094/2025

Question Booklet Alpha Code **A**

Question Booklet Serial Number

Total No. of questions : 100 Time : 1 Hour 30 Minutes

Maximum : 100 Marks

INSTRUCTIONS TO CANDIDATES

1. The question paper will be given in the form of a Question Booklet. There will be four versions of question booklets with question booklet alpha code viz. A, B, C & D.
2. The Question Booklet Alpha Code will be printed on the top left margin of the facing sheet of the question booklet.
3. The Question Booklet Alpha Code allotted to you will be noted in your seating position in the Examination Hall.
4. If you get a question booklet where the alpha code does not match to the allotted alpha code in the seating position, please draw the attention of the Invigilator IMMEDIATELY.
5. The Question Booklet Serial Number is printed on the top right margin of the facing sheet. If your question booklet is un-numbered, please get it replaced by new question booklet with same alpha code.
6. The question booklet will be sealed at the middle of the right margin. Candidate should not open the question booklet, until the indication is given to start answering.
7. Immediately after the commencement of the examination, the candidate should check that the question booklet supplied to him contains all the 100 questions in serial order. The question booklet does not have unprinted or torn or missing pages and if so he/she should bring it to the notice of the Invigilator and get it replaced by a complete booklet with same alpha code. This is most important.
8. A blank sheet of paper is attached to the question booklet. This may be used for rough work.
9. **Please read carefully all the instructions on the reverse of the Answer Sheet before marking your answers.**
10. Each question is provided with four choices (A), (B), (C) and (D) having one correct answer. Choose the correct answer and darken the bubble corresponding to the question number using Blue or Black Ball-Point Pen in the OMR Answer Sheet.
11. **Each correct answer carries 1 mark and for each wrong answer 1/3 mark will be deducted. No negative mark for unattended questions.**
12. No candidate will be allowed to leave the examination hall till the end of the session and without handing over his/her Answer Sheet to the Invigilator. Candidates should ensure that the Invigilator has verified all the entries in the Register Number Coding Sheet and that the Invigilator has affixed his/her signature in the space provided.
13. Strict compliance of instructions is essential. Any malpractice or attempt to commit any kind of malpractice in the Examination will result in the disqualification of the candidate.

094/2025

Maximum : 100 marks

Time : 1 hour and 30 minutes

1. The colour code of 2.7K resistor with the tolerance value of ± 5% is :

(A) Orange Green Violet Gold
(B) Red Green Brown Silver
(C) Red Violet Red Gold
(D) Orange Yellow Red Silver

2. The knee voltages of silicon and germanium diodes are respectively :

(A) 0.3 V and 0.7 V
(B) 1.1 V and 0.3 V
(C) 0.3 V and 1.1 V
(D) 0.7 V and 0.3 V

3. The material used for the blue colour LED is :

(A) InGaN
(B) AlGaAs
(C) AlInGap
(D) INVAR

4. The β of a transistor (BJT) is 99. When the emitter current is 5mA, the collector current will be:

(A) 4.59 mA
(B) 4.95 mA
(C) 9.9 mA
(D) 3.59 mA

5. Which one is the best true statement in case of semiconductor diode breakdown mechanisms?

(A) Zener breakdown occurs due to a strong electric field
(B) Avalanche breakdown is caused by collisions between free electrons and atoms
(C) Both are false statements
(D) Both are true statements

6. In the cutoff region of a bipolar junction transistor :

(A) Base-emitter junction is reverse biased. No current flow
(B) Base-emitter junction is forward biased and Collector-base junction is forward biased
(C) Base-emitter is junction forward biased and Collector-base junction is reverse biased
(D) Ic and V_{CE} exceed specifications and can cause damage to the transistor

7. Which among the below is a wrong statement in the case of a MOSFET?

(A) Gate Oxide is a thin insulating layer separating the gate electrode from the channel

(B) Enhancement mode MOSFETs require a voltage applied to the gate to create a channel for current flow

(C) Depletion mode MOSFETs have a built-in channel

(D) MOSFET channel is the region between the gate and drain where current flows

8. The channel-length modulation parameter lambda, λ in the drain current (I_D) equation for a MOSFET in saturation is a :

