1. Select the option that is not a field bus system

(A) MOD BUS
(B) PROFI BUS
(C) DEVICE NET
(D) SYSTEM BUS
(E) Answer not known

2. The two common error check methods incorporated in the industrial data networks in the Data Link Layer are _____ and _____.

(A) Checksum and CRC
(B) FRC and CRC
(C) Convolution sum and check sum
(D) FRC and check sum
(E) Answer not known

3. The fastest field bus standard is

(A) PROFI BUS - DP
(B) PROFI BUS - PA
(C) MOD BUS
(D) FOUNDATION FIELD BUS
(E) Answer not known

4. The two sub-layers of the Data Link Layer in the OSI Protocol Stack are ———————— and ————————.

(A) Flow control and Error Control
(B) TCP and UDP
(C) MAC and LLC
(D) TCP and IP
(E) Answer not known

5. The IoT protocol that uses client - server architecture to connect IoT device with a broker and publishes messages to topics on the server, is called

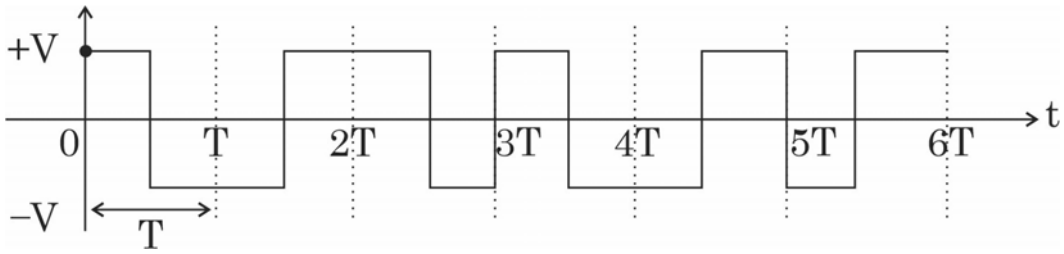
(A) Constrained Access Protocol (CoAP)
(B) Coordinated Access Protocol (CoAP)
(C) Message Queue Telemetry Transport (MQTT) protocol
(D) Message Queue Transmission Technique (MQTT) protocol
(E) Answer not known

6. From the following list, select the IoT communication models :

(i) Request - Response communication model
(ii) Publish – Subscribe communication model
(iii) Push – Pull communication model
(iv) Complementary – Symmetry communication model

(A) (ii) only
(B) (i) and (ii) only
(C) (i), (ii) and (iii) only
(D) (iii) and (iv) only
(E) Answer not known

7. Determine the bit sequence represented by the following Manchester coded waveform



(A) 0 1 0 0 1 0

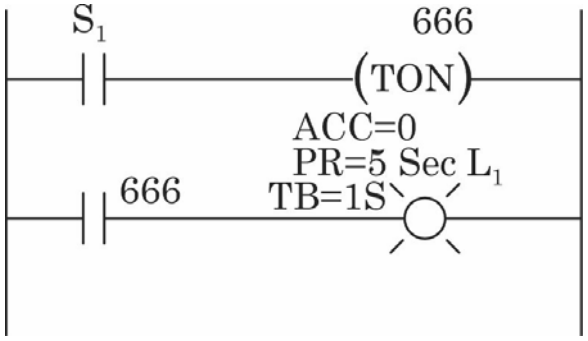
(B) 1 0 1 1 0 0

(C) 1 0 0 1 1 0 1 0 0 1 0 1

(D) 0 1 1 0 0 1 0 1 1 0 1 0

(E) Answer not known

8. The output L_1 will be turned on after ———————— when the input SI is true.



(A) 50 sec.

(B) 5 sec.

(C) 5 m sec.

(D) 0.1 m sec.

(E) Answer not known

9. HART protocol involves simultaneous transmission of (i) and (ii)

(A) (i) 4 to 20 mA analog signal (ii) BFSK digital signal

(B) (i) 0 to 5V analog signal (ii) BFSK digital signal

(C) (i) 4 to 20 mA analog signal (ii) Manchester coded digital signal

(D) (i) 0 to 5V analog signal (ii) Manchester coded digital signal

(E) Answer not known

10. Identify the HART slave devices from the following list :

(i) Sensors

(ii) Hand–held terminals

(iii) Transmitters

(iv) Actuators

(A) All are slave devices

(B) Except (iii), all others are slave devices

(C) Except (ii), all others are slave devices

(D) Except (ii) and (iii), all others are slave devices

(E) Answer not known

11. The _____ counter is an output instruction whose function is to increment its accumulated value on false to true transitions of its instruction.

(A) Reset counter

(B) Up counter

(C) Down counter

(D) Ring counter

(E) Answer not known

12. In DCS the _____ is a dedicated device that is not used for operational purposes and hence when not needed, it can be disconnected from DCS and locked up for safe keeping.

(A) HLCD (High Level Computing Device)

(B) LCU

(C) Shared communication

(D) LLEI (Low Level Engineering Interface)

(E) Answer not known

13. In _____ topology, all devices are connected to a single communication line.

(A) Mesh

(B) Ring

(C) Star

(D) Bus

(E) Answer not known

14. Most of the continuous applications are popularly programmed using _____ in DCS.

(A) Ladder

(B) Function Blocks

(C) Control functions

(D) Instruction list

(E) Answer not known

15. In HART communication, changes in set point are communicated by the master to the field devices through the _____ of HART protocol.

(A) Physical layer
(B) Data link layer
(C) Network layer
(D) Application layer
(E) Answer not known

16. The overview display that provide information concerning the plant is named as _____ display.

(A) Loop level
(B) Plant level
(C) Area level
(D) Group level
(E) Answer not known

17. A collection of processor based hardware that performs plant management of functions traditionally performed by a plant computer which interfaces to other devices only through shared communication facility is

(A) High Level Human Interface (HLHI)
(B) Data Input/Output (DI/OU)
(C) High Level Computing Device (HLCD)
(D) Computer Interface Device (CID)
(E) Answer not known

18. Which form of logic gate system is given by a ladder diagram with a rung having two normally closed gates in series.

(A) AND
(B) OR
(C) NOR
(D) NAND
(E) Answer not known

19. In a PLC, the scan time refers to the amount of time in which

(A) timers and counters are indexed by
(B) one 'rung' of ladder logic takes to complete
(C) the PLC read inputs, solves the logic and write outputs
(D) transmitted data communications must finish
(E) Answer not known

20. In modular PLC, relays will be connected to

(A) Digital input
(B) Analog Input
(C) Digital Output
(D) Analog Output
(E) Answer not known

21. In electro-magnetic type linear velocity measurement, the rate of change of flux is directly proportional to the rate of change of

(A) resistance
(B) inductance
(C) capacitance
(D) reluctance
(E) Answer not known

22. The advantage of digital method of torque measurement eliminate the errors arising from the use of

(A) flanger
(B) slip rings
(C) contact
(D) axis
(E) Answer not known

23. In Knudsen gauge, the temperature of plates is

(A) greater than that of the vane
(B) smaller than that the vane
(C) equal to that of the vane
(D) constant
(E) Answer not known

24. A pitot tube is used for measurement of velocity of flow of water having a density of 1000 kg/m^3. Find the velocity of flow at the head of the pitot tube if it produces a differential pressure of 10kN/m^2 between its two outlets

