राष्ट्रीय प्रौद्योगिकी संस्थान वरंगल
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NATIONAL INSTITUTE OF TECHNOLOGY WARANGAL
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QUESTION BOOKLET – ADVANCED TEST FOR RECRUITMENT TO TECHNICAL CADRE POSTS

Post:	Technician
Department	Audio Visual Section
Advt.:	01/2026 dated 09.01.2026
Date of Exam:	25-08-2026
Duration:	2 Hours
Total Marks:	200 (100 Q X 2 M each)
No. of Questions:	100 (MCQs)
Negative Marking:	1/4th mark for every wrong answer

INSTRUCTIONS TO THE CANDIDATES

1. This is an Advanced Test comprising 100 Multiple Choice Questions (MCQs), to be conducted in MCQ mode only.
2. The duration of the test is 2 hours.
3. Answers must be marked on the OMR Answer Sheet using a blue or black ballpoint pen only. Use of pencils is not permitted.
4. Candidates must write/mark their Roll Number, Post applied for, and other required details in the designated space on the OMR Answer Sheet.
5. Answers marked on the Question Booklet or on any sheet other than the OMR Answer Sheet will not be evaluated.
6. For each question, darken the circle corresponding to the correct answer completely and clearly on the OMR Answer Sheet.
7. Each question carries equal marks. There will be a negative marking of ¼ th mark for every wrong answer. No marks will be deducted for questions not attempted.
8. Mark only one answer for each question. Marking more than one circle for a question will be treated as a wrong answer.
9. Overwriting, cutting, or erasing that leaves the OMR Answer Sheet unclear may result in the answer not being evaluated.
10. No candidate shall leave the examination hall during the test.
11. Any attempt to copy, use unfair means, or communicate with others will result in immediate disqualification.
12. The use of electronic gadgets, calculators, mobile phones, smart watches, or any written/printed material is strictly prohibited.
13. Rough work, if any, should be done only on the separate sheet provided for the purpose.
14. Ensure that the OMR Answer Sheet is duly filled and handed over to the Invigilator before leaving the examination hall.
15. Failure to submit the OMR Answer Sheet will result in cancellation of candidature.
16. All material provided, including rough sheets, must be returned before leaving the examination hall.

1. **Which of the following is an example of an active electronic component?**
   A) Resistor
   B) Capacitor
   C) Inductor
   D) Transistor

2. **When two identical resistors of 100Ω are connected in parallel, the total equivalent resistance is:**
   A) 200Ω
   B) 100Ω
   C) 50Ω
   D) 25Ω

3. **What is the primary function of a dielectric material in a capacitor?**
   A) To conduct electrical current directly between plates
   B) To increase capacitance and prevent electrical contact between the plates
   C) To discharge the capacitor instantly
   D) To convert AC voltage into DC voltage

4. **What is the typical forward voltage barrier potential for a standard Silicon (Si) PN-junction diode?**
   A) 0.2 V−0.3 V
   B) 0.6 V−0.7 V
   C) 1.1 V−1.5 V
   D) 2.0 V

5. **What is the ripple frequency of a full-wave center-tapped or bridge rectifier when the AC input frequency is 50 Hz?**
   A) 25 Hz
   B) 50 Hz
   C) 100 Hz
   D) 200 Hz

6. **How many diodes are used in a standard single-phase full-wave Bridge Rectifier circuit?**
   A) 1
   B) 2
   C) 4
   D) 6

7. **What is the maximum theoretical efficiency of a Half-Wave Rectifier?**
   A) 40.6%
   B) 50.0%
   C) 81.2%
   D) 98.5%

8. **A Zener diode is primarily designed to operate in which bias condition to function as a voltage regulator?**
   A) Forward bias
   B) Reverse breakdown region
   C) Zero bias
   D) Cut-off forward mode

