3) Support to the pointer
4) Necessary magnetic flux

89. **The brake magnet of an error free electromechanical induction type energy meter is shifted by a small distance towards the edge of the disc. The energy meter reading will be -**
1) A higher kWhr
2) zero kWhr due to stoppage of disc
3) True reading
4) A lower kWhr

90. **In the two wattmeter method of power measurement, one of the wattmeter reads zero watts. The power factor is :**
1) 0.0
2) 0.5
3) 0.8
4) 1.0

91. **Electronic voltmeters which use rectifiers employ negative feedback. This is done to -**
1) Increase the overall gain
2) Improve stability
3) Overcome non linearity of diodes
4) None of these

92. **A strip chart recorder is :**
1) An active transducer
2) An inverse transducer
3) An output transducer
4) Both (B) and (C) above

93. **An instrument that measures the insulation resistance of systems using a self-provided 1000 V d.c. Generator is called -**

1) VTVM
2) Meggar
3) Thermocouple instrument
4) Multimeter

94. **Megger is an instrument for -**

1) Measuring current
2) Measuring voltage
3) Testing insulator
4) Measuring power

95. **In measurement systems, which of the following static characteristics are desirable?**

1) Accuracy
2) Sensitivity
3) Reproducibility
4) All of these

96. **A 3½ digit DVM has a lowest measuring range of 200 mV, which implies that -**

1) Its accuracy is 0.05 %
2) Its poorest resolution is 0.2 mV
3) Its best resolution is 0.1 mV
4) The maximum voltage that can be measured in this range is 199.9 mV

97. The figure shown below is a Lissajous pattern seen on a CRO screen for two sinusoidal signal sources of same frequency. The phase angle between the two signals is :

A.	$\sin^{-1}\left[\frac{A}{B}\right]$	B.	$\tan^{-1}\left[\frac{A}{B}\right]$
C.	$\cos^{-1}\left[\frac{A}{B}\right]$	D.	$\tan^{-1}\left[\frac{B}{A}\right]$

98. **A voltmeter has an accuracy of ± 3 percent of full scale 250 V range is employed to read 150 V. The actual voltage value will fall within the range -**

1) 140.5 to 150.5 V
2) 143 to 150 V
3) 142.5 to 157.5 V
4) 147 to 153 V

99. **A rectifier type instrument uses a bridge rectifiers. It has its scale calibrated in terms of rms value of a sine wave. It indicates a current of 2.22 A. When measuring a voltage having triangular wave shape, the peak value of current will be -**

1) 2.22 A
2) 5.1 A
3) 4.44 A
4) 4 A

100. **In a CRO, the voltage applied to its vertical deflection plates is 2000 V. The velocity of electron beam will be -**

1) 16.8×10^6 m/s
2) 2.98×10^8 m/s
3) 3×10^8 m/s
4) 26.5×10^6 m/s

101. **The static error band of an instrument does not include -**

1) Non-linearity
2) Electrical shift
3) Hysteresis in the instrument
4) None of these

102. The difference between the measured value and the true value is called the -

1) Relative error
2) Absolute error
3) Gross error
4) Probable error

103. The relative error is the -

1) Difference of measured value and true value
2) Ratio of absolute error to the measured value of the quantity under measurement
3) Ratio of absolute error to the true value of the quantity under measurement
4) Ratio of probable error to the true value of quantity under measurement

104. The errors committed by a person in the measurement are -

1) Gross errors
2) Random errors
3) Instrumental errors
4) Environmental errors

105. An instrument which gives total quantity of energy passed through it in a given time is called -

1) Integrating instrument
2) Indicating instrument
3) Recording instrument
4) Digital instrument

106. Sensitivity means -

1) Ratio of change in instrument reading to the change in measured quantity
2) Smallest perceptible change in output
3) Ability to display same reading while measuring a quantity
4) Error between measured value and absolute value

107. In an experiment, three observations of pressure are 10.02 kPa, 10.20 kPa and 10.26 kPa. The standard deviation of the reading is :

1) 0.0128
2) 0.0883
3) 0.883
4) 0.126

108. A second order transducer is described by the equation

$$\frac{d^2y(t)}{dt^2} + 2.8\frac{dy(t)}{dt} + 4y(t) = 11.7\,u(t)$$

Where, y(t) is the output and u(t) is the input. The damping coefficient and natural frequency are –

A.	2.8 and 4
B.	0.8 and 11.7
C.	4 and 2.8
D.	0.7 and 2

109. The first order instrument has to measure signals with frequency content up to 200 Hz with an amplitude inaccuracy of 2%. The maximum allowable time constant is :