(A) 17.5 m/s

(B) 175.4 m/s

(C) 4.47 m/s

(D) 4.47 m

(E) Answer not known

25. Torque of rotating shafts is measurement by mounting a strain gauge bridge on the shaft. The supply to the bridge circuit is given to it and the output from it is taken from by using

(A) only slip rings

(B) only rotary transformers

(C) only slip rings and telemetry equipment

(D) slip rings, rotary transformers, telemetry equipment

(E) Answer not known

26. The transducer used for measurement of angular displacement is

(A) LVDT

(B) Thermocouple

(C) Circular potentiometer

(D) Thermistor

(E) Answer not known

27. The output of a hygrometer is used to indicate

(A) absolute humidity

(B) relative humidity

(C) either absolute or relative humidity

(D) moisture

(E) Answer not known

28. RVDT used a ———— core.

(A) iron and ferromagnetic

(B) iron

(C) ferromagnetic

(D) ferrite

(E) Answer not known

29. In an ultrasonic flow meter, the error caused by velocity of sound propagation in medium can be eliminated by

(A) measuring transit time

(B) measuring phase shift

(C) measuring difference of transit times in the direction of flow and against the direction of flow

(D) measuring the difference of frequency in the direction of flow and against the direction of flow

(E) Answer not known

30. The seismic mass of a spring mass accelerometer is 50g and the spring constant is 5000 N/m. The amplitude of mass displacement is ±2cm. Find the maximum measurable acceleration in g

(A) 200.4 g
(B) 2000 g
(C) 204 g
(D) 20.4 g
(E) Answer not known

31. The moisture present in atmosphere can influence the property of

(A) temperature
(B) materials
(C) pressure
(D) viscosity
(E) Answer not known

32. Universal smart transmitter supports the following open standard protocol

(A) HART
(B) UART
(C) SMART
(D) USB
(E) Answer not known

33. Match correctly the instruments used for pressure measurements :

(a)	Measuring varying pressure	1.	Ionization gauges
(b)	High pressures (1000 atmospheres and above)	2.	Manometers
(c)	Pressure below 1mm of Hg	3.	Diaphragm gauges
(d)	Low vacuum and Ultra high vacuum	4.	Cathode Ray Oscilloscope (CRO)

	(a)	(b)	(c)	(d)
(A)	3	4	1	2
(B)	2	3	1	4
(C)	4	1	2	3
(D)	4	3	2	1

(E) Answer not known

34. Recording is not possible with

(A) Liquid-in-glass thermometers

(B) Thermo couples

(C) Filled in system thermometers

(D) Optical pyrometers

(E) Answer not known

35. What is the lower measuring temperature of optical pyrometer

(A) 600 °C
(B) 700 °C
(C) 500 °C
(D) 800 °C
(E) Answer not known

36. Who discovered the pH scale?

(A) Peter Lauritz Sovenson
(B) Henry Moseley
(C) Benjamin Franklin
(D) Wilhelm Rontgen
(E) Answer not known

37. What is the principle of operation of a radar level transmitter?

(A) Buoyancy
(B) Ultrasonic
(C) Pressure
(D) Electromagnetic waves
(E) Answer not known

38. Which of the following flow meters is based on the principle of fluid acceleration?

(A) Turbine flow meter
(B) Orifice plate
(C) Magnetic flow meter
(D) Ultrasonic flow meter
(E) Answer not known

39. Which of the following flow measurement device is suitable for measuring the flow rate of corrosive fluids?

(A) Magnetic flow meter
(B) Turbine flow meter
(C) Vortex flow meter
(D) Thermal flow meter
(E) Answer not known

40. When the venturimeter is inclined, then for a given flow, it will show ———— reading.

(A) Same
(B) More
(C) Less
(D) None of these
(E) Answer not known

41. The power consumed by a cache is computed by

(A) Lee power model
(B) First power model
(C) Third power model
(D) CACTI
(E) Answer not known

42. The speed of I^2C bus is

(A) 100 K bits/s
(B) 10 K bits/s
(C) 75 K bits/s
(D) 100 K bits/s and 10 K bits/s
(E) Answer not known

43. High speed CAN 2.0 supports bit rates

(A) Maximum 500000 bit/s
(B) Upto 1000 K bit/s
(C) Upto 125 K bit/s
(D) From 40 K bit/s to 1 M bit/s
(E) Answer not known

44. At logic 0, CAN high be applied at

(A) 0 V
(B) 1.5 V
(C) 2.5 V
(D) 3.5 V
(E) Answer not known

45. In CISC architecture most of the complex instructions are stored in

(A) Register
(B) Diodes
(C) CMOS
(D) Transistors
(E) Answer not known

46. Who coined the term RISC?

(A) David Patterson
(B) Von Neumann
(C) Michael J Flynn
(D) Harvard
(E) Answer not known

47. The low active signals like DSR, DTR, CTS and RTS used in 8251 interface are called as

(A) Handshake signals
(B) Universal signals
(C) High impedance signals
(D) Modern signals
(E) Answer not known

48. Which process can be used in analyzing the set of possible designs?

(A) Scheduling
(B) Design space exploration
(C) Hardware/Software partitioning
(D) Compilation
(E) Answer not known

49. Which of the following is a feature of a multiprocessor?

(A) The processors can share the memory
(B) It has multiple computers, each of which can have multiple processors
(C) It supports distributed computing
(D) It is called message passing multi computers
(E) Answer not known

50. Which of the following is an aperiodic task requesting the processor at unpredictable times?

(A) Job
(B) Aperiodic task
(C) Sporadic
(D) Periodic task
(E) Answer not known

51. Runtime change in supply voltage levels supplied to various components in a system so as to reduce the overall system power dissipation while maintaining a total computation time and/or throughput requirement is known as

(A) Low power bus encoding
(B) Platform description
(C) Low power system synthesis
(D) Dynamic voltage scaling
(E) Answer not known

52. Which one of the below is not the application of shift register?

(A) Serial to Parallel
(B) Data Storage
(C) Parallel to Serial
(D) Digital to Analog
(E) Answer not known

53. A 4-bit asynchronous binary counter is made up of four flip-flops, each with a 25 ns propagation delay. The maximum usable clock frequency is

(A) 40 MHz
(B) 10 MHz
(C) 25 MHz
(D) 100 MHz
(E) Answer not known

54. Which of the following statement(s) is/are TRUE?

(i) A flip-flop is a monostable circuit.

(ii) A flip-flop is a sequential logic circuit.

(iii) A flip-flop is a Astable circuit.

(iv) A flip-flop is a bistable circuit.

