



## RRB JE 2025 CBT-2 Electronics

Junior Engineer · Electronics Engineering (ECE) · CEN 05/2025 · CBT-2 · Technical Abilities · Question Paper

English

Complete Paper · 100 Questions · Technical Abilities Section · Official Answer Key

### About this Compilation

This booklet contains the complete question paper of the **RRB JE 2025 CBT-2 (Electronics Engineering (ECE))** examination in **English (Technical Abilities section only)**, with the correct option marked as per the official answer key.

✓ Correct option (highlighted green)

### How to use

- Use the **Index** page to jump directly to any set (clickable).
- Questions appear section by section in the order of the paper, numbered 1 onward.
- Diagram and wide-table questions appear at full width at the end of their section.
- The correct answer is highlighted in green with a tick.

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# Index — All Sets (click to open)

Set 1

02 Jul 2026

9:00 AM - 11:00 AM

## Technical Abilities

100 Questions • Answer Key

## Q1 Technical Abilities

If the strength of the current in a straight wire is doubled, how does the magnitude of the magnetic field at a fixed distance from the wire change?

- ☒ A. The field strength doubles
- ☐ B. The field strength quadruples
- ☐ C. The field strength is halved
- ☐ D. The field strength remains unchanged

## Q2 Technical Abilities

In a centralized switching system, what is the Control Unit responsible for?

- ☐ A. Generating the ringing voltage only
- ☐ B. Physically moving the copper wires
- ☐ C. Generating the voice of the caller
- ☒ D. Processing dialed digits and managing call setup

## Q3 Technical Abilities

Consider the following statements about routing in computer networks.

S1: Routers operate at the network layer  
S2: Routing determines packet forwarding paths  
S3: Static routing updates automatically  
S4: Dynamic routing protocols exchange routing information

Which of the given statements are **TRUE**?

- ☐ A. Only S2 and S3
- ☐ B. Only S1 and S2
- ☒ C. Only S1, S2 and S4
- ☐ D. Only S1 and S4

## Q4 Technical Abilities

If the same quantity is measured several times and the readings vary slightly each time, which type of error is most likely present?

- ☒ A. Random error
- ☐ B. Calibration error
- ☐ C. Systematic error
- ☐ D. Parallax error

## Q5 Technical Abilities

What is the BCD code for decimal digit 3?

- ☐ A. 0001
- ☒ B. 0011
- ☐ C. 0110
- ☐ D. 0101

## Q6 Technical Abilities

In the 8085 microprocessor, what does the instruction PCHL do?

- ☐ A. Pops the PC from the stack
- ☐ B. Loads HL with the PC
- ☒ C. Loads the PC with HL
- ☐ D. Pushes PC onto the stack

## Q7 Technical Abilities

A single-phase AC circuit contains a resistive inductive load. The current lags behind the voltage by an angle greater than  $0^\circ$  and less than  $90^\circ$ . What is the power factor of the circuit called?

- ☒ A. Lagging power factor
- ☐ B. Zero power factor
- ☐ C. Unity power factor
- ☐ D. Leading power factor

## Q8 Technical Abilities

Which action is the most important for maintaining accurate measurements in an instrument?

- ☐ A. Operating the instrument always at maximum frequency range.
- ☐ B. Reduce the sensitivity of the instrument
- ☒ C. Calibrate the instrument using a standard reference
- ☐ D. Setting the amplifier gain of the instrument to zero



**Q9 Technical Abilities**

How many PN junctions are present in the structure of a Silicon Controlled Rectifier (SCR)?

- A. One
- B. Four
- C. Two
- D. Three

**Q10 Technical Abilities**

In the 8085 microprocessor, what happens to the Stack Pointer after execution of PUSH instruction?