(A) power factor parameter

(B) process dependent parameter

(C) material dependent parameter

(D) resistance parameter

9. From the equivalent circuit of the two transistor model of an SCR, if the common-base current gains are α_1 and α_2, then theoretically the anode current I_a becomes infinity under the condition :

(A) $\alpha_1 + \alpha_2 = 0.33$

(B) $\alpha_1 + \alpha_2 = 0.66$

(C) $\alpha_1 + \alpha_2 = 1$

(D) $\alpha_1 + \alpha_2 = 0.50$

10. Which one is the best true statement in the power electronics?

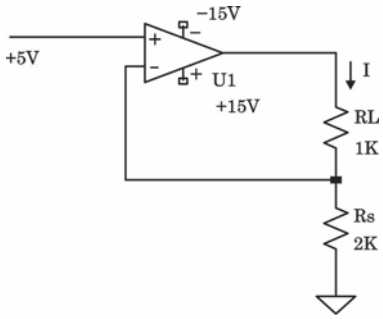
(A) DIAC acts as an uncontrolled bidirectional switch

(B) TRIAC acts as a controlled bidirectional switch

(C) Both are false statements

(D) Both are true statements

11. Find the current I in the circuit. An ideal op-amp is used and it is powered by a dual supply of $\pm 15V$.



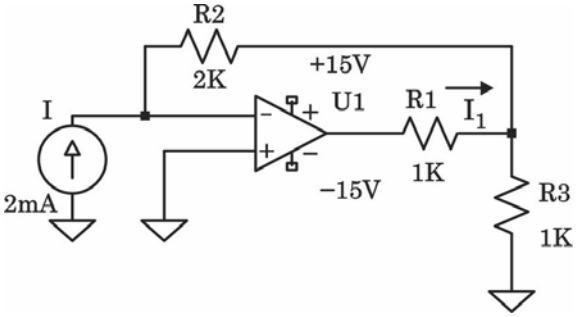
(A) 5 mA

(B) 2.5 mA

(C) 7.5 mA

(D) 1.67 mA

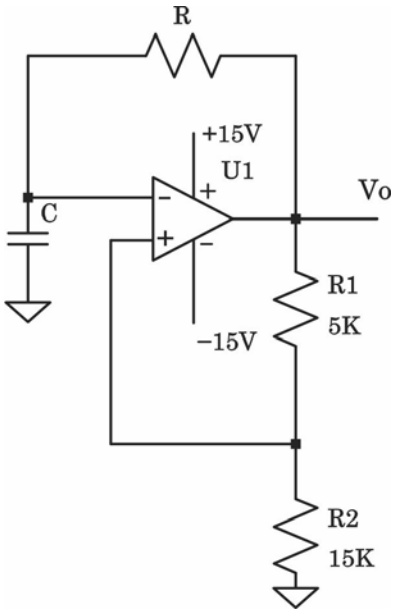
12. An ideal op-amp is powered by a dual supply of ±15 V . Compute the current I_1 through the resistor R1.



(A) 4 mA (B) –4 mA

(C) –6 mA (D) 6 mA

13. For the circuit shown in the figure, the time period of the generated square wave is given by



(A) 2RC ln 3 (B) 2RC ln 21

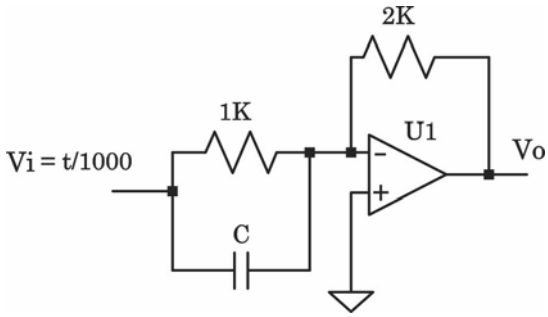
(C) 2RC ln 7 (D) 0.69RC ln 3

14. A practical op-amp is configured as an inverting amplifier with a gain of 100. The maximum frequency at which an undistorted output can be obtained is 10 KHz. If the op-amp has a slew rate of 0.25 V/μs, what is the maximum peak voltage of the sinusoidal input signal that can be applied without causing output distortion?