(A) (ii) only
(B) (i) and (iii) only
(C) (ii) and (iv) only
(D) (iv) only
(E) Answer not known

55. Which of the following statement(s) is/are correct?

(i) A Multiplexer is a combinational circuit

(ii) A Multiplexer is many to one data selector

(iii) Memory unit is required for multiplexer

(A) (ii) only
(B) (i) and (ii) only
(C) (i), (ii) and (iii)
(D) (ii) and (iii) only
(E) Answer not known

56. Involution theorem states that

(A) $A + \overline{A} = 1$ (B) $A \cdot \overline{A} = 0$
(C) $\overline{\overline{A}} = A$ (D) $\overline{A} + 1 = A$
(E) Answer not known

57. The minimized form of the Boolean logical expression $\left(\overline{A}\,\overline{B}\,\overline{C} + \overline{A}\,B\,\overline{C} + \overline{A}\,BC + A\,B\,\overline{C}\right)$ is

(A) $A\,\overline{C} + \overline{B}\,C + \overline{A}\,B$ (B) $\overline{A}\,\overline{C} + B\,\overline{C} + \overline{A}\,B$

(C) $\overline{A}\,C + \overline{B}\,C + \overline{A}\,B$ (D) $A\,\overline{C} + \overline{B}\,C + A\,\overline{B}$

(E) Answer not known

58. The value of 110111 ÷ 101 is equal to

(A) 0101 (B) 1011

(C) 1100 (D) 0011

(E) Answer not known

59. When the number of bits present in the digital input increases, the wide range of resistors are required incase of

(A) R-2R ladder type DAC

(B) Inverted R-2R ladder type DAC

(C) Delta-Sigma type DAC

(D) Binary Weighted resistor type DAC

(E) Answer not known

60. The resolution of an 6-bit Digital to Analog converter will be

(A) 1/63 (B) 1/64

(C) 1/31 (D) 1/32

(E) Answer not known

61. The ventricular repolarization is represented by the ECG waves.

(A) P - wave
(B) QRS complex - wave
(C) ST - segment wave
(D) T - wave
(E) Answer not known

62. The number of ^{1}HNMR signals for 1, 1, 2 – tribromomethane is

(A) 2 signals with same intensity
(B) 2 signals with different intensity
(C) 1 signal
(D) 4 signals
(E) Answer not known

63. The process of removing adsorbed ions is called as

(A) Elution
(B) Eluant
(C) Eluate
(D) Solvent
(E) Answer not known

64. Which one of the following is the equation of Beer-Lambert Law?

(A) 10g It/Io

(B) $A = \varepsilon cl$

(C) 10g T/1

(D) $A = \varepsilon\ I_o/I_t$

(E) Answer not known

65. The particular portion of an instrument which enables the selection of an appropriate spectral region is called the

(A) Monochromator

(B) Source

(C) Filter

(D) Cuvette

(E) Answer not known

66. If a radiation of 500 to 560 nm is transmitted, what would be the corresponding complementary colour?

(A) Green

(B) Violet

(C) Yellowish blue

(D) Purple

(E) Answer not known

67. In ^{1}HNMR, if the proton orients antiparallel to the external magnetic filed would results in

(A) Higher energy state
(B) Super energy state
(C) Lower energy state
(D) Intermediate energy state
(E) Answer not known

68. Which one of the following cannot be detected directly in the mass spectrometer?

(i) Unchanged molecules
(ii) Radicals
(iii) Radical cation

(A) (i) only
(B) (ii) and (iii) only
(C) (i) and (ii) only
(D) (i), (ii) and (iii) only
(E) Answer not known

69. The number of ^{1}HNMR signals given by TMS is/are

(A) Two
(B) Three
(C) One
(D) Five
(E) Answer not known

70. Which of the following test is used for detecting electrical activity of the human brain?

(A) ERG
(B) EEG
(C) EMG
(D) ECG
(E) Answer not known

71. Which rhythm is the principal component of the EEG signal?

(A) Beta rhythm
(B) Gamma rhythm
(C) Alpha rhythm
(D) Theta rhythm
(E) Answer not known

72. The variation of the electrical potential associated with the passage of a pulse along the membrane of a muscle cell or nerve cell is called.

(A) Action potential
(B) Muscle potential
(C) Resting potential
(D) Half cell potential
(E) Answer not known

73. ECG is related to

(A) Heart
(B) Brain
(C) Eye
(D) Muscle
(E) Answer not known

74. Match the following based on the classification of the brain waves.

(a)	Beta	1.	Light sleep
(b)	Alpha	2.	Deep sleep
(c)	Theta	3.	Awake
(d)	Delta	4.	Calm relaxation

	(a)	(b)	(c)	(d)
(A)	3	4	2	1
(B)	3	4	1	2
(C)	4	3	1	2
(D)	4	3	2	1

(E) Answer not known

75. Wave length of X rays lie between

(A) 0.01 to 10 nm
(B) 0.001 to 10 nm
(C) 1 to 10 nm
(D) 10 to 100 nm
(E) Answer not known

76. Compare MRI to CT Scans, which is true

1. Both methods use X-rays, but exposure is higher with CT.
2. CT reveals soft structure, while MRI is better at dense material, such as bone
3. Both methods produce Cross-Sectional images at a specified plane through the body.
4. Both the method uses radioactive substance is used for tracking.

(A) 1 only
(B) 1 and 3
(C) 3 only
(D) 1 and 4
(E) Answer not known

77. Which one of the following disease is not related to respiratory system?

(A) Asthma
(B) Pneumonia
(C) Lung Cancer
(D) Cerebral Palsy
(E) Answer not known

78. Bardycardia refers to

(A) Slower heart beat
(B) Higher heart rate
(C) Heart block
(D) Blockage of AV node
(E) Answer not known

79. Which type of electrodes are employed to study the electrical activities of individual cells?

(A) Micro electrodes
(B) Surface electrodes
(C) Scalp electrodes
(D) Needle electrodes
(E) Answer not known

80. The study of measurement of physiological variables of the human body is called as

(A) Biometrics
(B) Urology
(C) Electromyography
(D) Computed tomography
(E) Answer not known

81. Which of the following statement is true about the measurement of schering bridge?

(i) Measurement of properties of insulators

(ii) Measurement of properties of capacitor bushings

(iii) Measurement of mutual inductance

(A) (i) only

(B) (ii) only

(C) (i) and (iii) only

(D) (i) and (ii) only

(E) Answer not known

82. _____are widely used as detectors at frequencies of 250 Hz and over upto 3 or 4 KHz.

(A) Tuneable Amplifier

(B) Head phones

(C) Vibration galvanometer

(D) Galvanometer

(E) Answer not known

83. The power loss on voltmeter is

(A) V. Rv

(B) V^2. Rv

(C) V^2/Rv

(D) Rv/V^2

(E) Answer not known

84. The value of effective resistance with a.c differ from its d.c value on account of

(A) stray conductance effect

(B) stray magnetic effect

(C) skin effect and eddy current losses

(D) residual effect

(E) Answer not known

85. A 4 ½ digit voltmeter is used for measuring voltage. Find the resolution of the instrument

(A) 0.01

(B) 0.001

(C) 0.0001

(D) 0.1

(E) Answer not known

86. The wheatstone bridge method is better than the other methods of measuring resistance. The main reason is

(A) It has four resistor arms

(B) It operates on null indication principle

(C) It is based on kirchoff's law

(D) It does not involve ohm's law

(E) Answer not known

87. The significance of swamping resistance connected in an measuring instrument is

(A) to reduce errors on account of friction
(B) to reduce the static error
(C) to reduce temperature error
(D) to reduce the instrumental error
(E) Answer not known

88. The main application of murray loop test is

(A) to identify ground fault on a cable
(B) to identify short circuit fault on a cable
(C) to identify open circuit
(D) both (A) and (B)
(E) Answer not known

89. Which of the following is not a valid advantages of Electrodynamometer instruments?

(A) Free from hystersis and eddy current errors
(B) Give accurate reading for frequency 1MHz
(C) Used for both a.c and d.c
(D) Generally for Wattmeters
(E) Answer not known

90. A 1000/5A, 50 Hz current transformer has the nominal ratio of 100 and the actual ratio of 110. Find the ratio error in percentage.