1) 0.908×10^{-3}s
2) 0.509×10^{-3}s
3) 0.950×10^{-3}s
4) 0.590×10^{-3}s

110. The transfer function of a measuring instrument is given by $\frac{e^{-1.5s}}{(1+0.5s)}$. The output of the instrument after 2 seconds for a unit step input is :

A.	0.623
B.	0.362
C.	0.632
D.	0.236

111. **An induction type transducers are based on -**

1) Faraday's law
2) Seebeck effect
3) Peltier effect
4) Thomson effect

112. **In semiconductor strain gauges, when a tensile strain is applied, the resistance will -**

1) Increase in n-type materials
2) Increase in p-type materials
3) Increase in both n-type and p-type
4) Decrease in both n-type and p-type

113. **The linear variable differential transformer is :**

1) An inductance variable type pressure transducer
2) A resistance variable type displacement transducer
3) An inductance variable type displacement transducer
4) A resistance variable type pressure transducer

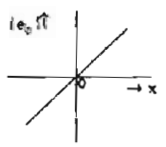
114. **Synchro is a -**

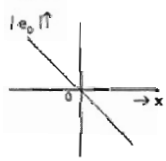
1) Parabolic transducer
2) An angular position transducer
3) A synchronizing transducer
4) A variable transducer

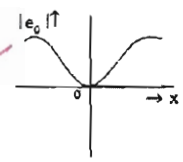
115. **The operation of Pirani gauge is based on -**

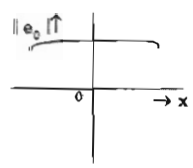
1) Ionization of gas at low pressure
2) Vibration of volume with pressure
3) Vibration of viscosity with pressure
4) Vibration of thermal conductivity of gas with pressure

116. The displacement versus voltage characteristics of a property connected LVDT is :

A. 

B. 

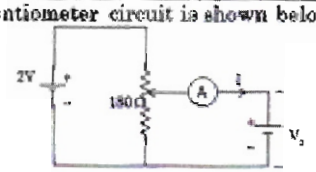
C. 

D. 

117. A piezo electric crystal is characterized by a constant $12\times10^{-3}\ \frac{V/m}{N/m^2}$ and has the following data :
Dielectric current = 1.250×10^{-6} F/m
Young's modulus = 1.2×10^{11} N/m^2
Diameter = 8 mm
Thickness = 2 mm
Leakage resistance = $10^8\ \Omega$
The resistivity in V/m for measurement of displacement is :

A.	63×10^{-3} V/m
B.	36×10^{-3} V/m
C.	3.6×10^{-3} V/m
D.	6.3×10^{-3} V/m

118. A potentiometer circuit is shown below :



The jockey of potentiometer is kept exactly at the mid point and the ammeter reads the current I as 0.2 mA.When V_x is reversed, the ammeter reads 3.8 mA. The internal resistance of the ammeter and the unknown potential V_x are respectively.

A.	50Ω,0.9V
B.	500Ω,0.9V
C.	50Ω,1.1V
D.	500Ω,1.1V

119. A strain gauge is attached to a bar of length 20 cm which is subjected to a tensile force. The nominal resistance of strain gauge is 100 Ω. The changes is resistance and elongation in the bar measured are 0.35 Ω and 0.2 mm respectively. The gauge factor is :

1) 100 2) 10
3) 3.5 4) 2

120. The strain gauge of resistance 120 Ω and gauge factor 2 is at zero strain condition. A 200 kΩ fixed resistance is connected in parallel with it. Then the combination will represent an equivalent strain of -

1) +529 μm/m 2) −300 μm/m
3) zero 4) +124 μm/m

121. An instrument gives maximum deflection for any amount of quantity passed through it which of the following pair is present ?

1) Deflecting and controlling force 2) Deflecting and damping force
3) Damping and controlling force 4) Damping, controlling and deflecting force

122. The force responsible for reduction of oscillations of the pointer in an ammeter is :

1) Controlling force 2) Damping force
3) Deflecting force 4) None of these

123. If the damping torque is more than the critical damping, the instrument is called -

1) Under damped
2) Over damped
3) Under critically damped
4) Over critically damped

124. Air friction damping is used in the instrument which is :

1) Moving iron
2) Moving coil
3) Induction
4) Hot wire

125. Swamping resistance is used to compensate error due to -

1) Stray magnetic field
2) Temperature variations
3) Large supply variations
4) None of these

126. The capacitance of a parallel plate capacitor used in capacitive transducers for measurement of displacement is :

1) Directly proportional to area of plates and the separation between the plates
2) Directly proportional to area of plates and inversely proportional to the separation between the plates
3) Directly proportional to the separation between the plates and inversely proportional to area of plates
4) Inversely proportional to the area of plates and the separation between the plates

127.