(A) 0.0398 V (B) 3.98 V

(C) 0.0796 V (D) 0.398 V

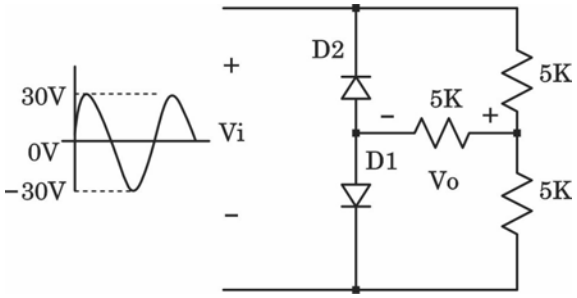
15. In the circuit shown, an input signal Vi is applied as indicated. Which of the following best describes the output Vo obtained from the circuit?



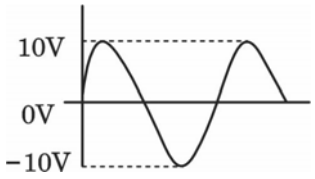
(A) –2C – 0.002t (B) –3C – 0.003t

(C) –3C – 0.002t (D) –C – 0.002t

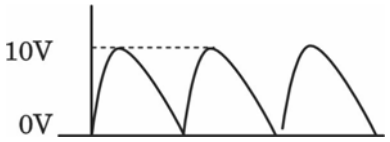
16. In the circuit consisting of ideal diodes, a sinusoidal input voltage with a peak value of 30 V is applied as shown. Which of the following waveforms best represents the output voltage?



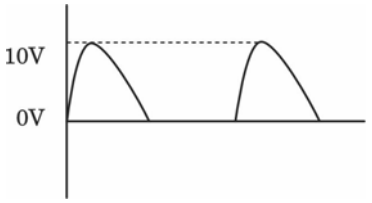
(A)



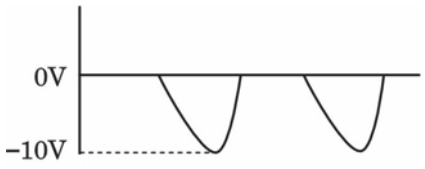
(B)



(C)



(D)

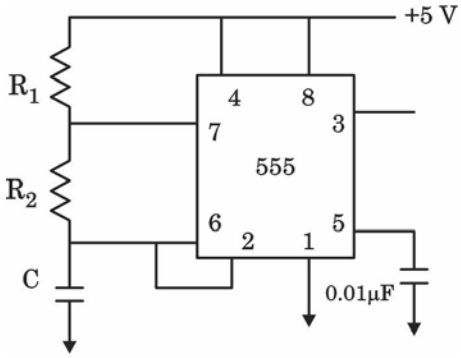


17. A PLL 565 circuit is observed to have a free-running frequency of 3 kHz. If the timing capacitor used is 0.01 μF, what is the approximate value of the external resistor?

(A) 10 kΩ (B) 1 kΩ

(C) 100 kΩ (D) 530 Ω

18. A 555 timer circuit is wired as shown, with an output taken from pin number 3. The component values are : $R_1 = 10\,k\Omega$, $R_2 = 20\,k\Omega$ and $C = 0.1\,\mu F$. What is the duty cycle (%) of the output waveform?



(A) 70% (B) 50%

(C) 66.7% (D) 60%

19. A Hartley oscillator circuit uses a frequency-determining network consisting of a 100 pF capacitor and two identical 10 μH inductors.

The circuit satisfies the Barkhausen criterion for sustained oscillations.

If the inductors are replaced with 1 μH inductors, what happens to the oscillation frequency?

(A) Increases by a factor of $\sqrt{2}$

(B) Increases by a factor of $\sqrt{10}$

(C) Decreases by a factor of $\sqrt{10}$

(D) Remains the same

20. A system employs of a four-stage cascade amplifier, where each stage is designed with a lower 3 dB cutoff frequency of 40 Hz and an upper 3 dB cutoff frequency of 2 MHz. Assuming all stages are identical and cascaded without additional filtering or feedback, what is the effective 3 dB bandwidth of the complete amplifier chain?