- A. Incremented by 1
- B. Decremented by 2
- C. Incremented by 2
- D. Unchanged

**Q11 Technical Abilities**

If the modulating signal is a constant DC voltage, the output of a Phase Modulator will be:

- A. A signal with increasing frequency.
- B. Zero.
- C. A constant frequency signal with a fixed phase shift.
- D. A signal with varying amplitude.

**Q12 Technical Abilities**

The output of the phase detector in a phase-locked loop is \_\_\_\_\_.

- A. A proportional error voltage when the phase detector identifies a phase difference between input and the VCO signal
- B. Zero when the phase detector finds the input and oscillator phases are perfectly aligned.
- C. An alternating current signal when the phase detector locks the loop.
- D. A maximum constant voltage when the phase detector is in a free-running state.

**Q13 Technical Abilities**

What are the statements that begin with # symbol called in C programming language?

- A. Preprocessor Directives
- B. Comments
- C. Function declarations
- D. Control statements

**Q14 Technical Abilities**

A designer is selecting an LED driver for an outdoor display exposed to dust and rain. Which specification should be examined first to determine whether the driver can withstand these environmental conditions?

- A. Ingress Protection (IP) rating
- B. Dimming compatibility
- C. Output current tolerance
- D. Power factor rating

**Q15 Technical Abilities**

Which shape is used to represent a decision in a flowchart?

- A. Rectangle
- B. Diamond
- C. Parallelogram
- D. Oval

**Q16 Technical Abilities**

Which characteristic primarily defines how accurately the vertical deflection system of a CRO displays signals of different amplitudes and frequencies?

- A. Phosphor persistence on the CRT screen
- B. Operation of the sweep circuit and retrace interval
- C. The gain and frequency response of the vertical amplifier
- D. Accelerating anode voltage in the electron gun

**Q17 Technical Abilities**

In the 8085 microprocessor, what will be the value of the Program Counter after execution of the instruction RST 3?

- A. 0003H
- B. 0018H
- C. 0024H
- D. 0030H



**Q18 Technical Abilities**

Which arrangement is used in a CRT of Cathode Ray Oscilloscope (CRO) to achieve proper electrostatic focusing of the electron beam?

- A. Two accelerating anodes at equal potential without a focusing anode
- B. A fluorescent screen at lower potential placed after the high potential accelerating anodes
- C. A focusing anode at lower potential placed between two high potential accelerating anodes ✓
- D. A cathode at high potential followed by only high potential accelerating anodes

**Q19 Technical Abilities**

Consider an abrupt p-n junction under thermal equilibrium. If the acceptor doping concentration ( $N_A$ ) in the p-region is made significantly larger than the donor doping concentration ( $N_D$ ) in the n-region (i.e.,  $N_A \gg N_D$ ), how is the depletion region physically distributed?

- A. It extends equally into both the p-type and n-type regions.
- B. It extends primarily into the lightly doped n-type region. ✓
- C. It is confined strictly to the metallurgical junction with zero penetration into either region.
- D. It extends primarily into the heavily doped p-type region.

**Q20 Technical Abilities**

Which protocol is responsible for delivering web pages over the Internet?

- A. ARP
- B. HTTP ✓
- C. FTP
- D. SMTP

**Q21 Technical Abilities**

Which of the following statements is TRUE about data transmission modes?

- A. Parallel transmission can transmit multiple bits simultaneously ✓
- B. Serial transmission sends multiple bits simultaneously
- C. Parallel transmission sends one bit at a time
- D. Serial transmission always requires more communication lines

**Q22 Technical Abilities**

Which internal component of the IC 555 is responsible for resetting the flip-flop when the voltage at Pin 6 exceeds two-thirds of  $V_{CC}$  supply?

- A. The Upper Comparator ✓
- B. The Voltage Divider Network
- C. The Lower Comparator
- D. The Discharge Transistor

**Q23 Technical Abilities**

Which operator is used for dynamic memory allocation in C++?