A pitot static tube is used to measure the air flow rate is a square tube. If P_d is the differential pressure, the flow rate is proportional to -	
A.	$\sqrt{P_d}$
B.	P_d^2
C.	$\frac{1}{\sqrt{P_d}}$
D.	P_d

128. A seismic vibration sensor, having natural frequency ω_n and damping ratio 'δ' used for measuring amplitude of vibration with frequency 'ω' should have -

1) $\omega_n << \omega$ and $\delta >> 1$
2) $\omega_n = \omega$ and $\delta > 1$
3) $\omega_n << \omega$ and $\delta < 1$
4) $\omega_n >> \omega$ and $\delta < 1$

129. A torque sensing transducer is connected to the shaft of an electric motor to drive a load having moment of inertia of 0.2 kg-m². The torsional constant is 1.5 N-m/rad. Its natural frequency is :

1) $\pi/4$ rad/s
2) 5.48 rad/s
3) $\pi/2$ rad/s
4) 2.74 rad/s

130. An accelerometer gives an output of 14 mV/g. Its sensitivity will be -

1) 1.43 mV/ms^{-2}
2) 14 mV/ms^{-2}
3) 14.3 mV/ms^{-2}
4) 28.6 mV/ms^{-2}

131. Which of the following instrument is used for the measurement of high temperature or distant object ?

1) Pyrometer
2) Anemometer
3) Both (A) and (B) above
4) None of these

132. Consider the following statements about temperature measurement : 1. A thermistor is much more sensitive than a platinum thermometer. 2. The resistance of a thermistor is solely a function of its absolute temperature, whether the source of heat is external, internal or both 3. Highly linear temperature-resistance relationship is a great advantage of the thermistor 4. Thermistor has a negative temperature coefficient. Of these statements.

1) 1 and 2 are correct
2) 3 and 4 are correct
3) 1, 2, 3 and 4 are correct
4) 1, 2 and 4 are correct

133. The advantage of the LVDT over the inductive bridge type transducer is that -

1) It produces high output voltage for small change in core position
2) It can be used for operation at temperature as low as -265°C and as high as +600°C
3) It can measure displacement of a moving object
4) The error due to stray magnetic field is less

134. It is required to measure temperature in the range of 1300°C and 1500°C. The most suitable thermocouple to be used as a transducer would be -

1) Chromel-constantan
2) Iron-constantan
3) Chromel-alumel
4) Platinum-rhodium

135. Match List – I with List – II and select the correct answer using the codes given below the lists :

List – I (Quantity to be measured)	List –II (Type of Transducer)
a. Strain b. Temperature c. Angular velocity	1. Magnetostrictive transducer 2. Magnetoelectric transducer 3. Encoder 4. Thermocouple

	a	b	c
A	1	4	3
B	2	1	3
C	3	4	2
D	1	4	2

136. A pressure gauge used to measure vacuum indicates a pressure of 5 kPa. If the atmospheric pressure is 100 kPa, the absolute pressure is :

1) 20 kPa
2) 105 kPa
3) 0.05 kPa
4) 95 kPa

137. The sensing element of a thermocouple at its hot junction is provided with a shield while taking measurement in a high temperature gas. The shield is provided to -

1) Reduce conduction error
2) Reduce radiation error
3) Reduce convection error
4) Provide compensation for Seebeck effect

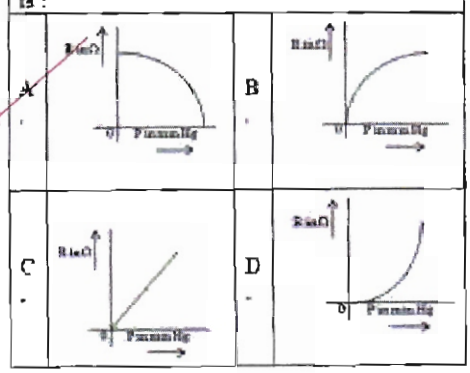
138. **A electromagnetic flow meter is used to measure the flow rate is a pipe of diameter 5cm. The voltage profile is symmetrical and is assumed to be uniform. The operating flux density in the liquid has a peak value of 0.2 T. The fluid velocity when the open circuit voltage between electrodes has a peak to peak value of 0.4 mV is :**

