



श्री चित्रा तिरुनाल आयुर्विज्ञान और प्रौद्योगिकी संस्थान, तिरुवनन्दपुरम् - ६९५ ०११, केरल, भारत

SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES & TECHNOLOGY

THIRUVANANTHAPURAM – 695 011 KERALA, INDIA

(An Institute of National Importance under Govt. of India)

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WRITTEN TEST

**JUNIOR ENGINEER (INSTRUMENTATION)-A TO JUNIOR ENGINEER
(INSTRUMENTATION)-B (I MFCP)**

Roll No.

Date: 25.03.2026

Duration: 60 Minutes

Time: 9.30AM

Total Marks: 50

INSTRUCTIONS TO THE CANDIDATE

1. Write your Roll Number on the top of the Question Booklet and in the Answer sheet.
2. Each question carries 1 mark.
3. There will not be any Negative marking.
4. Marking more than one answer will invalidate the answer.
5. Candidate should sign in the Question paper and Answer Sheet.
6. Candidate should hand over the question paper and OMR sheet to the invigilator before leaving the examination hall.

Signature of the Candidate

प्रमुख, बी.एम.टी.स्कंध
Head, BMT Wing

MFCP : Junior Engineer (Instrumentation) –A to Junior Engineer (Instrumentation) – B
at Engineering Services, DTQM

Instructions / Notes:

- Circle the correct answer. No negative marking
- One mark each to correct answer.

1. Which device converts a physical parameter (like temperature or pressure) into an electrical signal?
A. Amplifier
B. Transducer
C. Oscillator
D. Rectifier
2. Which of the following is an important routine maintenance practice for a laboratory centrifuge?
A. Increasing RPM beyond limit
B. Cleaning the rotor and chamber regularly
C. Running the centrifuge without a lid
D. Overloading the rotor
3. Which sensor is commonly used in a pulse oximeter?
A. Infrared and red LED sensor
B. Ultrasonic sensor
C. Piezoelectric sensor
D. Hall sensor
4. Which equipment measures blood oxygen saturation (SpO_2)?
A. ECG machine
B. Spirometer
C. Defibrillator
D. Pulse oximeter
5. The unit of electrical resistance is:
A. Volt
B. Ampere
C. Ohm
D. Watt
6. In a defibrillator, the main purpose is to:
A. Monitor heart rate
B. Restart the heart with electric shock
C. Measure blood pressure
D. Provide oxygen
7. Which component stores electrical energy in an electric field?
A. Resistor



- B. Capacitor
 - C. Inductor
 - D. Diode
8. The full form of ECG is:
- A. Electro Cardio Graph
 - B. Electronic Cardio Generator
 - C. Electrical Cardio Gauge
 - D. Electro Current Generator
9. During maintenance of a laboratory centrifuge, what is the main purpose of balancing the tubes before operation?
- A. To increase centrifugation time
 - B. To increase motor speed
 - C. To reduce sample temperature
 - D. To prevent vibration and damage to the rotor
10. Which semiconductor device allows current flow in only one direction?
- A. Transistor
 - B. Capacitor
 - C. Diode
 - D. Transformer
11. Which medical equipment is used to assist or replace breathing?
- A. Ventilator
 - B. ECG
 - C. Syringe pump
 - D. Nebulizer
12. Which law states that $V = IR$?
- A. Kirchhoff's Law
 - B. Ohm's Law
 - C. Faraday's Law
 - D. Coulomb's Law
13. In a hospital defibrillator, energy is usually stored in:
- A. Transformer
 - B. Battery
 - C. Capacitor
 - D. Inductor
14. Which test instrument is most commonly used to measure voltage, resistance, and current?
- A. Oscilloscope
 - B. Multimeter
 - C. Function Generator
 - D. Spectrum Analyzer
15. Which device converts AC to DC?
- A. Amplifier
 - B. Oscillator

- C. Rectifier
D. Modulator
16. The main purpose of grounding in medical equipment is:
A. Increase voltage
B. Safety from electrical shock
C. Increase current
D. Reduce resistance
17. Which medical device is used to deliver controlled medication through IV?
A. Infusion Pump
B. ECG Monitor
C. Ventilator
D. Defibrillator
18. Which display is commonly used in modern medical instruments?
A. CRT
B. LED/LCD
C. Analog meter
D. Neon lamp
19. The unit of frequency is:
A. Volt
B. Hertz
C. Ampere
D. Watt
20. Preventive maintenance of medical equipment mainly helps to:
A. Increase weight of equipment
B. Increase noise
C. Increase power consumption
D. Reduce equipment failure
21. What is the full form of IPBX?
A. Electrical Private Access Base Exchange
B. Electronic Personal Automatic Base Exchange
C. Electronic Private Automatic Branch Exchange
D. Electrical Public Automatic Branch Exchange
22. The main purpose of an IPBX system is to:
A. Control CCTV cameras
B. Provide internet connection
C. Increase power supply
D. Switch internal telephone calls within an organization
23. Which signal is used in telephony to alert a user of an incoming call?
A. Busy tone
B. Hold tone
C. Ring tone
D. Dial tone