- A. allocate
- B. alloc
- C. delete
- D. new ✓

**Q24 Technical Abilities**

In 8051, consider the following instructions:

```
MOV PSW, #18H
MOV R3, #55H
MOV A, R3
```

From which register bank is R3 selected in the instruction MOV A, R3?

- A. Bank 0
- B. Bank 1
- C. Bank 2
- D. Bank 3 ✓

**Q25 Technical Abilities**

A resistor connected to a DC supply of 20 V produces the same heating effect as an AC supply connected across the same resistor. What is the RMS value of the AC voltage?

- A. 20 V ✓
- B. 10 V
- C. 14.14 V
- D. 28.28 V



**Q26 Technical Abilities**

Assume an SCR is operating in the forward blocking state. Once a sufficient positive current pulse is applied to the gate terminal, the SCR triggers into the conduction state. What happens if the gate signal is completely removed immediately after conduction starts?

- A. The SCR will immediately turn off.
- B. The SCR will continue to conduct until the anode current drops below the holding current. ✓
- C. The anode current will drop by exactly 50%.
- D. The SCR will begin to oscillate between the ON and OFF states.

**Q27 Technical Abilities**

Which type of network typically experiences the lowest transmission delay?

- A. Satellite Network
- B. MAN
- C. LAN ✓
- D. WAN

**Q28 Technical Abilities**

An engineer is designing a feedback control system using a potentiometer transducer to measure angular position. What is the primary effect if a voltmeter with low resistance is connected to measure the potentiometer output?

- A. It increases output signal noise regardless of wiper position
- B. It causes loading error, resulting in nonlinear output voltage relative to wiper position ✓
- C. It reduces the mechanical lifespan of the potentiometer due to excess current
- D. It maximizes sensitivity and accuracy of the measuring instrument

**Q29 Technical Abilities**

What would happen if an electrical device is not earthed and a fault occurs?

- A. The device will automatically shut down
- B. The exposed metal parts may carry dangerous voltage ✓
- C. The resistance of the device will increase
- D. The supply voltage will decrease

**Q30 Technical Abilities**

In an analog Stored Program Control (SPC) system, the Program manages:

- A. The digital conversion of the voice signal
- B. The electronic connection of the analog matrix ✓
- C. The brightness of the telephone screen
- D. The internet connection of the subscriber

**Q31 Technical Abilities**

In a CRO time-base circuit, why is constant-current charging preferred for generating the sweep voltage?

- A. It relies on the transistor's collector current to set the linearity
- B. It makes the retrace interval longer than the sweep interval
- C. It ensures the capacitor voltage rises uniformly over time, forming a linear sweep ✓
- D. It causes the capacitor voltage to rise exponentially with time, distorting the sweep

**Q32 Technical Abilities**

At room temperature, the region in a PN junction diode where there are no mobile electrons or holes is called \_\_\_\_\_.

- A. Ohmic terminal interface
- B. Depletion region ✓
- C. P-type region
- D. N-type region

**Q33 Technical Abilities**

What is the output of the give C language code snippet?

```
void f(int x)
{
    x = x + 5;
}
int main()
{
    int a = 10;
    f(a);
    printf("%d",a);
    return 0;
}
```

- A. 10 ✓
- B. 15
- C. Garbage value
- D. 5



**Q34 Technical Abilities**

In a pulsed radar system, the \_\_\_\_\_ power is the maximum instantaneous power delivered during the pulse width, whereas the \_\_\_\_\_ power is the mean power output calculated over the total transmission cycle.

- A. Effective; Gain
- B. Peak; Average
- C. Pulsed; Continuous
- D. Average; Peak

**Q35 Technical Abilities**

When a NOR-based SR flip-flop with active HIGH inputs receives a momentary logic high on its S (set) input while the R (reset) input remains low, what will be the resulting state of the Q output?

- A. The Q output will toggle between high and low repeatedly
- B. The Q output will become low after S returns to low
- C. Q becomes HIGH and remains latched HIGH
- D. Both outputs will become high during the pulse

**Q36 Technical Abilities**

A magnetic material has a hysteresis loop area of 0.4 J for each cycle. If the material is subjected to a frequency of 40 Hz, what is the total hysteresis loss per second?