(A) 50 Hz to 1.5 MHz (B) 40 Hz to 2 MHz

(C) 100 Hz to 950 kHz (D) 91.96 Hz to 869.96 kHz

21. The largest positive and negative values that can be expressed in 2's complement notation with n bits are, respectively :

(A) $+(2^{n-1}-1), -(2^{n-1}-1)$

(B) $+2^{n-1}, -2^{n-1}$

(C) $+2^{n-1}, -(2^{n-1}+1)$

(D) $+(2^{n-1}-1), -2^{n-1}$

22. Conversion of the excess-3 code to BCD is not possible using :

(A) Look up table

(B) A 4 bit half adder

(C) 4:16 demultiplexer with external logic gates

(D) A 4 bit full adder with subtraction logic

23. The Sum of Products (SOP) format for logical expressions is particularly well-suited for the design of logic circuits that utilize only :

(A) XOR gates

(B) AND gates

(C) NAND gates

(D) NOR gates

24. According to De Morgan's theorem, the NOR gate is equivalent to :

(A) Bubbled AND

(B) Bubbled NOR

(C) Bubbled NAND

(D) Bubbled OR

25. Consider the following 4-variable Boolean function expressed in SOP form $F(A, B, C, D) = \sum m(0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15)$

What is the minimized expression obtained using a Karnaugh Map (K-Map)?

(A) 0

(B) 1

(C) $A \oplus B \oplus C \oplus D$

(D) $A + \overline{A}$

26. A 16:1 multiplexer is constructed using 5:1 multiplexers (each 5:1 MUX has 5 data inputs, 3 select lines, and 1 Output). What is the minimum number of 5:1 multiplexers required to build this 16:1 MUX? :

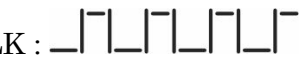
(A) 4

(B) 6

(C) 5

(D) 7

27. A positive edge-triggered D flip-flop has the following inputs: D = 1 (constant) CLK waveform as shown below :

CLK : 

Assume the flip-flop is initially reset (Q = 0). What will be the output Q after 3 clock edges?

(A) 0 (B) 1

(C) Undefined (D) Toggles between 0 and 1

28. A 4-bit Johnson counter starts at 0000. After receiving 6 clock pulses, what will the output state of the counter be?

(A) 0011 (B) 0000

(C) 1111 (D) 1100

29. TTL circuits featuring active pull-up configurations are favored due to their appropriateness for:

(A) Wired-AND operation

(B) Bus operated system

(C) Wired logic operation

(D) Reasonable dissipation and speed of operation

30. Which of the following does not represent a characteristic of CMOS configuration?

(A) CMOS devices dissipate much lower static power than bipolar devices

(B) CMOS devices have a high noise margin

(C) CMOS devices have low input impedance

(D) CMOS devices have much lower transconductance than bipolar devices

31. With respect to a microprocessor which one of the following is FALSE?

(A) An instruction cycle comprises of several machine cycles

(B) A machine cycle comprises of several instruction cycles

(C) A machine cycle comprises of several clock cycles

(D) An instruction cycle comprises of several clock cycles

32. Cache memory in a microprocessor is a :

(A) Dynamic memory
(B) Static memory
(C) Read only memory
(D) Non Volatile memory

33. The addressing mode of MOV A, B instruction in a microprocessor is :

(A) Register addressing since A and B are registers
(B) Adjacent addressing since A and B are adjacent registers
(C) Immediate addressing since register B is immediate to register A
(D) Implicit addressing since contents of A and B registers are implied

34. DMA in a microprocessor based system refers to :

(A) Direct Memory Allocation
(B) Dynamic Memory Access
(C) Direct Memory Access
(D) Dynamic Multiple Access

35. Which of the following statements is TRUE?

(A) DRAMS are used as primary memory
(B) SRAMS are used as secondary memory
(C) DRAMS are used as secondary memory
(D) None of the above

36. Stack Pointer in a microprocessor points at :

(A) First filled location of a stack
(B) First location where a non-zero value appears in a stack
(C) Last filled location of a stack
(D) Location adjacent to last filled location of a stack

37. In a CISC processor, the number of machine cycles in an instruction fetch will :

(A) Depend on clock frequency

(B) Be always one

(C) Be always more than one

(D) Depend on the type of instruction

38. SHIFT and ADD algorithm can be used for :

(A) Binary Addition

(B) Iterative Addition

(C) BCD Addition

(D) Binary Multiplication

39. In a 4 kilobyte memory chip, the number of address lines needed are :

(A) 8

(B) 10

(C) 12

(D) 14

40. CISC processors have :

(A) Fixed instruction size and fixed data size

(B) Variable instruction size and fixed data size

(C) Fixed instruction size and variable data size

(D) Variable instruction size and variable data size

41. If an impulse signal is delayed by 5 unit of time and added with the original impulse signal the resultant signal is?