(A) –9.09%

(B) –90.9%

(C) 19.09%

(D) 90.9%

(E) Answer not known

91. A slide wire is used for measurement of current in a circuit. The voltage drop across a standard resistor as balanced at 75 cm and the standard cell emf of 1.45V is balanced at 50 cm. Find the voltage drop across 75 cm length

(A) 0.2175 mV

(B) 2.175 mV

(C) 0.2175 V

(D) 2.175 V

(E) Answer not known

92. The transformation ratio for a potential transformer is defined as

(A) Primary winding voltage/Secondary winding voltage

(B) Primary winding current/Secondary winding voltage

(C) Primary winding voltage/Secondary winding current

(D) Secondary winding voltage/Primary winding voltage

(E) Answer not known

93. The rate of change of inductance with deflection is $\frac{dL}{d\theta} = 5 - 2\theta$ μH/rad, where θ is the deflection in radian from zero position. The spring constant is $12 \times 10^{-6}\ N\,m/rad$. Estimate the deflection for a current of 5A.

(A) θ=2.8 rad

(B) θ=1.69 rad

(C) θ=1.8 rad

(D) θ=2.69 rad

(E) Answer not known

94. Which of the following statement is true on the consideration of precision measurement of medium resistance with Wheatstone bridge?

(i) Resistance of connecting leads

(ii) Thermo–electric effects

(iii) Temperature effects

(A) (i) only

(B) (ii) and (iii) only

(C) (i), (ii) and (iii)

(D) (i) and (ii) only

(E) Answer not known

95. Which of the following is NOT a source of systematic error?

(A) Zero drift
(B) Observer bias
(C) Random measurement noise
(D) Sensitivity error
(E) Answer not known

96. The minimum current that a typical clamp–on meter can measure is usually in the range of

(A) 1 mA to 5 mA
(B) 10 mA to 100 mA
(C) 0.1A to 0.5 A
(D) 1A to 5A
(E) Answer not known

97. In which of the following instrument "creeping" is observed

(A) Watt hour meter
(B) Watt meter
(C) Power Frequency Meter
(D) Ameter and Voltmeter
(E) Answer not known

98. In characteristics of Instruments system, which of the following are undesirable static characteristics?

(A) Accuracy
(B) Static Error
(C) Sensitivity
(D) Reproducibility
(E) Answer not known

99. In Cathode Ray oscilloscope, the Lissajous patterns are used to determine

(A) Voltage amplitude
(B) Distortion amplitude
(C) Current amplitude
(D) Measurement of Phase shift
(E) Answer not known

100. Choose the best detectors for detection of null condition in the bridge circuit when works at a frequency of 2 kHz

(A) Vibration galvanometer and Headphones
(B) Headphones and tunable amplifiers
(C) Vibration galvanometer and tunable amplifiers
(D) Vibration galvanometers, Headphones and tunable amplifiers
(E) Answer not known

101. A continuous time, linear time invariant system is described by $\frac{d^2y}{dt^2} + 4\frac{dy}{dt} + 3y(t) = 2\frac{dx}{dt} + 4x$. Assume zero initial conditions, the response $y(t)$ of the above system for the input $x(t) = e^{-2t}u(t)$ is given by

(A) $\left(e^{-t} - e^{-3t}\right) u(t)$ (B) $\left(e^{-t} + e^{-3t}\right) u(t)$

(C) $\left(e^{-t} - e^{3t}\right) u(t)$ (D) $\left(e^{t} + e^{3t}\right) u(t)$

(E) Answer not known

102. The transfer function of a compensator is given by $\frac{1 + aTS}{1 + TS}$. When $a > 1$ and $T > 0$, the maximum phase shift provided by such a compensator is

(A) $\tan^{-1}\left(\frac{a-1}{a+1}\right)$ (B) $\tan^{-1}\left(\frac{a+1}{a-1}\right)$

(C) $\sin^{-1}\left(\frac{a-1}{a+1}\right)$ (D) $\sin^{-1}\left(\frac{a+1}{a-1}\right)$

(E) Answer not known

103. Every state $x(t_0)$ of a system can be completely identified by measurement of output $y(t)$ over a finite time interval. Then the system is called

(A) Controllable (B) Uncontrollable

(C) Unobservable (D) Observable

(E) Answer not known

104. A linear system is described by the state equations

$$\begin{bmatrix}\dot{X}_1\\ \dot{X}_2\end{bmatrix}=\begin{bmatrix}0 & 1\\ -2 & -3\end{bmatrix}\begin{bmatrix}X_1\\ X_2\end{bmatrix}+\begin{bmatrix}0\\ 1\end{bmatrix}u;\ y(t)=\begin{bmatrix}1 & 0\end{bmatrix}x(t)$$

Where u and y are the input and output respectively. The transfer function is

(A) $2s/s^2+3s+2$ (B) $1/s^2+3s+2$

(C) $2/s^2+3s+2$ (D) s/s^2+3s+2

(E) Answer not known

105. Which of the following point is NOT on the root locus of a system with the open-loop transfer function $G(S)H(S)=\dfrac{K}{S(S+1)\ (S+4)}$?

(A) $S=-1$ (B) $S=-0.5$

(C) $S=-4.5$ (D) $S=-2$

(E) Answer not known

106. A system with transfer function, T.F. $\dfrac{C(S)}{R(S)}=\dfrac{1}{S+1}$. When it is excited by $\sin 2\sqrt{2}\,t$. The magnitude of transfer function will be

(A) $1/9$ (B) $1/3$

(C) $1/\sqrt{3}$ (D) $1/8$

(E) Answer not known

107. If the Nyquist plot of the open loop transfer function $G(S)\ H(S)$ of a system passes through the $(-1 + jo)$ point, then the gain margin and the phase margin of the system are ———— and ———— respectively.

(A) 1 dB and 180^o
(B) 1 dB and -180^o
(C) 0 dB and -180^o
(D) 0 dB and 0^o
(E) Answer not known

108. The centroid of the root locus with open loop transfer function $\frac{K}{(S+3)\left(S^2+3S+2\right)}$ is

(A) $(-1,\ 0)$
(B) $(-2,\ 0)$
(C) $(-3,\ 0)$
(D) $(-5,\ 0)$
(E) Answer not known

109. For the given characteristic equation $S^3 + 3S^2 + 7S + K = 0$, the range of value of K for which the system to be stable is

(A) $K > 21$
(B) $K < 0$
(C) $0 < K < 21$
(D) $K = 0$
(E) Answer not known

110. For $0 < \xi < 1/\sqrt{2}$, resonant peak (M_r) is equal to

(Where ξ is damping ratio)

(A) $\dfrac{1}{2\xi\sqrt{1-\xi^2}}$

(B) $\dfrac{1}{2\xi\sqrt{1-2\xi^2}}$

(C) $\dfrac{\xi}{\sqrt{1-2\xi^2}}$

(D) $\xi/2$

(E) Answer not known

111. The response of a second order system to a step input is obtained as $C(t) = 1.66e^{-8t} \sin\left(6t + 37^\circ\right)$ the damping ratio is

(A) 0.4

(B) 0.5

(C) 0.8

(D) 1.0

(E) Answer not known

112. The transfer function of the signal flow graph is given as $\frac{C(S)}{R(S)} = \frac{G_1G_2 + G_1G_3}{1 + G_1G_2H_2 + H_1}$. It has how many feed forward paths and how many loops.