- A. 12 W
- B. 10 W
- C. 16 W
- D. 20 W

**Q37 Technical Abilities**

Which instruction is used to return from a subroutine in 8085?

- A. RET
- B. JMP
- C. RST
- D. CALL

**Q38 Technical Abilities**

In a monostable configuration of IC 555, why is the Discharge pin (Pin 7) connected directly to the Threshold pin (Pin 6)?

- A. To ensure the capacitor is instantly discharged once the threshold is reached.
- B. To allow the capacitor to charge very slowly for stable output.
- C. To prevent the capacitor from ever reaching  $2/3 V_{cc}$
- D. To trigger the next pulse automatically.

**Q39 Technical Abilities**

For Astable Multivibrator using IC 555, to increase the frequency of an astable 555 circuit without changing the duty cycle ratio, what should a designer do? Assume standard terminologies and resistor names.

- A. Increase the value of Capacitor C
- B. Decrease the supply voltage
- C. Increase the value of  $R_A$
- D. Decrease the value of C while keeping resistors  $R_A$  and  $R_B$  constant

**Q40 Technical Abilities**

A synchronous counter is a counter in which:

- A. No clock is used
- B. Flip-flops are triggered one by one
- C. Only one flip-flop is used
- D. All flip-flops are triggered simultaneously

**Q41 Technical Abilities**

Which mechanical property allows a conductor to be drawn into thin wires without breaking?

- A. Brittleness
- B. Hardness
- C. Elasticity
- D. Ductility

**Q42 Technical Abilities**

Which of the following statements about the Harvard architecture used in the 8051 microcontroller is correct?

- A. Uses separate memory for program and data
- B. Has no external memory support
- C. Uses only RAM
- D. Uses single memory for program and data



#### Q43 Technical Abilities

You need to read a floating-point value from the user in the C programming language. Which of the following statements correctly performs this task?

- A. `float x; scanf("%f", *x);`
- B. `float x; scanf("%d" , &x);`
- C. `float x; scanf("%f, &x);` ✓
- D. `float x; scanf("%f" , x);`

#### Q44 Technical Abilities

How does the shading coil in an AC relay minimize contact chatter during operation?

- A. It maintains the spacing between relay contacts during operation.
- B. It maintains a holding magnetic force during current zero crossing. ✓
- C. It delays the movement of the relay armature during release.
- D. It changes the relay's operating voltage rating.

#### Q45 Technical Abilities

What is the output the given C language code snippet?  
`#include<stdio.h>`

```
int main()
{
    int x[] = {10,20,30};
    int *p = x;
    p++;
    printf("%d",*p);
    return 0;
}
```

- A. 30
- B. 10
- C. Garbage value
- D. 20 ✓

#### Q46 Technical Abilities

What does the remanence ( $B_r$ ) indicate in a magnetic hysteresis loop?

- A. It is the area enclosed by the hysteresis loop.
- B. It is the applied field needed to reduce flux to zero.
- C. It is the maximum magnetic flux density reached in the loop.
- D. It is the residual magnetic flux density after removing the applied field. ✓

#### Q47 Technical Abilities

Which of the following is a false statement regarding the non-inverting amplifier using OP-AMP?

- A. It provides higher magnitude gain for the same resistor values when compared to the inverting amplifier
- B. It is limited to handling only DC signals ✓
- C. It is ideal for use in instrumentation and buffer circuits
- D. It offers high input impedance

#### Q48 Technical Abilities

An op amp acting as a comparator typically operates in:

- A. Open-loop mode ✓
- B. Linear region only
- C. Closed-loop mode with negative feedback
- D. Unity gain mode

#### Q49 Technical Abilities

What is the output of the given C language code snippet?  
`#include<stdio.h>`

```
void f(int n)
{
    if(n==0)
        return;
    printf("%d ",n);
    f(n-1);
}
```

```
int main()
{
    f(3);
    return 0;
}
```

- A. 3 2 1 0
- B. 3 2 1 ✓
- C. 1 2 3
- D. Infinite loop



**Q50 Technical Abilities**

Under forward-bias conditions, what is the primary mechanism that creates forward current across a PN junction?