24. IPBX is a telephone exchange used for:
- A. Private use of an organization
 - B. Public use
 - C. Personal use
 - D. Third party use
25. Which signaling method is commonly used for dialing in modern IPBX systems?
- A. Morse code
 - B. Pulse dialing
 - C. DTMF (Dual Tone Multi Frequency)
 - D. AM modulation
26. In an IPBX system, the internal telephone is called:
- A. Router
 - B. Extension
 - C. Gateway
 - D. Node
27. Which device converts voice signals into electrical signals in a telephone handset?
- A. Oscillator
 - B. Transformer
 - C. Microphone
 - D. Speaker
28. Which cable is commonly used to connect telephones to the IPBX system?
- A. Fiber optic cable
 - B. Twisted pair cable
 - C. Coaxial cable
 - D. Ribbon cable
29. In IPBX maintenance, checking line continuity is usually done using:
- A. Signal generator
 - B. Spectrum analyzer
 - C. Multimeter
 - D. Oscilloscope
30. What does "busy tone" indicate in a telephone system?
- A. Line is powered off
 - B. Line is free
 - C. Line is disconnected
 - D. Line is in use
31. Which component in an IPBX helps route calls between extensions?
- A. Capacitor
 - B. Rectifier
 - C. Switching matrix
 - D. Filter



32. Regular maintenance of IPBX mainly includes:
- A. Increasing call duration
 - B. Changing handset color
 - C. Cleaning connectors and checking wiring
 - D. Increasing voltage
33. Which backup source is commonly used to keep IPBX working during power failure?
- A. UPS or battery backup
 - B. Transformer
 - C. Solar panel
 - D. Generator only
34. What is a 'SIP' in a SIP phone?
- A. System initiated phone
 - B. Session initiation protocol
 - C. Section inside phone
 - D. Session ignited protocol
35. If there is no dial tone in an extension, the first thing to check during maintenance is:
- A. Printer cable
 - B. Monitor display
 - C. Internet connection
 - D. Line wiring and extension port
36. Regular maintenance of IPBX mainly includes:
- A. Increasing call duration
 - B. Changing handset color
 - C. Cleaning connectors and checking wiring
 - D. Increasing voltage
37. SIP phone works throughnetwork inside an organization?
- A. LAN
 - B. LAP
 - C. LAS
 - D. PAN
38. SIP phone is known as
- A. VIP
 - B. VoIP
 - C. AIP
 - D. NIP
39. Expanded form of DID:
- A. Dual-driven desk
 - B. Disconnected internet dialing
 - C. Dual internet design
 - D. Direct inward dialing

40. A bridge rectifier uses how many diodes?
A. 2
B. 3
C. 6
D. 4
41. In a closed-loop control system, feedback is used to:
A. Increase error
B. Reduce system accuracy
C. Reduce error and improve stability
D. Increase noise
42. The maximum memory that the 8085 can address is:
A. 16 KB
B. 64 KB
C. 46 KB
D. 128 KB
43. Four resistors $R_1 = 2 \Omega$, $R_2 = 3 \Omega$, $R_3 = 6 \Omega$, and $R_4 = 6 \Omega$ are connected in a circuit such that R_1 and R_2 are connected in series, and R_3 and R_4 are connected in parallel. The two combinations are then connected in series with each other. What is the effective resistance of the circuit?
A. 5Ω
B. 6Ω
C. 8Ω
D. 11Ω
44. The ideal value of input impedance of an operational amplifier is:
A. 0Ω
B. Infinite
C. Very low
D. $1 \text{ k}\Omega$
45. In a negative feedback amplifier, the gain of the amplifier generally:
A. Increases
B. Decreases but becomes more stable
C. Becomes zero
D. Becomes infinite
46. CMRR in an operational amplifier stands for:
A. Common Mode Rejection Ratio
B. Common Mode Response Ratio
C. Current Mode Rejection Ratio
D. Circuit Mode Rejection Ratio
47. The unit of CMRR is usually expressed in:
A. Ohms
B. Volts
C. Decibels (dB)
D. Amperes

48. An operational amplifier used without feedback is called:
- A. Linear amplifier
 - B. Differential amplifier
 - C. Inverting amplifier
 - D. Open-loop amplifier
49. While troubleshooting a Laboratory Incubator, the temperature is not reaching the set value. What should be checked first?
- A. Replace the display panel
 - B. Check the thermostat/temperature sensor and heating element
 - C. Replace the door gasket immediately
 - D. Change the power cord
50. During operation of a Laboratory Centrifuge, the equipment vibrates excessively. What is the most likely cause?
- A. Low voltage supply
 - B. Unbalanced sample tubes in the rotor
 - C. Faulty display unit
 - D. Damaged power switch

Answer key
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Notes:

- Answer all questions. No negative marking
- One mark each to correct answer.

1. B
2. B
3. A
4. D
5. C
6. B
7. B
8. A
9. D
10. C
11. A
12. B
13. C
14. B
15. C
16. B
17. A
18. B
19. B
20. B
21. C
22. D
23. C
24. A
25. C

26. B
27. C
28. B
29. C
30. D
31. C
32. C
33. A
34. B
35. D
36. C
37. A
38. B
39. D
40. D
41. C
42. B
43. B
44. B
45. B
46. A
47. C
48. D
49. B
50. B



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