(A) 1, 2

(B) 2, 1

(C) 2, 2

(D) 1, 1

(E) Answer not known

113. The state space model in diagonal canonical form for the given system is

$$\frac{Y(s)}{U(s)} = \frac{s+3}{s^2+3s+2}$$

(A) $\begin{bmatrix}\dot{X}_1\\ \dot{X}_2\end{bmatrix} = \begin{bmatrix}-2 & 0\\ 0 & -1\end{bmatrix}\begin{bmatrix}X_1\\ X_2\end{bmatrix} + \begin{bmatrix}1\\ 0\end{bmatrix}u; y = \begin{bmatrix}-1 & 2\end{bmatrix}\begin{bmatrix}X_1\\ X_2\end{bmatrix}$

(B) $\begin{bmatrix}\dot{X}_1\\ \dot{X}_2\end{bmatrix} = \begin{bmatrix}-2 & 0\\ 0 & -1\end{bmatrix}\begin{bmatrix}X_1\\ X_2\end{bmatrix} + \begin{bmatrix}1\\ 1\end{bmatrix}u; y = \begin{bmatrix}2 & -1\end{bmatrix}\begin{bmatrix}X_1\\ X_2\end{bmatrix}$

(C) $\begin{bmatrix}\dot{X}_1\\ \dot{X}_2\end{bmatrix} = \begin{bmatrix}-1 & 0\\ 0 & -2\end{bmatrix}\begin{bmatrix}X_1\\ X_2\end{bmatrix} + \begin{bmatrix}1\\ 1\end{bmatrix}u; y = \begin{bmatrix}2 & -1\end{bmatrix}\begin{bmatrix}X_1\\ X_2\end{bmatrix}$

(D) $\begin{bmatrix}\dot{X}_1\\ \dot{X}_2\end{bmatrix} = \begin{bmatrix}-1 & 0\\ 0 & -2\end{bmatrix}\begin{bmatrix}X_1\\ X_2\end{bmatrix} + \begin{bmatrix}1\\ 1\end{bmatrix}u; y = \begin{bmatrix}-1 & 2\end{bmatrix}\begin{bmatrix}X_1\\ X_2\end{bmatrix}$

(E) Answer not known

114. The state space representation of the following differential equation governing the system $\frac{d^2y}{dt^2} + 5\frac{dy}{dt} + 4y = u$ is,

(A) $\begin{bmatrix} \dot{X}_1 \\ \dot{X}_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -4 & -5 \end{bmatrix} \begin{bmatrix} X_1 \\ X_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u$

(B) $\begin{bmatrix} \dot{X}_1 \\ \dot{X}_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -5 & -4 \end{bmatrix} \begin{bmatrix} X_1 \\ X_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u$

(C) $\begin{bmatrix} \dot{X}_1 \\ \dot{X}_2 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ -4 & -5 \end{bmatrix} \begin{bmatrix} X_1 \\ X_2 \end{bmatrix} + \begin{bmatrix} 1 \\ 0 \end{bmatrix} u$

(D) $\begin{bmatrix} \dot{X}_1 \\ \dot{X}_2 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ -5 & -4 \end{bmatrix} \begin{bmatrix} X_1 \\ X_2 \end{bmatrix} + \begin{bmatrix} 1 \\ 0 \end{bmatrix} u$

(E) Answer not known

115. The transfer function of a system given by $T(s) = \frac{100}{s^2 + 20s + 100}$. The system is

(A) an over damped

(B) an critically damped

(C) an under damped

(D) an undamped

(E) Answer not known

116. The impulse response of a system is $C(t) = -te^{-t} + 2e^{-t}(t > 0)$. Its open loop transfer function

(A) $(2s+2)/s^2$

(B) $(2s+1)/s^2$

(C) $(2s+1)/(s+1)^2$

(D) $(2s+2)/(s+1)^2$

(E) Answer not known

117. In force current analogy viscous friction constant B is analogous to

(A) Reciprocal of resistance

(B) Reciprocal of inductance

(C) Reciprocal of capacitance

(D) Resistance

(E) Answer not known

118. In Nyquist analysis, what does the term "gain crossover frequency" refer to

(A) Frequency where gain is maximum

(B) Frequency where magnitude is zero

(C) Frequency where magnitude equals one

(D) Frequency where phase is zero

(E) Answer not known

119. If the gain plot of a Bode plot has a slope of –20 dB/decade and the phase plot is at –90 degrees. What can be inferred about system?

(A) The system is stable

(B) The system is unstable

(C) The system is type 0

(D) The system has a pole at the origin

(E) Answer not known

120. A lag compensator is typically used to

(A) Improve steady state error

(B) Increase system bandwidth

(C) Reduce overshoot

(D) Increase the rise time

(E) Answer not known

121. For an AM DSBFC modulator with a carrier frequency $f_c = 100$ kHz and a modulating signal with maximum frequency of $fm_{(\max)} = 5$ kHz, the frequency limits for the upper and lower sidebands are ___(i)___ and ___(ii)___ respectively. The bandwidth of the modulated signal is ___(iii)___

(A) (i) 500 kHz (ii) 20 kHz (iii) 520 kHz

(B) (i) 105 kHz (ii) 95 kHz (iii) 200 kHz

(C) (i) 500 kHz (ii) 20 kHz (iii) 480 kHz

(D) (i) 105 kHz (ii) 95 kHz (iii) 10 kHz

(E) Answer not known

122. An amplitude modulated wave (AM-DSBFC) has a carrier power of 6 kW and 60% modulation. The total power of the modulated wave is

(A) 6 kW

(B) 7.08 kW

(C) 3.6 kW

(D) 9.6 kW

(E) Answer not known

123. The function of Network Layer in the OSI protocol stack is

(A) Successful delivery of data packets to the destination node

(B) Successful delivery and sequencing of data packets at the destination node

(C) Successful establishment of session for delivery of data packets

(D) Successfully framing the data at transmitter and deframing the same at the receiver

(E) Answer not known

124. If the minimum bandwidth of an ASK modulation scheme is f_b, then the corresponding minimum bandwidth of BPSK modulation scheme is ___(i)___, and the minimum bandwidth of QPSK modulation scheme is ___(ii)___

(A) (i) f_b (ii) $\frac{f_b}{2}$

(B) (i) $\frac{f_b}{2}$ (ii) $\frac{f_b}{4}$

(C) (i) $\frac{f_b}{2}$ (ii) $\frac{f_b}{3}$

(D) (i) f_b (ii) $\frac{f_b}{3}$

(E) Answer not known

125. If the digital information is contained in both the amplitude and phase of the modulated signal the scheme is called

(A) Phase - Amplitude Modulation (PAM)

(B) Phase Shift - Amplitude Modulation (PAM)

(C) Quadrature Amplitude Modulation (QAM)

(D) Quaternary Amplitude Modulation (QAM)

(E) Answer not known

126. The minimum Nyquist Bandwidth for a BFSK signal with the mark frequency of 49 kHz and space frequency of 51 kHz (representing the binary digits 1 and 0 respectively) and an input data rate of 2 kbps, is given by

(A) 6 kHz

(B) 4 kHz

(C) 3 kHz

(D) 2 kHz

(E) Answer not known

127. Identify the multiplexing scheme that uses the least bandwidth in an efficient manner

(A) TDM

(B) TDMA

(C) FDM

(D) FDMA

(E) Answer not known

128. A TDM frame in a PCM-TDM system consists of ___(i)___ and a TDM superframe consists of ___(ii)___

(i) PCM codes from all the channels

(ii) One TDM frame along with alignment bits.