- A. The millions of protons creation inside the depletion region
- B. The freezing of movement for free electrons across the metallurgical junction.
- C. Majority carriers crossing the junction to become injected minority carriers that diffuse through the neutral regions ✓
- D. The drift of majority carriers due to the enhanced internal barrier electric field.

**Q51 Technical Abilities**

Why is earthing necessary for electrical equipment?

- A. To improve light brightness
- B. To decrease power consumption
- C. To increase wire length
- D. To protect people from electric shock ✓

**Q52 Technical Abilities**

The LPF in a PLL determines which of the following dynamic characteristics?

- A. The maximum output power of the circuit.
- B. The input impedance of the phase detector.
- C. The free-running frequency of the VCO.
- D. Settling time and loop stability. ✓

**Q53 Technical Abilities**

The primary reason for the increase in resistance of metallic conductors with temperature is \_\_\_\_\_.

- A. Atomic vibrations inside the conductor decrease
- B. Atomic collisions inside the conductor increase ✓
- C. Number of free electrons becomes zero
- D. Conducting path inside the material becomes shorter

**Q54 Technical Abilities**

In the Hexagonal cell model, where is the Base Transceiver Station (BTS) typically located to provide uniform coverage?

- A. Exactly at the center of the hexagon ✓
- B. Along the longest edge of the cell
- C. Outside the cell boundary to avoid interference
- D. At any one of the six corners

**Q55 Technical Abilities**

What allows a Radar system to detect the presence of a target?

- A. Acoustic resonance
- B. Chemical ionization
- C. Electromagnetic wave reflection ✓
- D. Atmospheric refraction

**Q56 Technical Abilities**

Which of the following contains only valid octal digits?

- A. 3, 5, 7, 9
- B. 0, 3, 5, 7 ✓
- C. 2, 4, 6, 9
- D. 1, 5, 7, 8

**Q57 Technical Abilities**

What does PPP stand for in Wide Area Network ( WAN ) communication?

- A. Private Port Protocol
- B. Public Packet Protocol
- C. Packet Transfer Protocol
- D. Point-to-Point Protocol ✓

**Q58 Technical Abilities**

In a graded-index Optical fiber, how is the refractive index distributed?

- A. Higher in the cladding than the core
- B. Decreasing continuously from center to edge ✓
- C. Uniformly throughout the core
- D. Increasing from center to edge

**Q59 Technical Abilities**

What does the instruction ORA B do in 8085?

- A. Adds B to accumulator
- B. Performs logical OR between accumulator and B ✓
- C. Performs AND between accumulator and B
- D. Subtracts B from accumulator



**Q60 Technical Abilities**

A constant negative DC voltage is applied to the input of an inverting integrator. Assuming the op-amp starts at zero volts and remains unsaturated, the output will be:

- A. A constant DC voltage
- B. A positive-going linear ramp ✓
- C. A negative-going linear ramp
- D. A square wave

**Q61 Technical Abilities**

Which cable transmits data using light signals?

- A. Twisted pair cable
- B. Fiber optic cable ✓
- C. Coaxial cable
- D. USB cable

**Q62 Technical Abilities**

A technician is troubleshooting a circuit where the fuse does not blow during an overcurrent fault. What is the most likely cause?

- A. The fuse wire has low resistance
- B. The fuse is installed after the protective relay.
- C. The fuse rating is higher than the circuit's safe current. ✓
- D. The fuse is connected in parallel with the load.

