L - 2

Question Booklet

Recruitment for the post of Junior Technician

Department: Electronics and Communication Engineering

Level-2 Test

Application No.	:	
Name of the Candidate	:	
Date of Test	:	**07th December 2025**

Instructions to Candidates:

- The test booklet comprises 100 objective multiple-choice questions (MCQs).
- Candidates must record all responses exclusively on the OMR answer sheet supplied.
- **Each correct answer is awarded one mark, while 0.25 marks will be deducted for every incorrect response.**
- Answers must be marked using only **BLUE or BLACK ballpoint pens**.
- Ensure that the chosen option is clearly shaded in the **OMR sheet** as per the instructions provided on it. Incomplete or ambiguous markings may lead to rejection of the response.
- No additional sheets will be issued for rough work. Candidates may utilize the space provided within the question booklet for any rough calculations or notes.
- At the end of the examination, candidates must return both the OMR answer sheet and the question booklet to the invigilator. Failure to do so may result in disqualification.
- The total duration of the examination is **150** minutes.

Signature of the candidate

For rough work

Marks = 100 x 1 = 100 **Duration: 150 mins**

1. Kirchhoff's Current Law (KCL) is based on which principle?
   A) Conservation of charge
   B) Conservation of energy
   C) Conservation of resistance
   D) Conservation of flux

2. Kirchhoff's Voltage Law (KVL) states that the algebraic sum of voltages around a loop is:
   A) Infinite
   B) Dependent on current
   C) Zero
   D) Maximum at source

3. Thevenin's theorem states that any linear circuit can be represented by ____ in series with a resistance.
   A) a voltage source
   B) a capacitor
   C) a current-limited diode
   D) a transformer core

4. Norton's theorem represents a network using a:
   A) Capacitor only
   B) Current source with parallel resistance
   C) Series voltage source
   D) Magnetic core

5. An RLC circuit contains:
   A) Resistor, Inductor, Capacitor
   B) Only resistors
   C) Inductor and diode
   D) Resistor and battery

6. Power factor in AC circuits is defined as:
   A) cos φ
   B) sin φ
   C) tan φ
   D) ratio of XL to XC

7. Resonance in an RLC circuit happens when ____ equals capacitive reactance.
   A) inductive reactance
   B) power dissipation
   C) resistance
   D) phase angle

8. A dependent source is a source whose value changes based on:
   A) Temperature
   B) Mechanical force
   C) Another electrical variable
   D) Humidity

9. Mesh analysis primarily deals with:
   A) Branch powers
   B) Loop currents
   C) Magnetic flux
   D) Voltage phasors

10. Maximum power is delivered to the load when the load resistance (R_L) is equal to:
   A) Twice the source resistance
   B) Zero
   C) The source resistance
   D) Half the source resistance

11. A capacitor ideally blocks ____ while allowing AC to pass.
   A) DC
   B) thermal energy
   C) magnetic flux
   D) electromagnetic waves

12. An ideal voltage source has internal resistance:
   A) Zero
   B) Very high
   C) Moderate
   D) Negative

13. KCL applies at a:
   A) Loop
   B) Node
   C) Mesh
   D) Resistor

14. In a closed loop circuit, there is a 12 V battery and two resistors in series. The voltage drop across the first resistor is measured as 7 V. What must be the voltage drop across the second resistor?
   A) 3 V
   B) 5 V
   C) 7 V
   D) 12 V

15. Star–Delta transformation converts:
   A) Voltage to power
   B) DC to AC
   C) Magnetic flux to current
   D) Star to delta networks

16. Reactive power arises due to:
   A) Batteries
   B) Resistors
   C) Inductors and capacitors
   D) Transformers

17. Adding ____ to an inductive load improves power factor.
    A) capacitors
    B) additional inductors
    C) diodes
    D) resistors

18. Steady-state AC analysis uses:
    A) Random noise
    B) Sinusoidal signals
    C) Pulse trains
    D) Square waves

19. An ideal current source has internal resistance:
    A) Zero
    B) Unity
    C) Infinite
    D) Variable

20. In an electrical circuit, an ideal voltage source is chosen when the load requires:
    A) A fixed voltage regardless of load current
    B) A fixed power output at all load conditions
    C) A source whose internal resistance changes with load
    D) A constant phase shift between current and voltage

21. A transformer works on the principle of ____ induction.
    A) electromagnetic
    B) electrostatic
    C) thermal
    D) mechanical

22. Transformer cores are commonly made from:
    A) Aluminium plates
    B) Plastic sheets
    C) Laminated steel
    D) Carbon rods