9. **In a Bipolar Junction Transistor (BJT), the three regions in increasing order of physical size are:**
   A) Base < Emitter < Collector
   B) Collector < Base < Emitter
   C) Emitter < Collector < Base
   D) Base < Collector < Emitter

10. **For a BJT to operate in the Active (Amplifier) region, how must its junctions be biased?**
    A) Emitter-Base reverse biased, Collector-Base forward biased
    B) Emitter-Base forward biased, Collector-Base forward biased
    C) Emitter-Base forward biased, Collector-Base reverse biased
    D) Emitter-Base reverse biased, Collector-Base reverse biased

11. **Which BJT biasing circuit provides the most stable operating (Q) point against variations in temperature and β?**
    A) Fixed-bias (Base-bias) circuit
    B) Voltage divider (Universal) bias circuit
    C) Collector feedback bias circuit
    D) Unbiased circuit

12. **What is the relationship between α (common base gain) and β (common emitter gain) in a BJT?**
    A) $\beta = \frac{\alpha}{1-\alpha}$
    B) $\beta = \frac{1-\alpha}{\alpha}$
    C) $\beta = \alpha \times (1 + \alpha)$
    D) $\beta = 1 - \alpha$

13. **A Field Effect Transistor (FET) is fundamentally a:**
    A) Current-controlled bipolar device
    B) Voltage-controlled unipolar device
    C) Voltage-controlled bipolar device
    D) Current-controlled unipolar device

14. **What is a key advantage of a JFET over a standard BJT?**
    A) Much lower input impedance
    B) Much higher input impedance
    C) High power dissipation
    D) Requirement of high gate current

15. **What are the ideal characteristics of an Operational Amplifier regarding input and output impedance?**
A) Zero input impedance, infinite output impedance
B) Infinite input impedance, zero output impedance
C) Low input impedance, low output impedance
D) Infinite input impedance, infinite output impedance

16. **What is the Common Mode Rejection Ratio (CMRR) of an ideal Operational Amplifier?**
A) 0
B) 1
C) 100
D) Infinite (∞)

17. **In an inverting op-amp configuration with an input resistor *Rin*=10 kΩ and feedback resistor *Rf*=100 kΩ, the voltage gain (*Av*) is:**
A) +10
B) −10
C) +11
D) −0.1

18. **In an unregulated DC power supply, what happens to the output voltage when the load current increases?**
A) Output voltage remains constant
B) Output voltage decreases
C) Output voltage increases
D) Output voltage drops immediately to zero

19. **What is the essential condition for sustained oscillations according to the Barkhausen criterion?**
A) Loop gain $|A\beta| \geq 1$ and total phase shift around the loop is 0° (or 360°)
B) Loop gain $|A\beta| = 0$ and total phase shift is 180°
C) Loop gain $|A\beta| < 1$ with negative feedback
D) Loop gain $|A\beta| \geq 1$ with 90° phase shift

20. **Which type of oscillator is most commonly used in radio frequency (RF) and telecommunication applications due to its high frequency stability?**
A) RC Phase Shift Oscillator
B) Wien Bridge Oscillator
C) Crystal Oscillator (Quartz)
D) Astable Multivibrator

21. **What is the binary equivalent of the decimal number (25)10?**
A) $(11001)_2$
B) $(10101)_2$
C) $(11101)_2$
D) $(11010)_2$

22. **What is the 2's complement of the binary number 101100?**
    A) 010100
    B) 010011
    C) 010101
    D) 101101

23. **Which logic gate produces a HIGH (1) output only when all of its inputs are HIGH (1)?**
    A) OR gate
    B) AND gate
    C) NAND gate
    D) NOR gate

24. **Which of the following pairs are classified as Universal Logic Gates?**
    A) AND and OR
    B) NAND and NOR
    C) XOR and XNOR
    D) NOT and AND