**Q63 Technical Abilities**

A 1 mA, 100  $\Omega$  meter movement is converted to a 100 mA ammeter using a parallel shunt resistor. If this shunt resistor suddenly becomes open-circuited while a steady line current of 80 mA is passing through the meter, what is the most likely outcome?

- A. The meter becomes more sensitive and shows larger deflections
- B. The meter continues to indicate the measured current correctly
- C. The meter indication drops to zero due to loss of shunt current
- D. Excessive current may flow through the meter movement and damage it ✓

**Q64 Technical Abilities**

The transition of an SCR from the forward blocking state to the conduction state is called:

- A. Avalanche breakdown
- B. Commutation
- C. Triggering ✓
- D. Forward recovery

**Q65 Technical Abilities**

During insulation testing of a long underground cable, a technician observes higher leakage current compared to a shorter cable of the same type. What is the most likely reason?

- A. The larger insulation surface area provides more leakage paths to ground. ✓
- B. A longer cable always has higher insulation resistance than a shorter cable.
- C. Leakage current is independent of cable length for the same insulation material.
- D. The increased cable length reduces the dielectric strength of the insulation.

**Q66 Technical Abilities**

What is the function of the INTA' signal in the 8085 microprocessor?

- A. To reset the processor
- B. To acknowledge an interrupt request ✓
- C. To disable interrupts
- D. To enable interrupts

**Q67 Technical Abilities**

In the 8085 microprocessor, what operation is performed by the instruction SUI 20H?

- A. Subtracts 20H from the accumulator with borrow
- B. Adds 20H to the accumulator
- C. Compares with 20H with the accumulator
- D. Subtracts 20H from the accumulator ✓

**Q68 Technical Abilities**

Which of the following best describes packet switching in computer network?

- A. Entire message transmitted as one continuous signal
- B. Fixed bandwidth allocated permanently to users
- C. Data divided into smaller packets transmitted independently ✓
- D. Dedicated physical path between sender and receiver



**Q69 Technical Abilities**

According to Carson's Rule, the approximate bandwidth of a frequency modulation signal is \_\_\_\_\_.

- A. Infinite
- B. Equal to the carrier frequency
- C. Twice the carrier frequency
- D. Twice the sum of the frequency deviation and the highest modulating frequency ✓

**Q70 Technical Abilities**

The current flows directly into the input terminals of an ideal op-amp is \_\_\_\_\_ due to \_\_\_\_\_ input impedance.

- A. zero; infinite ✓
- B. dependent on the supply voltage; zero
- C. 1 milliAmpere; zero
- D. 1 Ampere; moderate

**Q71 Technical Abilities**

Consider the following statements regarding modems used in computer network:

- S1: Modems are required when communication medium carries analog signals
- S2: Modulation converts digital data into analog form
- S3: Demodulation converts analog data into digital form
- S4: Modems assign MAC addresses to computers

Which statements are TRUE?

- A. Only S1, S2 and S3 ✓
- B. Only S1 and S2
- C. Only S1, S3 and S4
- D. Only S1 and S4

**Q72 Technical Abilities**

If a communication system performs effectively in between 200 Hz to 3.4 kHz, what is its bandwidth?

- A. 3.2 kHz ✓
- B. 200 Hz
- C. 3.6 kHz
- D. 3.4 kHz

**Q73 Technical Abilities**

What happens to the amount of substance deposited if the time for which current flows through an electrolyte is doubled?