23. The open-circuit test on a transformer primarily measures:
    A) Copper loss
    B) Temperature rise
    C) Core (iron) loss
    D) Voltage regulation

24. During a short-circuit test, the primary measurement made is of ____.
    A) copper losses
    B) core temperature
    C) frequency drift
    D) insulation breakdown

25. A phasor diagram represents:
    A) Temperature variation
    B) Magnetic flux density
    C) Electrical noise levels
    D) Voltage and current magnitudes with phase

26. Transformer efficiency is maximum when:
    A) Copper loss equals core loss
    B) Voltage is highest
    C) Load is zero
    D) Frequency is minimum

27. An autotransformer uses:
    A) Two separate windings
    B) Three-phase coils
    C) A single continuous winding
    D) No windings

28. The output voltage ratio of a transformer depends directly on its ____.
    A) turns ratio
    B) operating temperature
    C) core vibration
    D) winding resistance

29. A transformer changes:
    A) Voltage level
    B) Frequency only
    C) Resistance only
    D) Mechanical energy

30. An ideal transformer has:
    A) Moderate energy loss
    B) Only resistive loss
    C) High leakage flux
    D) No losses

31. A diode conducts when it is placed under ____ bias.
    A) zero
    B) reverse
    C) forward
    D) zener

32. A Zener diode is primarily used for:
    A) Power amplification
    B) Voltage regulation
    C) Signal mixing
    D) Impedance matching

33. A clipping circuit modifies the signal's:
    A) Frequency
    B) Amplitude
    C) Impedance
    D) Temperature

34. A clamping circuit shifts a waveform's ____ level.
    A) DC
    B) frequency
    C) impedance
    D) current

35. BJT stands for:
    A) Bipolar Junction Transistor
    B) Binary Junction Triode
    C) Base-Junction Transducer
    D) Bipolar Jitter Tracker

36. MOSFET is expanded as:
    A) Magnetic Oscillating Semiconductor Fast Electronic Transistor
    B) Multi Output Semiconductor Field Enabled Transistor
    C) Metal Oxide Signal Feedback Transmitter
    D) Metal Oxide Semiconductor Field Effect Transistor

37. A differential amplifier amplifies the:
    A) Sum of inputs
    B) Product of inputs
    C) Square of inputs
    D) Difference of inputs

38. An op-amp is short for:
    A) Operational Amplifier
    B) Output Amplifier
    C) Optical Amplifier
    D) Oscillation Amplifier

39. An inverting amplifier has:
    A) Positive gain
    B) Negative gain
    C) Unity gain only
    D) No gain

40. A summing amplifier performs:
    A) Differentiation of signals
    B) Impedance measurement
    C) Addition of signals
    D) Amplitude modulation

41. An integrator circuit produces an output proportional to the ____ of input.
    A) integral
    B) derivative
    C) square
    D) logarithm

42. A differentiator circuit outputs a signal proportional to the:
    A) Derivative of input
    B) Integral of input
    C) Product of signals
    D) DC offset

43. How do active filters differ from passive filters?
    A) Passive filters work only at high frequencies
    B) Active filters require inductors, while passive filters do not
    C) Active filters can amplify signals, while passive filters cannot
    D) Both use only resistors and capacitors with no other components

44. A Schmitt trigger is used to clean up noisy or slowly changing signals and convert them into:
    A) Triangular waves
    B) Sawtooth waves
    C) Sine waves
    D) Square waves

45. Oscillators generate:
    A) Static voltage
    B) Magnetic fields
    C) Constant resistance
    D) Periodic waveforms

46. Rectifiers convert:
    A) AC to DC
    B) DC to AC
    C) Voltage to current
    D) Power to frequency

47. A half-wave rectifier uses:
    A) One diode
    B) Two diodes
    C) Four diodes
    D) Eight diodes

48. A bridge rectifier uses ____ diodes to convert AC to DC.
    A) one
    B) two
    C) four
    D) six

49. In a differential amplifier, a high Common-Mode Rejection Ratio (CMRR) is:
A) Desirable
B) Undesirable
C) Irrelevant
D) Impossible

50. In an ideal op-amp, the input impedance is extremely high so that it draws almost no current from the source. The input impedance is:
A) Infinite
B) Zero
C) Negative
D) Equal to output impedance

51. An ideal op-amp is designed to deliver output voltage without any internal voltage drop, which requires its output impedance to be extremely low. The output impedance is:
A) Infinite
B) Zero
C) Variable
D) Reactive