(A) $\delta(t)$

(B) $5\ \delta(t)$

(C) $\delta(t)+\delta(t-5)$

(D) $\delta(t)+\delta(t+5)$

42. Impulse response of a system is given by $h(t)=e^{-t}u(t)$. The system is :

(A) Stable

(B) Marginally stable

(C) Unstable

(D) Cannot be determined

43. A signal is given by the equation $f(t)=10\sin 50t+2\sin 100t+0.2\sin 200t$. The fundamental frequency of the signal is ———————— rad/sec.

(A) 10 (B) 50

(C) 100 (D) 500

44. Condition for periodicity of a continuous time signal is :

(A) $x(t)=x(t+T_0)$ (B) $x(t)=x(2t)$

(C) $x(t)=-x(t)$ (D) $x(t)=x(t^2)$

45. The output of a system is $y(t)=x(t)+x(t-1)$ the system is :

(A) Time variant (B) Linear time invariant

(C) Unstable (D) Non casual

46. Laplace transform of $t^2u(t)$ is :

(A) 1 (B) $2/S^3$

(C) $3/S^2$ (D) $2/w^2$

47. A function which has the same Fourier transform and Laplace transform is :

(A) Exponential function (B) Logarithmic function

(C) Unit step function (D) Unit impulse function

48. Fourier transform of the signal $x(t)=e^{-at}u(t)$ is given by :

(A) $\frac{1}{s+a}$ (B) $1/a+jw$

(C) $1/(s+a)^2$ (D) $1/(a+jw)^2$

49. The difference equation $y(n)=x(n)+3x(n-1)-x(n-7)$ represents :

(A) An IIR filter

(B) An Oscillator

(C) An FIR filter

(D) FFT filter

50. Z transform of a function $x(n)=n\ u(n)$ is given by :

(A) $1/z-1$ ROC $(|z|>1)$

(B) $z/z-1$ ROC $(|z|<1)$

(C) $z^2/(z-1)$ ROC $(|z|<1)$

(D) $z/(z-1)^2$ ROC $(|z|>1)$

51. What is the most appropriate coordinate system to use for analyzing a point charge placed at the origin?

(A) Rectangular

(B) Cylindrical

(C) Spherical

(D) Parabolic

52. Biot-Savart's Law is used to calculate which of the following?

(A) Electric field intensity due to a charge distribution

(B) Magnetic field intensity due to a current distribution

(C) Electric potential

(D) Magnetic flux density due to a moving charge

53. Ampere's Circuital Law relates the line integral of the magnetic field intensity around a closed loop to the :

(A) Magnetic flux passing through the loop

(B) Total current enclosed by the loop

(C) Electric field intensity

(D) Magnetic vector potential

54. The phenomenon where an electromagnetic wave's amplitude decreases as it propagates through a lossy medium is characterized by the :

(A) Attenuation constant
(B) Wavelength
(C) Phase constant
(D) Intrinsic impedance

55. Which physical concept is best described by the curl of a vector field?

(A) The net outward flux from a volume
(B) The potential difference between two points
(C) The source strength of the field
(D) The rotational tendency or circulation of the field

56. The electric potential gradient is equal to which of the following?

(A) Negative of the electric field intensity
(B) Curl of the electric field intensity
(C) Divergence of the electric flux density
(D) Positive of the electric field intensity

57. What happens to the phase velocity of a uniform plane wave in a good conductor as the frequency increases?

(A) Decreases linearly with frequency
(B) Remains constant
(C) Increases with increasing frequency
(D) Becomes independent of the medium

58. What does a Standing Wave Ratio (SWR) of 1 indicate on a transmission line?

(A) Perfect mismatch
(B) Complete reflection
(C) High losses
(D) Perfect impedance matching

59. For a uniform plane wave propagating in free space, the ratio of the magnitudes of the electric field intensity to the magnetic field intensity ($|E|/|H|$) is equal to :

(A) The speed of light

(B) The intrinsic impedance of free space

(C) The permeability of free space

(D) The permittivity of free space

60. Poynting's Theorem relates the rate of change of electromagnetic energy density to :

(A) The power flow and ohmic losses

(B) The magnetic flux density and electric field

(C) The displacement current and conduction current

(D) The impedance of the medium

61. The noise temperature of a receiver working at room temperature of 27°C with a noise figure 1.02 is :

(A) 6 °C (B) 27.54 °C

(C) 6 K (D) 306 K

62. Which of the following statements is/are true in Amplitude Modulation (AM)?

(i) AM is simple and more power efficient than angle modulation.