25. **According to De Morgan's first theorem, the expression $\overline{A + B}$ is equal to:**
    A) $\overline{A} \cdot \overline{B}$
    B) $\overline{A} + \overline{B}$
    C) $A \cdot B$
    D) $\overline{A \cdot B}$

26. **What is the simplified form of the Boolean expression $A+A \cdot B$?**
    A) B
    B) A
    C) A+B
    D) 1

27. **Which combinational circuit is used to add two single-bit binary inputs producing a Sum and a Carry?**
    A) Half adder
    B) Full adder
    C) Half subtractor
    D) Multiplexer

28. **A multiplexer (MUX) is commonly known as a:**
    A) Data distributor
    B) Data selector
    C) Code converter
    D) Parity generator

29. **How many select lines (S) are required for an 8-to-1 Multiplexer?**
    A) 2 select lines
    B) 3 select lines
    C) 4 select lines
    D) 8 select lines

30. **Which combinational logic circuit converts coded binary information into a familiar decimal or 7-segment display format?**
    A) Decoder
    B) Encoder
    C) Demultiplexer
    D) Comparator

31. **What is the primary difference between combinational logic and sequential logic circuits?**
    A) Sequential circuits contain memory elements
    B) Combinational circuits use clock pulses
    C) Sequential circuits do not use logic gates
    D) Combinational circuits store multiple bits

32. **In an SR flip-flop, what condition is considered invalid or forbidden?**
    A) S=0,R=0
    B) S=0,R=1
    C) S=1,R=0
    D) S=1,R=1

33. **What happens in a JK flip-flop when both inputs J and K are connected to logic HIGH (1)?**
    A) Toggle condition
    B) Invalid state
    C) Reset state
    D) Hold condition

34. **A D flip-flop is primarily used as a:**
    A) Data storage latch
    B) Frequency multiplier
    C) Parity checker
    D) Analog comparator

35. **How many flip-flops are required to construct a MOD-16 ripple counter?**
    A) 2 flip-flops
    B) 3 flip-flops
    C) 4 flip-flops
    D) 16 flip-flops

36. **In which type of shift register is data entered bit-by-bit sequentially and retrieved all at once simultaneously?**
A) SISO (Serial-In Serial-Out)
B) SIPO (Serial-In Parallel-Out)
C) PISO (Parallel-In Serial-Out)
D) PIPO (Parallel-In Parallel-Out)

37. **What standard supply voltage is required for standard 7400-series TTL Integrated Circuits?**
A) +3.3 V±5%
B) +5.0 V±5%
C) +12.0 V±10%
D) +15.0 V±10%

38. **How does the electric current (I) flowing through a conductor change if the applied voltage (V) is doubled while keeping the resistance (R) and temperature constant?**
A) Current doubles
B) Current reduces to half
C) Current remains unchanged
D) Current quadruples

39. **What is the standard commercial unit of electrical energy consumed by consumer loads?**
A) Kilowatt (kW)
B) Kilowatt-hour (kWh)
C) Kilo Volt-Ampere (kVA)
D) Watt-second (Ws)

40. **Kirchhoff's Current Law (KCL) applied at any node in an electrical circuit is a direct consequence of the conservation of:**
A) Energy
B) Magnetic flux
C) Electric charge
D) Momentum

41. **Three resistors of values 3Ω, 6Ω, and 2Ω are connected in parallel across a DC supply. What is the equivalent resistance of the combination?**
A) 1.0Ω
B) 11.0Ω
C) 2.0Ω
D) 0.5Ω

42. **What happens to the total circuit impedance in a series RLC circuit at the condition of resonance?**
A) Reaches minimum value equal to R
B) Reaches maximum theoretical value
C) Drops down to zero ohms
D) Becomes purely inductive

43. **What is the peak-to-peak voltage (*Vp–p*) of a single-phase AC sinusoidal supply having an RMS voltage (*Vrms*) of 230 V?**
A) ≈650.5 V
B) ≈325.3 V
C) ≈460.0 V
D) ≈162.6 V