52. A MOSFET is controlled by:
A) Current
B) Voltage
C) Magnetic field
D) Temperature

53. A clipper circuit removes:
A) Resistance
B) Noise only
C) Parts of the waveform
D) Impedance

54. Active filters achieve gain using:
A) Inductors only
B) Capacitors only
C) Switches
D) Op-amps

55. MOSFETs are commonly used in electronic circuits because they:
A) Store energy like capacitors
B) Behave as ideal current sources
C) Act as efficient electronic switches and amplifiers
D) Provide mechanical isolation between circuits

56. The binary number system is based on ____.
    A) base-2
    B) base-8
    C) base-4
    D) base-16

57. The output of the Boolean operation, **1 AND 0,** is:
    A) 0
    B) 1
    C) 2
    D) Undefined

58. The output of the Boolean operation, **1 OR 0**, is:
    A) 0
    B) 1
    C) 2
    D) Undefined

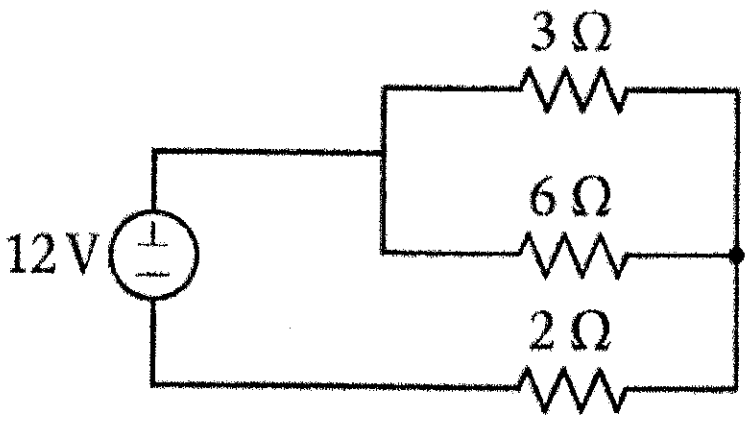
59. The Boolean gate **NOT** produces the:
    A) Inverse of input
    B) Double of input
    C) Square of input
    D) Same as input

60. A Karnaugh map (K-map) is a visual tool used in digital electronics to simplify complex _____ expressions:
    A) Exponential
    B) Boolean
    C) Mathematical
    D) Sinusoid

61. MUX is the short form of:
    A) Multimeter
    B) Multiplier
    C) Multiplexer
    D) Multi-controller

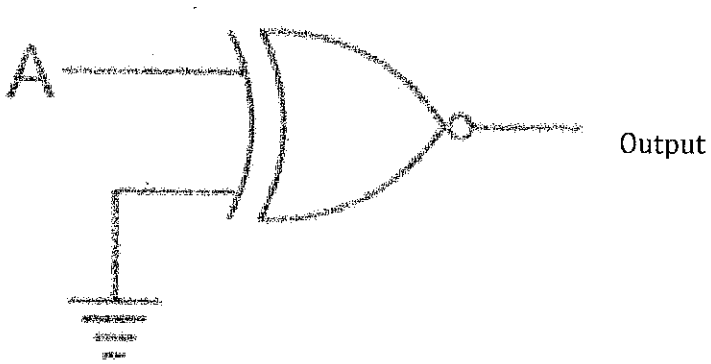
62. ADC stands for:
    A) Analog-to-Digital Converter
    B) Active Digital Controller
    C) Analog Data Combiner
    D) Amplitude Digital Calculator

63. What is the equivalent resistance of this circuit, assuming the battery has no internal resistance:



A) 1 Ohm
B) 3 Ohms
C) 6 Ohms
D) 11 Ohms

64. The output of the logic gate in the figure is:



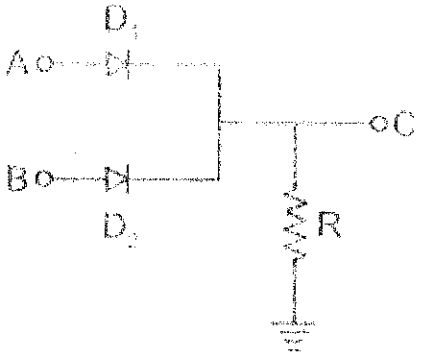
A) 0
B) 1
C) $\bar{A}$
D) A

65. Boolean algebra is fundamentally applied to the operation of:
A) Variables that assume two logical states
B) Expressions describing continuous analog behavior
C) Variables representing multi-level discrete states
D) Relationships in state-based mechanical systems