(ii) DSB needs less bandwidth and power compared to AM.

(iii) SSB needs less bandwidth and power compared to DSB.

(iv) Modulation index of AM cannot exceed 1.

(A) Only (iv)

(B) Only (iii) and (iv)

(C) Only (i), (ii) and (iv)

(D) Only (i), (iii) and (iv)

63. A message signal $m(t)=\sin 1000\pi t+\sin 5000\pi t$ modulates a carrier of frequency 5 MHz to produce AM. For demodulating it using envelope detector, the RC time constant should satisfy :

(A) $0.2\,\mu s << RC << 0.4\,ms$ (B) $0.2\,\mu s << RC << 2\,ms$

(C) $0.4\,ms << RC << 2\,ms$ (D) None of the above

64. For an FM modulator with frequency deviation 50 kHz and modulating signal frequency of 10 kHz, the approximate bandwidth is :

(A) 100 kHz (B) 20 kHz

(C) 80 kHz (D) 120 kHz

65. A superheterodyne receiver is tuned to receive an AM signal of 800 kHz avoiding image frequency. Which among the following can be the local oscillator frequency and image frequency respectively of the receiver? (Take IF = 455 kHz)

(A) 345 kHz, 1710 kHz (B) 1255 kHz, 1710 kHz

(C) 345 kHz, 1145 kHz (D) 1255 kHz, 345 kHz

66. A video signal band limited to 5 MHz is transmitted through the channel by using 8-bit PCM. What is the data rate in bits/s if the signal is sampled at least 20% higher than the Nyquist rate?

(A) 12×10^6 bits/s (B) 72×10^6 bits/s

(C) 80×10^6 bits/s (D) 96×10^6 bits/s

67. Which among the following for Delta modulation is false?

(i) It is a 1 bit DPCM

(ii) It uses a two level quantizer

(iii) It is preferred for highly correlated input signals

(iv) The bandwidth required is lower than that of PCM and DPCM.

(A) Only (iii) (B) Only (iii) and (iv)

(C) Only (iv) (D) None of these

68. Which is NOT the property of manchester code?

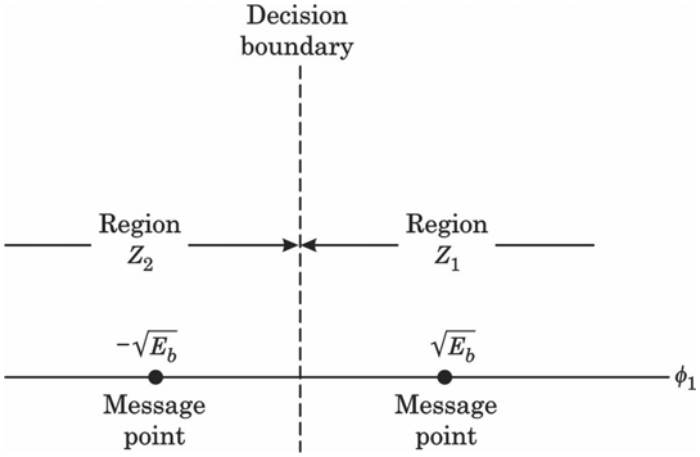
(A) It is a self clocking code

(B) It avoids channel inversion problem

(C) It avoids static data problem

(D) It has zero DC content

69. Identify the digital modulation scheme with the following signal constellation :



(A) BPSK (B) BASK

(C) BFSK (D) QAM

70. For a Hamming code with 10 parity bits, what are the total bits and data bits possible in a codeword?

(A) (1024,1014) (B) (512, 412)

(C) (1023, 1013) (D) (511, 411)

71. During a live recording session in a state-of-the-art studio, a premium condenser microphone exhibits a narrow dip in its frequency response around 8 kHz. After confirming that the preamplifier is functioning correctly and that both the diaphragm and backplate are undamaged, which of the following is the most likely cause of the observed issue?