44. **Why is the iron core of a power transformer constructed using thin, laminated silicon steel sheets instead of a single solid block?**
A) To reduce eddy current loss
B) To reduce copper resistance loss
C) To increase primary leakage flux
D) To step up secondary frequency

45. **A single-phase transformer has 500 primary turns and 100 secondary turns. If 230 V AC is applied to the primary, what is the secondary output voltage?**
A) 46 V
B) 1150 V
C) 23 V
D) 92 V

46. **What is the primary function of the commutator and brush assembly in a conventional DC Generator?**
A) To convert induced AC to DC
B) To step up the generated voltage
C) To minimize stator winding heating
D) To maintain constant rotor speed

47. **Why is a Permanent Magnet Moving Coil (PMMC) instrument unable to measure standard alternating current (AC)?**
A) Pointer gives zero average deflection
B) Permanent magnet demagnetizes instantly
C) Moving coil burns up immediately
D) Meter scale is purely logarithmic

48. **How should an ammeter and a voltmeter be connected to measure current and voltage across a load in an active circuit?**
A) Ammeter in series, voltmeter in parallel
B) Ammeter in parallel, voltmeter in series
C) Both instruments connected in series
D) Both instruments connected in parallel

49. **What is the essential purpose of connecting a series resistor with an LED connected to a DC supply?**
A) To limit forward diode current
B) To convert DC into AC pulses
C) To increase light emission wavelength
D) To invert forward voltage polarity

50. **Four identical cells, each having an EMF of 1.5 V and internal resistance of 0.2Ω, are connected in series. What is the total open-circuit voltage and internal resistance of the battery bank?**
A) 6.0 V and 0.8Ω
B) 1.5 V and 0.05Ω
C) 6.0 V and 0.05Ω
D) 3.0 V and 0.4Ω

51. **What is the total transmission bandwidth required for a standard Amplitude Modulated (AM) signal carrying a maximum audio modulating frequency *fm*?**
A) $2f_m$
B) f_m
C) $4f_m$
D) $f_m/2$

52. **Which circuit block in a Superheterodyne AM radio receiver is primarily responsible for converting incoming radio frequency (RF) signals to a fixed Intermediate Frequency (IF)?**
A) Envelope detector
B) Mixer and Local Oscillator
C) Audio power amplifier
D) Automatic Gain Control (AGC)

53. **What is the standard Intermediate Frequency (IF) used in commercial AM broadcast radio receivers?**
A) 455 kHz
B) 10.7 MHz
C) 38.9 MHz
D) 50 Hz

54. **Which basic demodulator circuit is most commonly used in commercial AM receivers to recover the audio message signal?**
A) Ratio detector
B) Foster-Seeley discriminator
C) Diode envelope detector
D) Phase locked loop (PLL) multiplier

55. **What physical antenna length is required for a resonant half-wave dipole operating at an RF frequency of 100 MHz in free space?**
A) 1.5 m
B) 3.0 m
C) 0.75 m
D) 6.0 m

56. **What optical phenomenon enables light to propagate through the glass core of an optical fiber cable without escaping?**
A) Total internal reflection
B) Optical dispersion
C) Diffraction scattering
D) Polarization rotation

57. **In optical fiber cables, what is the refractive index relationship between the core ($n1$) and the surrounding cladding ($n2$)?**
A) $n_1 > n_2$
B) $n_1 < n_2$
C) $n_1 = n_2$
D) $n_1 = 0$

58. **Which digital modulation scheme represents binary data by shifting between two distinct carrier frequencies?**
A) Frequency Shift Keying (FSK)
B) Amplitude Shift Keying (ASK)
C) Phase Shift Keying (PSK)
D) Pulse Code Modulation (PCM)

59. **In modern Audio-Visual (AV) receivers, which single digital interface connector carries uncompressed multi-channel digital audio and high-definition video over one cable?**
A) HDMI
B) RCA Composite
C) VGA
D) S-Video