1) 0.01 m/s
2) 0.04 m/s
3) 0.02 m/s
4) 0.2 m/s

139. **A rotameter(variable area flow meter), the inlet tube diameter is same as that of the effective float diameter and the tube taper is small. When the volume flow rate of fluid is Q_A, the float stands at a height of 70mm from the inlet and when the flow rate of the fluid is Q_B, the float moves to the height of 20mm from the inlet. The ratio of the flow rates Q_A/Q_B is :**

1) 0.29
2) 0.082
3) 3.5
4) 12.3

140. **The resistance versus pressure characteristics of a pirani vacuum gauge used for measurement of pressure of gases is :**



141. **In a pH meter, which of the following measures the pH value ?**

1) Voltage difference between electrodes
2) Temperature difference between electrodes
3) Pressures differences between electrodes
4) Colour of electrodes

142. **A CRO cannot be used for the measurement of -**

1) Voltage
2) Current
3) Frequency
4) Power

143. **A bolometer is used in the measurement of -**

1) Transmission losses
2) High voltages
3) Micro-wave power
4) VSWR

144. **A substance that changes its electrical resistance when light falls on it, is known as -**

1) Photo voltaic substance
2) Photoconductive substance
3) Photoelectric substance
4) None of these

145. A seismic transducer is generally used in the instruments for the measurement of -

1) Temperature
2) Relative humidity
3) Vibration
4) None of these

146. In a falling ball viscometer, the ball attains terminal velocities of 0.01 m/s for oil A and 0.002 m/s for oil B. Assuming that the oils A and B have the same density and oil A has kinematic viscosity of 5×10^{-3} m²/s, the kinematic viscosity of oil B is m²/s is :

1) 30×10^{-3}
2) 20×10^{-3}
3) 25×10^{-3}
4) 15×10^{-3}

147. A capillary tube is used for the measurement of -

1) Level
2) Pressure
3) Flow rate
4) Viscosity

148. When the reading of pH meter changes from 5 to 7, the hydrogen ion concentration of a solution is :

1) Increased 100 times
2) Decreased 100 times
3) Doubled
4) Halved

149. In a spectrophotometer, the monochromator has to resolve two wavelengths 599.9 nm and 600.1 nm. The required resolution is :

1) 5000
2) 3000
3) 1000
4) 100

150. A membrane is used for the measurement of -

1) Pressure
2) Density
3) Vibration
4) Velocity

151. Rotameter is used to measure -

1) Rotation
2) Flow
3) Viscosity
4) Specific gravity

152. Consider the following statements regarding a first order system with a proportional controller (p) which exhibits an offset to a step input : 1. Increase the gain of the P controller 2. Add derivative mode 3. Add integral mode Of these statements :

1) 1, 2 and 3 are correct
2) 1 and 2 are correct
3) 2 and 3 are correct
4) 1 and 3 are correct

153. Type of a system depends on the -

1) Number of its poles
2) Difference between the number of poles and zero
3) Number of its real poles only
4) Number of poles it has at the origin

154. For a feedback control system of type 2, the steady state error for a ramp input is :

1) Infinite
2) Constant
3) Zero
4) Indeterminate

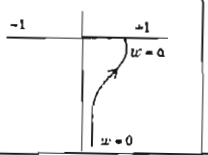
155. In the derivative error compensation, damping -

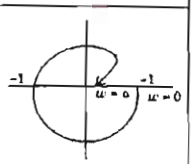
1) Decreases and settling time decreases
2) Increases and settling time increases
3) Decreases and settling time increases
4) Increases and settling time decreases

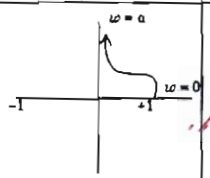
156. The transfer function of a inverse response system is given by -

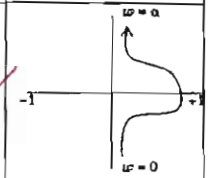
A.	$K.e^{-DS}$
B.	$\frac{K.e^{-DS}}{1+TS}$
C.	$\frac{K(1-T_1S)}{(1+T_2S)}$
D.	$\frac{K}{(1-TS)}$

157. The Nyquist plot in G(s) plane of a PID controller is given by -

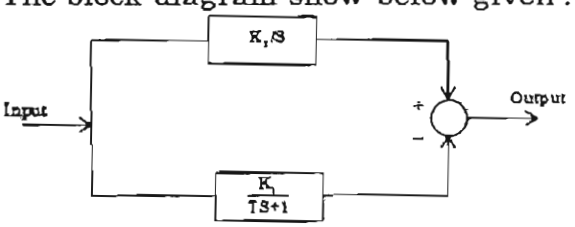
A. 