(A) A disruptive proximity effect leading to unintended phase cancellation

(B) An improperly regulated phantom power supply that adversely affects high frequencies

(C) Diaphragm wear resulting in increased compliance and altered sonic characteristics

(D) A resonance anomaly within the microphone's internal acoustic impedance network

72. A thermistor R_T varies from 10 kΩ at 25°C to 5 kΩ at 50°C. Calculate its sensitivity :

(A) 200 Ω/°C (B) 220 Ω/°C

(C) –200 Ω/°C (D) –220 Ω/°C

73. A Venturi-meter is used to measure the flow rate of water in a pipe. The diameter of the pipe is 0.4 m and the diameter of the throat is 0.2 m. If the pressure difference is 8000 Pa, what is the ratio of the fluid velocity in the pipe to the fluid velocity in the throat? Assume ideal flow conditions :

(A) 0.125 (B) 0.25

(C) 0.5 (D) 0.1

74. Which of the following velocity sensors offers a non-contact method for measuring rotational speed? This option is especially effective for very high RPMs, where physical contact is either undesirable or impractical?

(A) DC Tachogenerator (B) Eddy current proximity sensor

(C) Stroboscope (D) Incremental rotary encoder

75. Which of the following is the principle behind the operation of an electromagnetic flow meter?

(A) Bernoulli's principle (B) Faraday's Law

(C) The Doppler effect (D) Ampère-Maxwell's Law

76. In optical range sensors, the main limitation of structured light (2D) systems compared to laser range finders is :

(A) Higher cost per unit distance measured

(B) Inability to measure distance

(C) Susceptibility to variations in ambient lighting

(D) Limited resolution in well-lit environments

77. A CCD camera sensor offers benefits compared to a CMOS camera primarily in :

(A) Higher dynamic range and uniformity

(B) Decreased power usage

(C) Lower manufacturing cost

(D) On-chip signal processing capability

78. In a capacitive displacement sensor, if the separation between the plates is halved while the dielectric constant is increased two fold, the capacitance will :

(A) Stay the same (B) Double

(C) Quadruple (D) Halve

79. Which factors are responsible for hysteresis error in a resistive strain gauge measurement system?

(A) Nonlinearity of bridge output

(B) Residual mechanical strain after unloading

(C) Temperature fluctuations only

(D) Insufficient gauge factor

80. In a Public Address (PA) system, feedback noise is mainly generated by :

(A) Inadequate frequency response of the microphone

(B) An overly extensive dynamic range of the loudspeakers

(C) Insufficient power output from the amplifiers

(D) Over-amplification of the audio signal

81. A Doppler radar sensor operating at 10 GHz detects a frequency shift of 333 Hz. What is the relative speed of the target object (assume speed of light = 3×10^8 m/s)?

(A) 5 m/s (B) 10 m/s

(C) 20 m/s (D) 50 m/s

82. In an inductive proximity sensor, the detection distance increases with :

(A) Lower coil inductance (B) Higher excitation frequency

(C) Lower target permeability (D) Lower supply voltage

83. A sound intensity of 10^{-6} W/m^2 is recorded. What is the sound level?

(A) 60 dB (B) 70 dB

(C) 80 dB (D) 90 dB

84. An accelerometer has a natural frequency of 500 Hz. For accurate dynamic measurement, what should be the minimum frequency of the signal to be measured to avoid resonance and ensure linearity?

(A) 5 Hz (B) 50 Hz

(C) 500 Hz (D) 5000 Hz

85. Two sensors A and B have time constants of 2 ms and 5 ms respectively. If both are subjected to a step input simultaneously, which sensor reaches 63.2% of its final value faster and by how much time difference?

(A) Sensor A, 3 ms faster (B) Sensor B, 3 ms faster

(C) Sensor A, 5 ms faster (D) Sensor A, 2 ms faster

86. The main component in a Hall-effect sensor responds to :

(A) Temperature (B) Magnetic field

(C) Vibration (D) Electric field

87. Which of the options listed is not considered a dynamic characteristic of a sensor?

(A) Response time (B) Rise time

(C) Accuracy (D) Fidelity

88. The main limitation of using a U-tube manometer for rapid pressure transients is :

(A) Poor accuracy (B) Poor dynamic response

(C) Excessive sensitivity (D) Large temperature drift

89. In a torque sensor that utilizes a resistive strain gauge, why a Wheatstone bridge is favoured instead of a simple voltage divider?