60. **Which basic operating principle is utilized by a standard moving-coil dynamic microphone to convert sound waves into electrical signals?**
A) Electromagnetic induction
B) Piezoelectric effect
C) Electrostatic capacitance variation
D) Thermoelectric generation

61. **Why is a 70V or 100V line distribution transformer system used in commercial Public Address (PA) installations?**
A) To reduce I^2R power losses over long cable runs
B) To increase acoustic bass frequency response
C) To eliminate the need for microphone preamplifiers
D) To convert stereo channels to mono

62. **In a Local Area Network (LAN), which networking device connects multiple computers and uses physical MAC addresses to forward data packets specifically to the destination device?**
A) Network Switch
B) Passive Hub
C) Repeater
D) Patch Panel

63. **Which unlicensed ISM radio frequency band is primarily utilized by standard Bluetooth technology for short-range wireless communication?**
A) 2.4 GHz
B) 5.8 GHz
C) 900 MHz
D) 433 MHz

64. **What is the standard keyboard shortcut used in Microsoft Office (Word/Excel) to instantly open the "Find and Replace" dialogue box?**
A) Ctrl+H
B) Ctrl+F
C) Ctrl+K
D) Ctrl+R

65. **What is the total memory addressing capacity of an 8085 microprocessor with a 16-bit address bus?**
A) 64 KB
B) 1 MB
C) 256 KB
D) 16 KB

66. **Which hardware interrupt in the 8085 microprocessor has the highest priority and cannot be disabled by software (non-maskable)?**
A) TRAP
B) RST 7.5
C) RST 6.5
D) INTR

67. **The 8086 microprocessor features a 20-bit address bus and a 16-bit data bus. What is its maximum physical memory addressing capability?**
A) 1 MB
B) 64 KB
C) 4 MB
D) 16 MB

68. **In 8086 memory segmentation, how is the 20-bit physical address computed from a Segment Register and an Offset Register?**
A) Physical Address=(Segment×10H)+Offset
B) Physical Address=Segment+Offset
C) Physical Address=(Segment×100H)+Offset
D) Physical Address=(Offset×10H)+Segment

69. **What operation is performed by the 8085 assembly instruction XRA A?**
A) Clears the Accumulator to 00H and resets the Carry flag
B) Inverts all bits of the Accumulator
C) Loads an 8-bit immediate value into register A
D) Exchanges data between Accumulator and memory

70. **Which addressing mode is illustrated by the 8085 instruction MVI B, 45H?**
A) Immediate addressing mode
B) Direct addressing mode
C) Register indirect addressing mode
D) Implicit addressing mode

71. **What happens to the Stack Pointer (SP) register during the execution of a PUSH instruction in an 8085 microprocessor?**
A) It is decremented by 2
B) It is incremented by 2
C) It is decremented by 1
D) It remains unchanged

72. **Which peripheral interface IC is designated as the Programmable Peripheral Interface (PPI) with 24 programmable I/O pins organized into three 8-bit ports?**
A) IC 8255
B) IC 8259
C) IC 8251
D) IC 8254

73. **Which serial communication protocol is standard for connecting wireless modules like the HC-05 (Bluetooth) or ESP8266 (Wi-Fi) to a microprocessor's TX/RX lines?**
A) UART (Universal Asynchronous Receiver/Transmitter)
B) Parallel IEEE-488 bus
C) SPI multi-drop bus
D) SCSI interface

74. **How many PN junctions and terminal leads are present in a standard Silicon Controlled Rectifier (SCR)?**
A) 3 PN junctions and 3 terminals (Anode, Cathode, Gate)
B) 2 PN junctions and 2 terminals (Anode, Cathode)
C) 4 PN junctions and 3 terminals (Main Terminal 1, Main Terminal 2, Gate)
D) 1 PN junction and 2 terminals (Base, Emitter)