66. How many bits can a 4-byte device store?
A) 4 bits
B) 8 bits
C) 16 bits
D) 32 bits

67. Which statement correctly describes the output of an XOR gate?
A) It is HIGH only when both inputs are HIGH
B) It is HIGH only when both inputs are LOW
C) It is HIGH when the inputs are different
D) It is HIGH for all input combinations

68. Which of the logical operations can be performed with the circuit given below:



A) C = AB
B) C = A + B
C) C = $\overline{AB}$
D) C = $\overline{A+B}$

69. The 2's complement method is mainly used in digital systems to represent negative numbers, allowing easy implementation of operations such as:
A) Addition
B) Negation
C) Subtraction
D) Doubling

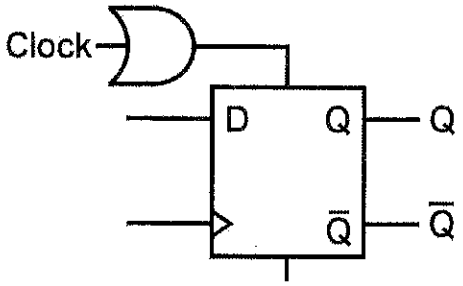
70. In an AC circuit, how does the current phasor relate to the voltage phasor in a purely inductive circuit?
A) The current leads the voltage by 90°
B) The current lags the voltage by 90°
C) The current and voltage are in phase
D) The current leads the voltage by 0°

71. A full adder takes two input bits and a carry-in. How many bits does it effectively add at once?
A) One bit
B) Two bits
C) Three bits
D) Four bits

72. Binary 1010 converted to decimal gives:
    A) 8
    B) 10
    C) 12
    D) 14

73. A flip-flop is capable of storing exactly ____ bit of data.
    A) one
    B) two
    C) four
    D) eight

74. What flip-flop is shown in the figure below?



    A) SR flip-flop
    B) D flip-flop
    C) JK flip-flop
    D) T flip-flop

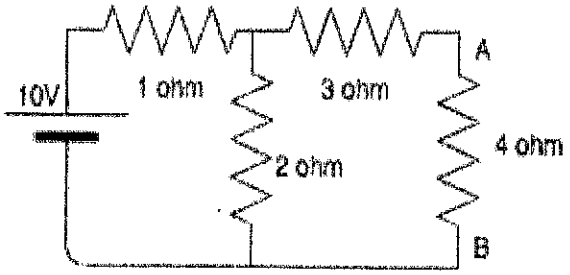
75. A truth table is given below.

A	0	1	0	1
B	0	0	1	1
y	1	0	0	0

Which of the following gates has this type of truth table
    A) NOT gate
    B) NAND gate
    C) XOR gate
    D) NOR gate

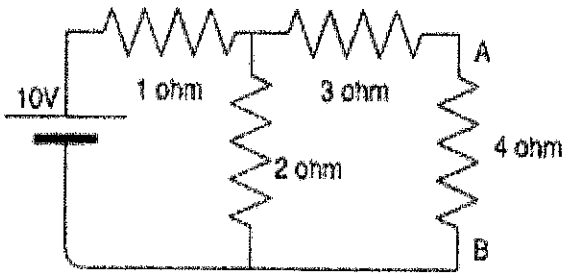
76. A voltmeter is used to measure:
    A) Current
    B) Voltage
    C) Power
    D) Frequency

77. Find the Thevenin resistance across terminal AB for the following circuit



A) 4.34 ohm
B) 3.67 ohm
C) 3.43 ohm
D) 2.32 ohm

78. Calculate the current across the 4 ohm resistor:



A) 0.67 A
B) 0.86 A
C) 1.23 A
D) 2.22 A

79. An energy meter gives output in:
A) Hz
B) kW
C) kWh
D) Amperes

80. A multimeter can measure:
A) Only current
B) Only voltage
C) Only resistance
D) All of the above

81. A potentiometer allows measurement of very accurate ____ values.
A) Resistance
B) Current
C) Voltage
D) frequency

82. Electrical bridges are primarily used to measure:
    A) Distribution-level line parameters in power networks
    B) Impedance parameters in an AC circuit
    C) Breakdown voltage of insulating materials
    D) Switching characteristics of power semiconductor devices