B. 

C. 

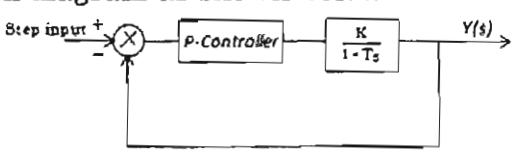
D. 

158. The block diagram show below given :



A.	Oscillatory response
B.	Inverse response
C.	Sluggish response
D.	Faster response

159. A closed loop system is represented by a block diagram as shown below :



The offset is the output can be reduced by -

A.	Adding an integral to the P-controller
B.	Decreasing the gain of P-controller
C.	Increasing the gain of P-controller
D.	Adding a derivative mode to the P-controller

160. The PI controller parameter (K_C, T_I) using Ziegler Nichols tuning rule in terms of ultimate gain K_u and ultimate period P_u is :

A.	$K_c = \frac{K_u}{2.2}$ and $T_I = \frac{P_u}{1.2}$
B.	$K_c = \frac{K_u}{1.2}$ and $T_I = \frac{P_u}{2.2}$
C.	$K_c = \frac{K_u}{1.7}$ and $T_I = \frac{P_u}{2}$
D.	$K_c = \frac{K_u}{2}$ and $T_I = \frac{P_u}{1.7}$

161. A photon is :

1) A quantum of light energy
2) A quantum of matter
3) A positive charge particle intensity
4) An instrument for measuring light

162. Fiber optic transmission is made possible by a phenomenon called -

1) Total reflection
2) Total internal reflection
3) Both (A) and (B) above
4) None of these

163. Laser is an/a -

1) Oscillator
2) Amplifier
3) Both (A) and (B) above
4) None of these

164. Half-life is determined by -

1) Mass spectrometer
2) Geiger-Muller counter
3) Both (A) and (B) above
4) Geiger-Mariden experiment

165. Which of the following isotopes is used for the treatment of cancer ?

1) K^{40}
2) Co^{40}
3) Sr^{90}
4) I^{131}

166. Molybdenum is used as a target element for production of X-rays because it is :

1) A heavy element with a high melting point
2) A heavy element and can easily absorb high velocity electron
3) An element having high coefficient of linear expansion
4) An element having low temperature coefficient of resistance

167. Percentage of blood volume in platelets when diameter of platelet is about 2μm is :

1) 0.7 %
2) 0.1 %
3) 0.5 %
4) 0.6 %

168. Sphygmomanometer is used for -

1) Respiratory volume measurement
2) Measuring electrical activity in the heart
3) Blood pressure measurement
4) Heart beat measurement

169. The output power of the He-Ne laser is :

1) 10 mW
2) 100 mW
3) 10 W
4) 100 W

170. Amount of oxygen (ml/minute) delivered to tissues when 100 ml of blood gives it 5 ml of O_2 to the tissues is : (given : normal cardiac output as 5 l/min)

1) 100 ml/min
2) 150 ml/min
3) 200 ml/min
4) 250 ml/min

171. As compared to PPM, the disadvantages of PDM is that it requires -

1) Powerful transmitter
2) Pulses of larger widths
3) More samples per second
4) None of these

172. The frequency range used in frequency modulator is :

1) 30 MHz to 300 MHz
2) 88 MHz to 108 MHz
3) 3 MHz to 30 MHz
4) 1 MHz to 3 MHz

173. If PCM is to be modulated for transmission, the most common type of modulation employed is :

1) AM
2) FM
3) PM
4) PAM

174. Audio frequency range used in telephone is :

1) 20 - 20000 KHz
2) 30 - 30000 KHz
3) 300 - 3000 KHz
4) 30 - 300 MHz

175. Which of the following has the least wavelengths ?

1) X-rays
2) Ultra-violet
3) Infra-red
4) UHF

176. A 5 MHz sinusoidal carrier wave of amplitude 10 mV is modulated by a 5 kHz sinusoidal audio signal wave of amplitude 6 mV. The lower and upper side band frequencies are -