75. **Which power semiconductor device is bidirectional and capable of conducting current in both directions when triggered, making it ideal for AC light dimmers and motor speed control?**
A) TRIAC
B) SCR
C) UJT
D) Fast Recovery Diode

76. **In an Uninterruptible Power Supply (UPS) system, which power electronic converter stage converts DC storage battery power back into AC mains power during a power failure?**
A) Inverter
B) Rectifier
C) Chopper
D) Cycloconverter

77. **Which electrical protective device is specifically designed to detect tiny leakage currents to ground (earth) to protect human operators from lethal electric shocks?**
A) Earth Leakage Circuit Breaker (ELCB / RCCB)
B) Miniature Circuit Breaker (MCB)
C) Rewirable High-Rupturing Cartridge Fuse
D) Thermal Overload Relay

78. **On a Cathode Ray Oscilloscope (CRO) screen, a sinusoidal waveform occupies a peak-to-peak height of 4 divisions. If the Volts/Div knob is set to 2 V/div, what is the RMS voltage (*Vrms*) of the signal?**
A) ≈2.83 V
B) 8.00 V
C) 4.00 V
D) ≈5.66 V

79. **What key advantage does a Digital Storage Oscilloscope (DSO) provide over a conventional analog Cathode Ray Oscilloscope (CRO)?**
A) Ability to capture, freeze, and store transient (one-shot) signals in digital memory
B) Elimination of analog input attenuation probes
C) Direct measurement of mechanical power output
D) Requirement of zero calibration or ground referencing

80. **Why does a Digital Multimeter (DMM) cause significantly lower "loading effect" errors compared to an analog pointer multimeter when measuring DC voltages across high-resistance circuits?**
A) DMM has a very high input impedance (typically 10 MΩ or more)
B) DMM uses a moving-iron permanent coil mechanism
C) DMM short-circuits the measured component temporarily
D) DMM requires an external current shunt on all voltage ranges

81. **What output waveform is produced by passing a symmetrical square wave directly through an ideal Op-Amp Integrator circuit?**
A) Triangular waveform
B) Pure sine waveform
C) Sawtooth waveform
D) Narrow positive spikes

82. **Which type of wave shaping circuit uses semiconductor diodes and DC reference voltages to cut off portions of an input signal above or below a predetermined voltage level without distorting the remaining waveform?**
A) Clipper circuit (Limiter)
B) Clamper circuit (DC restorer)
C) Voltage doubler
D) Schmitt trigger

83. **What is the defining characteristic of a White Noise signal generated by an RF/audio noise generator?**
A) Uniform power spectral density across all frequencies in the band
B) Power density that drops by 3 dB per octave
C) Signal composed entirely of odd harmonics of 50 Hz
D) Pure single-tone frequency with zero phase shift

84. **Which electronic solid-state image sensor technology is widely used in digital video cameras to convert incoming optical images into electrical charges using line-by-line active pixel amplifiers?**
A) CMOS / CCD Image Sensor
B) Vidicon pickup tube
C) Photodiode optocoupler
D) Plumbicon electron gun

85. **What is the standard eutectic composition of tin-lead (Sn-Pb) solder commonly used in electronic assembly, known for its lowest melting point of 183°C?**
A) 63% Tin / 37% Lead (63/37)
B) 50% Tin / 50% Lead (50/50)
C) 40% Tin / 60% Lead (40/60)
D) 80% Tin / 20% Lead (80/20)

86. **Which chemical solution is most commonly used as an etchant in chemical PCB fabrication to dissolve unprotected copper cladding?**
A) Isopropyl Alcohol (IPA)
B) Dilute Hydrochloric acid (HCl) only
C) Ferric Chloride (FeCl3) solution
D) Acetone solvent