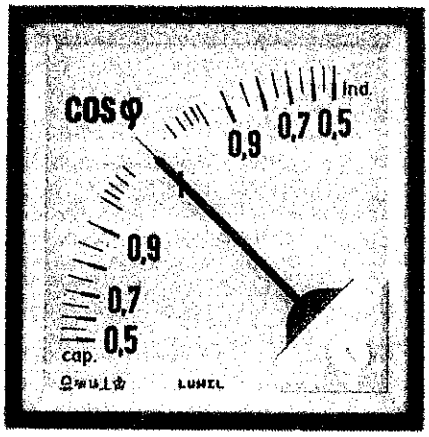
83. The SI unit of frequency is:
    A) Hertz
    B) Coulomb
    C) Newton
    D) Tesla

84. CRO stands for:
    A) Cathode Relay Oscillator
    B) Current Reading Oscilloscope
    C) Capacitor Range Oscillator
    D) Cathode Ray Oscilloscope

85. Phase is measured in:
    A) Degrees
    B) Amperes
    C) Joules
    D) Watts

86. A watt-hour meter measures:
    A) Frequency
    B) Power
    C) Voltage
    D) Energy

87. What is this instrument measuring?

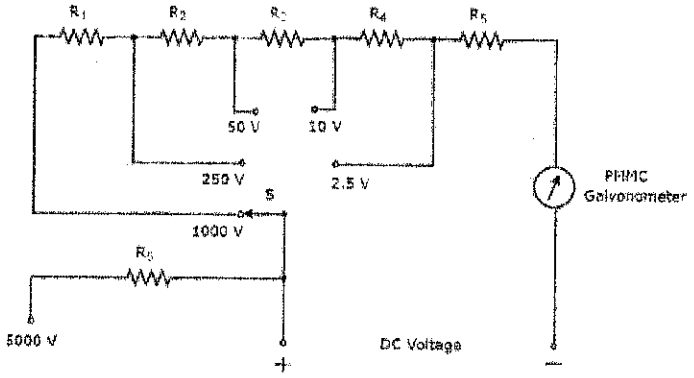


    A) Phase angle
    B) Phase difference
    C) Angle between Vectors
    D) Power factor

88. Which parameter can an oscilloscope directly measure from a signal without requiring any additional circuitry?
    A) Voltage variation over time
    B) Current through a load
    C) Power dissipated in a resistor
    D) Frequency spectrum of the signal

89. Current is measured with the meter connected in:
    A) Open Circuit
    B) Parallel
    C) Series
    D) Isolation

90. The figure shown below is a schematic diagram of _____ meter:



    A) Voltmeter
    B) Multimeter
    C) Ohmmeter
    D) None of the above

91. AM stands for:
    A) Amplitude Mixing
    B) Analog Mode
    C) Angular Modulation
    D) Amplitude Modulation

92. Which modulation technique provides the highest spectral efficiency among ASK, FSK, PSK, and QAM for the same symbol rate?
    A) ASK
    B) FSK
    C) QAM
    D) PSK

93. In FM, the information (message) signal primarily affects the carrier's:
    A) Amplitude
    B) Frequency
    C) Phase
    D) Bandwidth only

94. Narrowband, wideband, and ultra-wideband systems differ mainly in their:
    A) Modulation schemes
    B) Amount of bandwidth used
    C) Need for carrier signals
    D) Transmit power levels

95. Pulse Code Modulation (PCM) is:
    A) Sampling an analog signal and converting it into digital codes
    B) Combining two analog signals into one
    C) Changing pulse amplitude based on carrier frequency
    D) Increasing antenna gain in wireless links

96. In Amplitude Shift Keying (ASK), digital data is represented by:
    A) Switching between different amplitude levels of a carrier wave
    B) Changing the frequency of pulses
    C) Altering the phase of a transmitted signal
    D) Varying both amplitude and frequency together

97. In Frequency Shift Keying (FSK), binary symbols '0' and '1' are transmitted by:
    A) Switching between multiple amplitude states
    B) Modifying the amplitude of a pulse train
    C) Introducing phase discontinuity at fixed intervals
    D) Using two distinct carrier frequencies

98. In phase modulation, the instantaneous phase of the carrier varies according to:
    A) The phase of the message signal
    B) The frequency of the message signal
    C) The amplitude of the message signal
    D) The energy of the message signal

99. For a transformer with primary turns 400, secondary turns 100, if 20A current is flowing through primary, we will get _____
    A) 5A at secondary
    B) 40A at secondary
    C) 80A at secondary
    D) 800A at secondary

100. SNR is an abbreviation for ____ ratio.
    A) signal-to-noise
    B) sound-level
    C) static-noise
    D) sensor-network