- A. It remains unchanged
- B. It becomes zero
- C. It becomes half
- D. It also doubles ✓

**Q74 Technical Abilities**

The holding current of an SCR is defined as the:

- A. Maximum anode current the SCR can withstand
- B. Minimum anode current required to turn on the SCR
- C. Minimum anode current required to keep the SCR in conduction state ✓
- D. Gate current required to turn off the SCR

**Q75 Technical Abilities**

In a LAN environment, switches improve network efficiency primarily by:

- A. Forwarding frames selectively using MAC addresses ✓
- B. Broadcasting all frames to every device in the network
- C. Converting digital signal to analog signal
- D. Increasing collision occurrences and retransmitting

**Q76 Technical Abilities**

What is the output of the following C programming language code?

```
#include<stdio.h>
int main()
{
    int x = 10;
    int *p = &x;
    *p = *p + 5;
    printf("%d %d", x, *p);
    return 0;
}
```

- A. 10 10
- B. 10 15
- C. 15 15 ✓
- D. 15 10



**Q77 Technical Abilities**

Why is a high-sensitivity voltmeter preferred for accurate circuit measurements?

- A. It increases the power consumption of the measuring circuit
- B. It minimizes loading effect by drawing very small current ✓
- C. It reduces the response time of the instrument
- D. It increases the operating frequency of the circuit

**Q78 Technical Abilities**

What is the purpose of the Back-off technique in transponder power amplifiers related to Satellite communication?

- A. To save satellite battery life during the night
- B. To increase the speed of data transmission
- C. To increase the maximum output power
- D. To reduce intermodulation distortion when multiple carriers are present ✓

**Q79 Technical Abilities**

A coil is placed in a uniform magnetic field. If the area of the coil is doubled while the magnetic field strength and orientation remain unchanged, how will the magnetic flux through the coil be affected assuming the initial magnetic flux is a non-zero finite value?

- A. The magnetic flux will remain the same
- B. The magnetic flux will double ✓
- C. The magnetic flux will decrease to half
- D. The magnetic flux will become four times

**Q80 Technical Abilities**

Why should electrical connections be regularly tightened in high-current circuits?

- A. It prevents accidental current reversal
- B. Tight connections ensure lower circuit voltage
- C. Loose connections cause localized heating and fire risk ✓
- D. It avoids electromagnetic interference

**Q81 Technical Abilities**

In a 4-to-2 priority encoder, if both D1 and D3 are HIGH, which input determines the output and why?

- A. D3 determines the output because it has higher priority ✓
- B. Both D1 and D3 set the output together
- C. The output is undefined due to multiple actives
- D. D1 determines the output because it is the lower number

**Q82 Technical Abilities**

In the magnetic trip mechanism of an MCB, which sequence correctly describes the tripping action during a short circuit?

- A. Fault current → magnetic field generated → plunger attracted → latch released ✓
- B. Fault current → bimetal strip bends → latch released → contacts open
- C. Fault current → plunger released → magnetic field generated → contacts open
- D. Fault current → contact resistance increases → plunger attracted → latch released

**Q83 Technical Abilities**

What happens to the frequency of an astable multivibrator if the value of ONLY the timing capacitor is doubled?

- A. The frequency increases fourfold.
- B. The frequency remains the same.
- C. The frequency is reduced by half. ✓
- D. The frequency doubles.

**Q84 Technical Abilities**

Why does charging a lead-acid secondary cell increase the specific gravity of the electrolyte?

- A. Active materials reform and increase acid concentration ✓
- B. It decreases due to formation of water from hydrogen and oxygen
- C. It increases due to hydrogen gas raising electrolyte density
- D. It stays the same because separators control dilution



**Q85 Technical Abilities**

A motor draws a starting current much higher than its running current. What should be considered when selecting a relay?

- A. Relay selection depends solely on the coil voltage specification.
- B. Relay contact rating should match only the motor running current
- C. Relay contact rating must exceed the motor's peak starting current ✓
- D. Relay selection should focus only on minimum coil voltage

**Q86 Technical Abilities**

A 4 KB EPROM is organized with 8 data lines. How many address lines does it have?

- A. 14
- B. 8
- C. 10
- D. 12 ✓

**Q87 Technical Abilities**

In the 8085 microprocessor, if SP = 3FFFH and memory contains:

3FFE<sub>H</sub> = 20<sub>H</sub>

3FFF<sub>H</sub> = 20<sub>H</sub>

4000<sub>H</sub> = 10<sub>H</sub>

4001<sub>H</sub> = 10<sub>H</sub>

After executing POP H, what will be the contents of HL?