Based on the above statements, choose the correct option

(A) Both (i) and (ii) are correct

(B) Both (i) and (ii) are incorrect

(C) (i) is correct and (ii) is incorrect

(D) (i) is incorrect and (ii) is correct

(E) Answer not known

129. The maximum possible number of quantization levels produced by a 16-bit PCM is

(A) 4

(B) 16

(C) 65,536

(D) 32,768

(E) Answer not known

130. Phase Locked Loop is a simple linear integrated circuit used for

(A) Closed loop Amplification in RF circuits

(B) FM demodulation

(C) Linear Phase filtering in RF amplifiers

(D) AM Demodulation

(E) Answer not known

131. When DIT-FFT Radix-2 Algorithm is used, the inputs $x(n) = \{x(0), x(1), x(2), x(3)\}$ are fed in the sequence ___(i)___ to the flowgraph. This is called ___(ii)___

(A) (i) $x(0), x(2), x(3), x(1)$ (ii) Pseudo-Random order

(B) (i) $x(0), x(2), x(1), x(3)$ (ii) Bit Reversed Order

(C) (i) $x(1), x(3), x(0), x(3)$ (ii) Odd-Even order

(D) (i) $x(3), x(2), x(1), x(0)$ (ii) Reversed index order

(E) Answer not known

132. Among the three types of windows, namely, Barlett and Hanning, the best performance in terms of main lobe width is offered by ___(i)___ and its main lobe width is ___(ii)___ Assume the window length = N samples.

(A) (i) Hanning window (ii) $\frac{4\pi}{N}$ radians / second

(B) (ii) Barlett window (ii) $\frac{8\pi}{N}$ radians / second

(C) (i) Barlett window (ii) $\frac{4\pi}{N}$ radians / second

(D) (i) Hanning window (ii) $\frac{8\pi}{N}$ radians / second

(E) Answer not known

133. The transfer function of the analog normalized second order IIR Butterworth filter is : H(s) =

(A) $1/(s^2+2s+1)$

(B) $2/(s^2+s+1)$

(C) $2/(s^2+2s+1)$

(D) $1/(s^2+\sqrt{2}s+1)$

(E) Answer not known

134. According to the symmetry property of Twiddle Factor used in N-point FFT algorithm,

(A) $W_N^{K+N} = W_N^{-K}$

(B) $W_N^{K+N/2} = W_N^{K}$

(C) $W_N^{K+N/2} = W_N^{-K}$

(D) $W_N^{K+N/2} = -W_N^{K}$

(E) Answer not known

135. The frequency response of an LTI system is derived as ___(i)___ by applying ___(ii)___ property of DTFT.

(A) (i) $H(e^{jw}) = Y(e^{jw}) / X(e^{jw})$ (ii) Division in frequency

(B) (i) $H(e^{jw}) = Y(e^{jw}) / X(e^{jw})$ (ii) Convolution in time

(C) (i) $H(e^{jw}) = Y(e^{jw}) \cdot X(e^{jw})$ (ii) Convolution in time

(D) (i) $H(e^{jw}) = Y(e^{jw}) \cdot X(e^{jw})$ (ii) Multiplication in frequency

(E) Answer not known

136. The Discrete Time Fourier Transform of the sequence $x(n) = 2^n u(n)$ is given by

(A) $X(e^{jw}) = \dfrac{1}{1 - 2e^{-jw}}$

(B) $X(e^{jw}) = \dfrac{1}{1 + 2e^{-jw}}$

(C) $X(e^{jw}) = \dfrac{1}{1 + e^{-j2w}}$

(D) Fourier Transform does not exist for the given $x(n)$.

(E) Answer not known

137. If x(n) is a causal sequence of finite duration, the region of convergence (ROC) of its Z-Transform x(z) will be

(A) Entire z-plane except $z=0$ and $z=\infty$

(B) Entire z-plane including $z=0$ and $z=\infty$

(C) Entire z-plane except $z=\infty$

(D) Entire z-plane except $z=0$

(E) Answer not known

138. The cross - correlation of the two finite length sequences $x(n)=\{1,2,1,1\}$ and $y(n)=\{1,1,2,1\}$ is given by $r_{xy}(l)$ =

(A) $r_{xy}(l)=\{1,3,5,7,5,3,1\}$

(B) $r_{xy}(l)=\{2,3,3,2\}$

(C) $r_{xy}(l)=\{1,2,2,1\}$

(D) $r_{xy}(l)=\{1,4,6,6,5,2,1\}$

(E) Answer not known

139. A Discret Time LTI system has an impulse response $h(n)=\delta(n-3)$. The output of the system for the input $x(n)$ is

(A) $\delta(n-3)$

(B) $x(n)-3$

(C) $x(n-3)$

(D) 3

(E) Answer not known

140. The even component of the DT signal $x(n)=\{1, 0, -1, 2, 3\}$ is given by $x_e(n)$ =

(A) $x_e(n)=\{+1.5, 1, -0.5, 0, \underset{\uparrow}{1}, 0, -0.5, 1, 1.5\}$

(B) $x_e(n)=\{-1.5, -1, 0.5, 0, \underset{\uparrow}{0}, 0, -0.5, 1, 1.5\}$

(C) $x_e(n)=\{1, -1, 3\}$

(D) $x_e(n)=\{0, 2\}$

(E) Answer not known

141. The control configuration which uses the direct measurement of disturbances to adjust the values of the manipulated variable is

(A) Feed back configuration

(B) Inferential control configuration

(C) Feed forward control configuration

(D) Split range control

(E) Answer not known

142. The function of ———————— control action is to anticipate the future behaviour of the error signal by considering its rate of change.