1) 9.995 MHz and 10.005 MHz
2) 10 MHz and 15 MHz
3) 4.5 MHz and 5.5 MHz
4) 4.995 MHz and 5.05 MHz

177. Optical fibre works on the principle of -

1) Reflection
2) Refraction
3) Polarisation
4) Total internal reflection

178. The transmitting antenna converts -

1) Electrical energy into electromagnetic energy
2) Electromagnetic energy into electrical energy
3) Magnetic energy into electrical energy
4) Electrical energy into magnetic energy

179. The modulation that facilitates highest transmission speeds on a given bandwidth is :

1) Phase modulation
2) Frequency modulation
3) Amplitude modulation
4) Both frequency and amplitude modulation

180. The refractive indices of various layers in the ionosphere varies with respect to -

1) Electron density only
2) Frequency of incident wave only
3) Electron density and the frequency of incident wave
4) Intensity of incident wave only

181. In a microcomputer, WAIT states are used to -

1) Make the processor wait during a DNA operation
2) Make the processor wait during a power interrupt processing
3) Make the processor wait during power shutdown
4) Interface slow peripherals to the processor

182. In a 8085 microprocessor system with memory mapped I/O -

1) I/O devices have 8-bit addresses
2) I/O devices are accessed using IN and OUT instructions
3) There can be maximum of 256 input devices and 256 output devices
4) Arithmetic and logic operations can be directly performed with the I/O data

183. PROMs are used to store -

1) Bulk information
2) Sequential information
3) Information to be accessed relay
4) Relatively permanent information

184. Choose the correct statement(s) from the following :

1) PROM contains a programmable AND array and a fixed OR array
2) PLA contains a fixed AND array and a programmable OR array
3) PROM contains a fixed AND array and programmable OR array
4) None of these

185. POP operation means -

1) To save data in the stack
2) To read data from the stack
3) A byte is used to blankout certain bits
4) A portion of memory will be reserved for return addresses and data

186. Serial input data of 8085 can be loaded into bit 7 of the accumulator by -

1) Using TRAP
2) Executing RST 1
3) Using INTR
4) Executing RIM instruction

187. A microprocessor with a 16 bit address bus is used in a linear memory selection configuration. The maximum addressable memory space is :

1) 8 K
2) 16 K
3) 64 K
4) 4 K

188. Which of the following interrupts has the highest priority ?

1) RST 7.5
2) TRAP
3) INTR
4) RST 5.5

189. What do the contents of stack pointer specify ?

1) Address of top of stack
2) Address of bottom of stack
3) Contents of bottom of stack
4) Address of bottom of stack

190. Which one of the following can be used to change data from special code to temporal code ?

1) Shift registers
2) Counters
3) A/D converters
4) Combinational circuits

191. In a sequential circuit, the outputs at any instant of time depends -

1) Only on the inputs present at that instant of time.
2) On past outputs as well as present inputs
3) Only on the past inputs
4) Only on the present outputs

192. Among the following, the slowest ADC (Analog-to-Digital converter) is :

1) Parallel-comparator (i.e. flash) type
2) Successive approximation type
3) Integrating type
4) Counting type

193. The memory which is ultraviolet light erasable and electrically programmable is :

1) ROM
2) PROM
3) RAM
4) EPROM

194. The subject of Cybernetics deals with the science of -

1) Genetics
2) Control and communications
3) Molecular biology
4) Biochemistry

195. In the ladder logic programming, the status bit 1 for both 'examine ON' and 'examine OFF' instructions signifies :

1) Examine ON FALSE ; Examine OFF TRUE
2) Examine ON TRUE ; Examine OFF FALSE
3) Examine ON FALSE ; Examine OFF FALSE
4) Examine ON TRUE ; Examine OFF TRUE

196. The standard followed for programming languages used in PLC is :

1) IEC 63121 - 2 DST
2) IEC 61131 - 3STD
3) ICE 61234 - 3 PLC
4) IEC 62134 - 2 PLC

197. Computer is used to supervise, control and optimize a process using -

1) SCADA
2) DDC
3) PLC
4) DCS

198. The example for hybrid communication protocol is :

1) PROFI BUS
2) MOD BUS
3) HART
4) FF BUS

199. _____ supports point to point communication.

1) RS 232
2) RS 485
3) RS 423
4) RS 424

200. When a program is being executed in an 8085 microprocessor, its program counter contains -

1) The number of instructions in the current program that have already been executed
2) The total number of instructions in the program being executed
3) The memory address of the instruction that is being currently executed
4) The memory address of the instruction that is to be executed next