(A) It amplifies small strain signals better

(B) It reduces power consumption

(C) It eliminates temperature effects and improves linearity

(D) It allows operation without a power supply

90. A measurement system uses a transducer that generates its own voltage output in direct proportion to the rate of change of a magnetic field. This transducer, which does not require an external power source for its operation, is best classified as :

(A) A passive, primary and analog transducer

(B) An active, primary and analog transducer

(C) A passive, secondary and digital transducer

(D) An active, secondary and digital transducer

91. Assertion [A] : The skin effect is much smaller with stranded conductors than with solid conductors.

Reason [R] : Skin effect depends upon the type of material and supply frequency.

(A) Both [A] and [R] are individually true but [R] is not the correct explanation of [A]

(B) Both [A] and [R] are true and [R] is the correct explanation of [A]

(C) [A] is true, [R] is false

(D) [A] is false, [R] is true

92. How does the rise in voltage at the receiving end of an open-circuited line depend on the length of the line and the system operating voltage?

(A) Varies directly in proportion to the line length and operating voltage of the system

(B) Varies directly in proportion to the length of the line and is independent of the system operating voltage

(C) Proportional to the square of the length of the line and varies directly in proportion to the system operating voltage

(D) Proportional to the square of the length of the line and is independent of the system operating voltage

93. The sag of a transmission line is least affected owing to :

(A) Current through the conductor

(B) Weight of the conductor per unit length

(C) Atmospheric temperature

(D) Tension in the conductors

94. Assertion [A] : A layer of bedding is provided over the metallic sheath in underground cables.

Reason [R] : The bedding is provided over the metallic sheath to provide high insulation resistivity.

(A) Both [A] and [R] are individually true but [R] is not the correct explanation of [A]

(B) Both [A] and [R] are true and [R] is the correct explanation of [A]

(C) [A] is true, [R] is false

(D) [A] is false, [R] is true

95. The quality of a protective relay, by which it can discriminate between a fault in the protected section and the normal condition, is termed :

(A) Sensitivity (B) Selectivity

(C) Reliability (D) Stability

96. Match the items given in List 1 and those in List 2 :

List 1		List 2	
(a)	Distance relay	(1)	Distribution feeder
(b)	Differential relay	(2)	Transformer
(c)	Overcurrent relay with time delay	(3)	Bus-bars
(d)	Buchholz relay	(4)	Transmission line

(A) (a)-(2), (b)-(4), (c)-(1), (d)-(3) (B) (a)-(2), (b)-(3), (c)-(1), (d)-(4)

(C) (a)-(3), (b)-(2), (c)-(1), (d)-(4) (D) (a)-(4), (b)-(3), (c)-(1), (d)-(2)

97. A 10 MVA, 12 kV alternator has positive, negative and zero sequence reactances of 10%, 20% and 5% respectively. The value of base impedance for fault current limiting resistance computation is :

(A) 1.44 Ω (B) 2.88 Ω

(C) 14.4 Ω (D) 7.2 Ω

98. A 4-pole, 50 Hz turbo alternator has an inertia of 10,000 kg-m^2. The kinetic energy stored in the rotor at synchronous speed is :

(A) 157.98 MJ (B) 314.12 MJ

(C) 412.34 MJ (D) 492.98 MJ

99. Which of the following statements regarding the Gauss-Seidel load flow method is incorrect?

(A) Slow convergence

(B) Convergence characteristics of the Gauss-Siedel method are not affected by the selection of the slack bus

(C) A good initial guess for bus voltages is often critical for ensuring convergence

(D) Convergence is guaranteed if the coefficient matrix is symmetric and positive definite

100. Assertion [A] : High neutral grounding impedance may be used to improve transient stability.

Reason [R] : The resistance in the neutral of the transformer represents an absorption of electrical energy, which in turn reduces the accelerating energy thus improves the transient stability.

(A) Both [A] and [R] are individually true but [R] is not the correct explanation of [A]

(B) Both [A] and [R] are true and [R] is the correct explanation of [A]

(C) [A] is true, [R] is false

(D) [A] is false, [R] is true

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