(A) Derivative

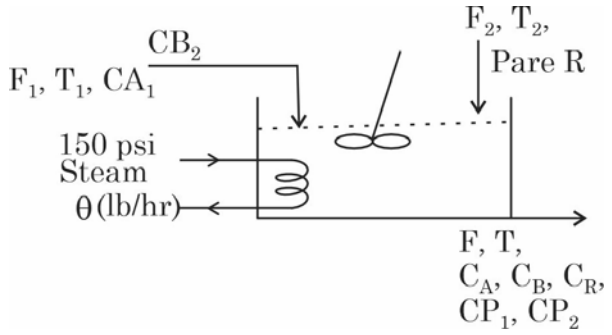
(B) Integral

(C) Feed forward

(D) Proportional

(E) Answer not known

143. Consider the CSTR system shown below in which steam 1 is a mixture of A and B with composition CA_1 and CB_1 (moles/volume) and has a volumetric flow rate of F_1 and temperature of T_1. Steam 2 is pure R. The reaction taking place are Reaction 1 : A + R $\rightarrow$ P_1 Reaction 2 : B + 2R $\rightarrow$ P_2. Find regress of freedom.



(A) 9

(B) 5

(C) 4

(D) 14

(E) Answer not known

144. Which term describes a control system in which controlled flow is added proportionately to an uncontrolled flow?

(A) Selective control

(B) Cascade control

(C) Ratio control

(D) Fuzzy control

(E) Answer not known

145. In proportional controller increase in ———————— reduces offset but increases ————————.

(A) K_p, Oscillations

(B) Offset, peak overshoot

(C) Oscillations, peak overshoot

(D) Oscillations, K_p

(E) Answer not known

146. Derivative control

(A) is predictive in nature

(B) reduces damping

(C) increasing the order of the system

(D) has the same effects as output rate control

(E) Answer not known

147. An increase in integral time tends to

(A) Speeds up the cloud loop response

(B) Slow down the cloud loop response

(C) No changes in the speed of the closed loop response

(D) Stabilize the closed loop response

(E) Answer not known

148. The integral controller enhances the

(A) Steady state response
(B) Dynamic response
(C) No effect of the controller
(D) Transient response
(E) Answer not known

149. Find the value of the function $y(t) = 2e^{-0.1t}$ when it reaches $t = \infty$.

(A) 2
(B) 0.1
(C) ∞
(D) 0
(E) Answer not known

150. The relationship between proportional band (PB) and proportional gain (PG) is

(A) $PG = \frac{PB}{100}$

(B) $PB = \frac{100}{PG}$

(C) $PG = \frac{1}{PB}$

(D) $PB = \frac{1}{PG}$

(E) Answer not known

151. ON-OFF control can be considered a special care of proportional control with a ———————— controller gain.

(A) Very high

(B) Very low

(C) Moderate

(D) Lowest

(E) Answer not known

152. A control valve regulates the liquid flow of a tank. The water level is controlled in the tank at a level of 25 feet by regulating the outflow. The measured in flow varies from 0 to 120 gallons per minute. Calculate the valve co-efficient Cv for the valve. (One foot of water develops a pressure of 0.433 psi).

(A) 10.8

(B) 36.5

(C) 43.3

(D) 56.2

(E) Answer not known

153. In the self-tuning regulator, the outer loop is used to adjust the parameter of the feedback controller, and is composed of a ———————— and an adjustment mechanism for the controller parameter.

(A) Recursive parameter estimator

(B) Synthesis controller

(C) Filter

(D) Inferential controller

(E) Answer not known

154. The ———————— provide a measure of interaction between the loops

(A) Controller gains
(B) Valve gains
(C) Relative gains
(D) Sensor gains
(E) Answer not known

155. To suppress errors that persist for long times the ———————— criterion will tune the controllers better.

(A) ISE
(B) IAE
(C) ITAE
(D) ITE
(E) Answer not known

156. ———————— control uses secondary measurements to adjust the process variable when the controlled variables cannot be measured.

(A) Inferential
(B) Split range
(C) Ratio
(D) Predictive
(E) Answer not known

157. Cavitation is a control valve is caused by

(A) Process noise
(B) Vibration in piping
(C) A laminar flow regime
(D) Pressure recovery above the vapor pressure
(E) Answer not known

158. A distinguishing feature of MPC in its ———————— approach.

(A) Moving window
(B) Receding horizon
(C) Fixed window
(D) Optimal window
(E) Answer not known

159. ———————— control can be suggested if it is possible to measure disturbances before they influence the process and can take actions to eliminate disturbances.

(A) Feed forwards
(B) Split range
(C) Model based
(D) Internal model based
(E) Answer not known

160. Cascade control means

(A) Feed forward control
(B) More than one feedback loop
(C) On-Off control
(D) One feedback loop
(E) Answer not known

161. A reading is recorded as 302.10 V. The reading has

(A) Two significant figures
(B) Four significant figures
(C) Three significant figures
(D) Five significant figures
(E) Answer not known

162. In piezo-electric transducers, the mode of motion affected depends on the ———————— of the body relative to the crystal arts and location of the electrodes.

(A) Shape
(B) Orientation
(C) Axis
(D) Condition
(E) Answer not known

163. An ac LVDT has the following data. Input = 6.3 V, Output = 5.2 V, range ± 0.5 inch. Find the output voltage when the core is –0.25 in. from the centre

(A) +3.12 V
(B) –3.12 V
(C) –2.6 V
(D) +2.6 V
(E) Answer not known

164. Ethylene diamine tartrate belong to ———————— group of piezo-electric material.

(A) Natural

(B) Synthetic

(C) Natural and synthetic

(D) Neither natural nor synthetic

(E) Answer not known

165. In capacitive transducer, the capacitance of cylindrical capacitor is expressed as

(A) $C = \dfrac{2\pi x}{\log_e\left(\dfrac{D_2}{D_1}\right)}$ Farad

(B) $C = \dfrac{\in A}{d}$ Farad

(C) $C = \dfrac{2\pi \in x}{\log_e\left(\dfrac{D_2}{D_1}\right)}$ Farad

(D) $C = \dfrac{2\pi \in x}{\log_e\left(\dfrac{D_1}{D_2}\right)}$ Farad

(E) Answer not known

166. In magneto strictive transducer, the output is proportional to the ———————— derivative of displacement of the mass *M*.

(A) First

(B) Second

(C) Third

(D) Zero

(E) Answer not known

167. The output voltage of the hall effect transducer is

(A) $E_H = K_H \frac{Bt}{I}$ (B) $E_H = \frac{K_H I}{B}$

(C) $E_H = K_H IB/t$ (D) $E_H = \frac{K_H B}{I}$

(E) Answer not known

168. The most widely used inductive transducer to translate the linear motion into electrical signals is

(A) Potentiometer
(B) Strain gauge
(C) Linear variable differential transformer
(D) Synchros
(E) Answer not known

169. The resistance of a circuit is found by measuring current flowing and the power fed into the circuit. Find the limiting error in the measurement of resistance when the limiting errors in the measurement of power and current are ± 1.5% and ± 1.0%, respectively

(A) ± 1.5% (B) ± 3%

(C) ± 3.5% (D) ± 1%

(E) Answer not known

170. The process of comparing measurement device with a standard to determine its accuracy is called

(A) Validation
(B) Calibration
(C) Adjustment
(D) Verification
(E) Answer not known

171. Which of the following is true, Instrumental errors can be avoided by?

(i) Calibrating the instrument against a standard

(ii) Using magnetic shield

(iii) Selecting a suitable instrument for the particular applications

(A) (i) only
(B) (ii) only
(C) (i) and (iii) only
(D) (i) and (ii) only
(E) Answer not known

172. What is the span of an instrument, operating under a bias which read a value from 230 V to 450 V only?

(A) 450
(B) 220
(C) 230
(D) 400
(E) Answer not known

173. Which of the following is not a dynamic property?

(A) Speed of response
(B) Measuring lag
(C) Hysteresis
(D) Fidelity
(E) Answer not known

174. ———————— in potentiometers refers to spurious output voltage fluctuations occurring during motion of the slider and includes the effects of resolution.