- A. 1020<sub>H</sub> ✓
- B. 1010<sub>H</sub>
- C. 2020<sub>H</sub>
- D. 2010<sub>H</sub>

**Q88 Technical Abilities**

Which class of IPv4 addresses supports the largest number of host addresses in a computer network?

- A. Class D
- B. Class A ✓
- C. Class C
- D. Class B

**Q89 Technical Abilities**

Consider the following code snippet in C programming language.

```
int n = 5;
```

```
int m = n++;
```

What is the value of m after execution?

- A. 5 ✓
- B. 1
- C. 6
- D. 0

**Q90 Technical Abilities**

Consider the following statements about RS-232 ports and connectors.

S1: DB9 connector is associated with RS-232

S2: RS-232 uses RJ45 connector for standard serial communication

S3: RS-232 communication is point-to-point

Which statements are TRUE?

- A. Only S2 and S3
- B. Only S1
- C. Only S1 and S3 ✓
- D. Only S1 and S2

**Q91 Technical Abilities**

In Boolean algebra, what is the value of  $C + C'$ ?

- A.  $C \cdot C'$
- B. C
- C. 0
- D. 1 ✓

**Q92 Technical Abilities**

In an LCD display, what is the main purpose of the liquid crystal layer positioned between the two glass plates?

- A. To store electrical energy for the display circuit
- B. To act as a light source for displaying characters
- C. To control the transmission of light through the display ✓
- D. To increase the operating voltage of the display segment



**Q93 Technical Abilities**

A 2-input NOR gate has one input permanently connected to logic LOW (0). How does the output behave with respect to the other input?

- A. Output is always HIGH
- B. Output follows the other input directly
- C. Output is always LOW
- D. Output is the complement of the other input ✓

**Q94 Technical Abilities**

A user wants to transmit uncompressed digital audio and video between a computer and a display using a single cable. Which connector type is most appropriate?

- A. BNC connector
- B. F connector
- C. HDMI connector ✓
- D. RCA connector

**Q95 Technical Abilities**

What is the main reason high-frequency Carrier signals are used in modulation?

- A. To reduce the physical size of the required antenna. ✓
- B. To amplify the original message signal.
- C. To make the signal move at the speed of light.
- D. To eliminate the need for a receiver.

**Q96 Technical Abilities**

A transmission line has a characteristic impedance of 50 ohm and is connected to a load of 100 ohm. The VSWR is \_\_\_\_\_.

- A. 2 ✓
- B. 0.5
- C. 4
- D. 1

**Q97 Technical Abilities**

Which statement is TRUE about if statement in the C programming language?

- A. A value of 0 written in the condition means True
- B. Every if statement must have a matching else
- C. A non-zero value written in the condition means True ✓
- D. if statement cannot be nested

**Q98 Technical Abilities**

A DC node has 1.8 A entering it. Two branches carry 0.6 A and 0.9 A away from the node. Assuming the remaining branch current is also leaving the node, what is its value?



- A. 0.9 A
- B. 0.3 A ✓
- C. 0.5 A
- D. 1.2 A



**Q99** Technical Abilities

Using De Morgan's law, what is the equivalent of  $\overline{(P \cdot Q \cdot R)}$ ?

A.  $P + Q + R$

B.  $\overline{P} \cdot \overline{Q} \cdot \overline{R}$

C.  $P \cdot Q \cdot R$

D.  $\overline{P} + \overline{Q} + \overline{R}$

**Q100** Technical Abilities

Signal A passes through a NOT gate and then through an AND gate where the second input is permanently set to logic 1. What is the final output expression?

A.  $Y = \overline{A}$

B.  $Y = \text{Always } 1$

C.  $Y = A$

D.  $Y = \text{Always } 0$