87. **How are the contact tie-point holes arranged inside the internal spring-clips of a standard solderless breadboard?**
A) Terminal strips isolated individually; power rails connected diagonally
B) All holes interconnected in a single continuous matrix
C) Terminal strips connected in horizontal rows of 10; power rails isolated individually
D) Terminal strips connected in vertical columns of 5; power rails connected in long horizontal buses

88. **What type of defective solder joint occurs when component leads move during cooling, characterized by a dull, rough, grainy appearance and high electrical resistance?**
A) Solder web
B) Solder bridge
C) Rosin joint
D) Cold solder joint

89. **When a desktop PC powers on with cooling fans spinning but produces a continuous sequence of beeps with no display output, which component is most likely loose or faulty?**
A) SATA Hard Drive
B) RAM (Memory module)
C) Optical CD/DVD Drive
D) Chassis Cooling Fan

90. **In an NPN bipolar junction transistor (BJT), what constitutes the majority of the current flowing across the base-collector junction under normal active forward-bias conditions?**
A) Electrons injected from the emitter that diffuse across the base
B) Holes injected from the collector into the base
C) Thermally generated minority carrier electrons in the base
D) Majority carrier holes drifting from the base terminal

91. **Which operational amplifier circuit configuration produces an output voltage proportional to the time rate of change of the input signal?**
A) Voltage Follower (Buffer)
B) Op-Amp Integrator
C) Op-Amp Differentiator
D) Inverting Summing Amplifier

92. **How many flip-flops are required to design a digital modulo-10 (BCD / Decade) asynchronous counter?**
A) 3 flip-flops
B) 10 flip-flops
C) 4 flip-flops
D) 5 flip-flops

93. **What is the fundamental function of the Automatic Gain Control (AGC) circuit in a radio broadcast receiver?**
A) To maintain a relatively constant audio output level despite variations in received RF signal strength
B) To suppress the local oscillator fundamental frequency
C) To separate audio frequencies from the intermediate frequency carrier
D) To step up the DC operating voltage of the RF amplifier stage

94. **What acoustic feedback phenomenon occurs when sound from a PA loudspeaker re-enters the live microphone connected to the same amplifier system?**
A) Total harmonic distortion (THD)
B) Acoustic howl / squeal (Larsen effect)
C) Dynamic range compression
D) Crossover phase cancellation

95. **In an 8085 microprocessor, which pin outputs a clock signal whose frequency is exactly half that of the external quartz crystal connected across pins X_1 and X_2?**
A) CLK (OUT)
B) ALE (Address Latch Enable)
C) READY
D) HOLD

96. **On an oscilloscope, what waveform pattern is displayed on the screen in X-Y mode when two sinusoidal signals of identical frequency and amplitude with a 90^0 phase difference are applied to CH1 and CH2?**
A) A horizontal flat line
B) A straight line tilted at 45^0
C) A figure-eight pattern
D) A perfect circle

97. **In linear regulated DC power supplies, what fixed regulated output voltage is provided by a standard three-terminal IC 7805 voltage regulator?**
A) +5 V DC
B) +12 V DC
C) -5 V DC
D) +15 V DC

98. **A 4-band carbon composition resistor has the color sequence: Brown, Black, Red, and Gold. What is its nominal resistance and tolerance?**
   A) $1.0\ k\Omega \pm 5\%$
   B) $100\ \Omega \pm 10\%$
   C) $10\ k\Omega \pm 5\%$
   D) $1.0\ k\Omega \pm 20\%$

99. **In an 8085 microprocessor system, what logic level is asserted on the $IO/\overline{M}$ status line when the CPU executes an IN or OUT peripheral I/O instruction?**
   A) Logic LOW
   B) Logic HIGH
   C) High-Impedance
   D) Alternating 50 Hz clock pulses

100. **Which two-input logic gate functions as a "controlled inverter" (inverting input A when control input B = 1, and passing A unchanged when B = 0)?**
   A) AND gate
   B) NAND gate
   C) NOR gate
   D) XOR gate

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