(A) Bandwidth
(B) Noise
(C) Shock
(D) Temperature
(E) Answer not known

175. A resistance wire strain gauge is bonded to a steel structural member subjected to a stress of $100\ \text{MN/m}^2$. The modulus of elasticity of steel is $200\ \text{GN/m}^2$. Find the strain.

(A) 500×10^{-6}
(B) 480×10^{-6}
(C) 500×10^{-3}
(D) 480×10^{-3}
(E) Answer not known

176. A parallel plate capacitor is suitable for measurement of linear displacements ranging from

(A) 0.1 μm to 1 μm
(B) 1 μm to 10 μm
(C) 1 mm to 10 mm
(D) 1 m to 10 m
(E) Answer not known

177. The mean deviation $\overline{D}$ in terms of deviations from the mean value of 'n' readings is

(A) $\dfrac{\Sigma \lvert d \rvert}{n}$
(B) $\dfrac{\Sigma d}{n}$
(C) $\dfrac{\sqrt{\Sigma d^2}}{n}$
(D) $\sqrt{\dfrac{\Sigma d^2}{n}}$
(E) Answer not known

178. In the overdamped system, the roots are

(A) Real and equal

(B) Imaginary and equal

(C) Real and unequal

(D) Imaginary and unequal

(E) Answer not known

179. Which of the following statement is true about calibration of instrument with

(i) A primary standard

(ii) An instrument of known accuracy

(iii) Static standard

(A) (i) only

(B) (ii) only

(C) (i) and (ii) only

(D) (i), (ii) and (iii)

(E) Answer not known

180. The dimensions of energy is expressed as

(A) ML^2T^{-2}

(B) ML^2

(C) MT^{-2}

(D) ML^3T^{-1}

(E) Answer not known

181. Voltage to current converter is also named as

(A) Voltage series positive feedback amplifier
(B) Current series negative feedback amplifier
(C) Voltage series negative feedback amplifier
(D) Current series positive feedback amplifier
(E) Answer not known

182. An differentiator has a transfer function whose

(A) Magnitude increases linearly with the frequency
(B) Magnitude varies inversely with the frequency
(C) Magnitude remains constant
(D) Magnitude decreases linearly with the frequency
(E) Answer not known

183. For an Non-Inverting Op-Amp with $R_f = 10\ k\Omega$ and $R_i = 1 k\Omega$, the output voltage drift due to temperature variation is found to be 3.135 mv. Find the input referred drift in voltage

(A) $28.5 \mu v$
(B) $285\ \mu v$
(C) $2.85 \mu v$
(D) $0.285 \mu v$
(E) Answer not known

184. Negative feedback in an Op-Amp will

(A) Increase the input and output impedances
(B) Increase the input impedance and bandwidth
(C) Decrease the output impedance and bandwidth
(D) Does not affect impedance of bandwidth
(E) Answer not known

185. In which arrangement, the input impedance of transistor is the highest

(A) Common Emitter
(B) Common Base
(C) Common Collector
(D) None of the above
(E) Answer not known

186. For a PN junction diode, the reverse saturation current for silicon and germanium are

(A) Microamperes, Nanoamperes
(B) Nanoamperes, Microamperes
(C) Microamperes, Microamperes
(D) Nanoamperes, Nanoamperes
(E) Answer not known

187. The barrier potential for silicon is 0.7 V at room temperature of 25°C. Its value at 125°C is

(A) 0.5 V
(B) 0.8 V
(C) 0.9 V
(D) 0.7 V
(E) Answer not known

188. The correct expression for relation between current gain α and β is

(A) $\alpha = \frac{\beta}{\beta + 1}$
(B) $\beta = \frac{\alpha}{\alpha - 1}$
(C) $\alpha = 0.5\beta$
(D) $\alpha = \beta(\beta + 1)$
(E) Answer not known

189. The main advantage of N-channel MOSFETS over P-channel is

(A) N-channel devices are slower than P-channel devices

(B) N-channel devices consumes less power then P-channel devices

(C) N-channel devices have higher packing density than P-channel devices

(D) N-channel handle lesser currents than P-channel

(E) Answer not known

190. Which of the following transistor configuration have maximum power gain capability?

(A) CB configuration

(B) CC configuration

(C) CD configuration

(D) CE configuration

(E) Answer not known

191. Which one of the following is the turning off method of SCR?

(A) $\frac{dv}{dt}$ triggering method

(B) Light triggering

(C) Reverse polarity of anode – to – cathode voltage

(D) Forward breakover voltage

(E) Answer not known

192. Which one of the following is the main advantages of class – B push – pull amplifier? It is being free from

(A) any circuit imbalances
(B) unwanted noise
(C) even – order harmonic distortion
(D) dc magnetic saturation effects
(E) Answer not known

193. A non-inverting amplifier has input resistance of 1 kΩ and feedback of 100 kΩ. The voltage gain is

(A) 1000
(B) 100
(C) 101
(D) 1001
(E) Answer not known

194. Which of the Op-Amp to act as a buffer amplifier?

(A) Summing amplifier
(B) Inverting amplifier
(C) Comparator
(D) The voltage follower
(E) Answer not known

195. Which oscillator circuit is meant for converting sine wave signal into square wave signal is called a?

(A) Astable multivibrator
(B) Wien bridge oscillator
(C) Blocking oscillator
(D) Schmitt trigger
(E) Answer not known

196. A ac circuit contains a capacitor 10^{-6} F and an inductor of 10^{-4} H. The frequency of oscillations will be

(A) 10^5 Hz (B) 10 Hz

(C) $\frac{10^5}{2\pi}$ Hz (D) $\frac{10}{2\pi}$ Hz

(E) Answer not known

197. Which of the following is correct?

(i) Negative feedback increase distortion and lower bandwidth

(ii) Negative feedback lower distortion and increase bandwidth

(iii) Negative feedback lower distortion and lower bandwidth

(A) (i) – only (B) (ii) – only

(C) (iii) – only (D) (ii) and (iii)

(E) Answer not known

198. Voltage followers are

(i) Inverting Op-Amp with unity gain

(ii) Non-Inverting Op-Amp with unity gain

(iii) Output voltage is not equal to the input voltage

(A) (i) only (B) (ii) only

(C) (iii) only (D) (i) and (iii)

(E) Answer not known

199. For a first order Butterworth Active HP filter having a cut off frequency of 200 Hz, if the resistance R connected between input and ground is 5 kΩ then find the value of C?

(A) $\frac{1}{\pi}\mu F$ (B) $\frac{1}{4\pi}\mu F$

(C) $\frac{1}{2\pi}\mu F$ (D) $\frac{1}{6\pi}\mu F$

(E) Answer not known

200. The input offset current equals the

(A) Difference between two base currents

(B) Average of two base currents

(C) Collector current divided by current gain

(D) None of these

(E) Answer not known
