रेलवे भर्ती बोर्ड / RAILWAY RECRUITMENT BOARD

सी ई एन नं. - 03/2024 / CEN No. - 03/2024

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|---|---|
| Test Date | 22/04/2025 |
| Test Time | 9:00 AM - 11:00 AM |
| Subject | RRB JE Stage 2 Electronics and Allied Engineering |

*** Note**
**Correct Answer will carry 1 mark per Question.**
**Incorrect Answer will carry 1/3 Negative mark per Question.**

**1. Options shown in green color with a tick icon are correct.**
**2. Chosen option on the right of the question indicates the option selected by the candidate.**

Section : **General Abilities**

**Q.1** **The Millennium Development Goals (MDGs) aimed to reduce extreme poverty by which year?**

**Ans**
✗ 1. 2008
✗ 2. 2005
✓ 3. 2015
✗ 4. 2014

**Q.2** **Why does a bee sting cause pain and irritation?**

**Ans**
✗ 1. The sting releases carbon dioxide gas.
✗ 2. The sting injects a mild sugar solution.
✓ 3. The sting injects methanoic acid.
✗ 4. The sting contains a strong base.

**Q.3** **If the absolute refractive index of a medium is less than 1, it means _____.**

**Ans**
✓ 1. light travels faster in that medium than in vacuum
✗ 2. the medium is a perfect reflector
✗ 3. the medium absorbs all light
✗ 4. light travels slower in that medium than in vacuum

**Q.4** **Which of the following companies announced plans in February 2025 to construct the world's longest undersea cable, aiming to enhance internet connectivity across five continents, with landing points in India?**

**Ans**
✓ 1. Meta
✗ 2. Google
✗ 3. Microsoft
✗ 4. Amazon

**Q.5** **In an electric circuit, what is the correct way to connect an ammeter?**

**Ans**
✗ 1. In parallel with the source
✗ 2. In parallel with the component
✓ 3. In series with the component
✗ 4. In either series or parallel

Q.6 The phenomenon of multiple echoes due to repeated reflections is called _____.

Ans
- ✗ 1. resonance
- ✓ 2. reverberation
- ✗ 3. refraction
- ✗ 4. diffraction

Q.7 In which of the following regions the Himalayas has the greatest width?

Ans
- ✗ 1. Himachal Pradesh
- ✗ 2. Sikkim
- ✓ 3. Kashmir
- ✗ 4. Arunachal Pradesh

Q.8 Which of the following correctly explains why clothes dry faster on a windy day?

Ans
- ✗ 1. Wind increases the humidity around the clothes.
- ✗ 2. Wind reduces the surface area of the clothes.
- ✗ 3. Wind decreases the temperature of the water molecules.
- ✓ 4. Wind removes the water vapour from the clothes' surroundings.

Q.9 The Rudra Veena is predominantly associated with which genre of Hindustani music?

Ans
- ✗ 1. Khayal
- ✗ 2. Ghazal
- ✓ 3. Dhrupad
- ✗ 4. Thumri

Q.10 What does PCB stand for?

Ans
- ✓ 1. Printed Circuit Board
- ✗ 2. Processing Circuit Board
- ✗ 3. Primary Control Board
- ✗ 4. Peripheral Connection Bus

Q.11 Which of the following is a characteristic difference between colloids and true solutions?

Ans
- ✓ 1. True solutions have a single-phase system, whereas colloids have a two-phase system.
- ✗ 2. True solutions exhibit Brownian motion, but colloids do not.
- ✗ 3. True solutions have visible solute particles, whereas colloids have invisible dispersed particles.
- ✗ 4. True solutions show the Tyndall effect, but colloids do not.

Q.12 Which of the following is NOT toxic to non-target organisms in the soil?

Ans
- ✗ 1. Herbicides
- ✗ 2. Fungicides
- ✗ 3. Pesticides
- ✓ 4. Organic fertilisers

Q.13 What is the approximate pH of a neutral salt solution?

Ans
- ✗ 1. More than 7
- ✗ 2. Less than 7
- ✗ 3. Depends on the temperature
- ✓ 4. Equal to 7

**Q.14** Which official in the Gupta administration was responsible for peace and war matters?

**Ans**

✗ 1. Mahapratihara

✗ 2. Vishayapati

✗ 3. Mahadandanayaka

✓ 4. Sandhi-Vigrahika

**Q.15** The glass panel used in greenhouses is known to retain _____.

**Ans**

✗ 1. humidity

✗ 2. pH

✓ 3. heat

✗ 4. rainfall

**Q.16** The fine powder that is obtained from the modified and recycled form of plastic is called _____.

**Ans**

✓ 1. polyblend

✗ 2. polyethylene

✗ 3. polythene

✗ 4. polystyrene

**Q.17** If an object is dropped from rest, what will be its velocity after 15 seconds? (g = 9.8 $m/s^2$)

**Ans**

✗ 1. 143 m/s

✓ 2. 147 m/s

✗ 3. 149 m/s

✗ 4. 145 m/s

**Q.18** What is the first step to securing ones smartphone or tablet?

**Ans**

✓ 1. Setting a password/PIN-protected lock screen

✗ 2. Using only free Wi-Fi networks

✗ 3. Turning off mobile data

✗ 4. Installing more apps

**Q.19** What is India's global military ranking in the 2025 Global Firepower (GFP) index?

**Ans**

✓ 1. $4^{th}$

✗ 2. $2^{nd}$

✗ 3. $5^{th}$

✗ 4. $3^{rd}$

**Q.20** Which of the following is the correct way to insert a new column in a spreadsheet?

**Ans**

✗ 1. Use Ctrl + Z to insert a column.

✗ 2. Go to File > New > Column.

✓ 3. Go to Home > Insert > Insert Sheet Columns.

✗ 4. Press Ctrl + X and then Insert.

**Q.21** Which of the following cities hosted the inaugural Kho Kho World Cup in January 2025?

**Ans**

✗ 1. Kolkata

✗ 2. Mumbai

✓ 3. New Delhi

✗ 4. Chennai

Q.22 **Which Article provides Ministers the right to participate in parliamentary proceedings but without voting rights?**

Ans
- ✗ 1. Article 77
- ✗ 2. Article 78
- ✗ 3. Article 53
- ✓ 4. Article 88

Q.23 **Dr. BR Ambedkar described which part of the Indian Constitution as its 'novel features', while Granville Austin referred to it as the 'Conscience of the Constitution'?**

Ans
- ✓ 1. Directive Principles of State Policy
- ✗ 2. Fundamental Duties
- ✗ 3. Fundamental Rights
- ✗ 4. Preamble

Q.24 **What is the net force acting on an object if balanced forces are applied?**

Ans
- ✗ 1. Equal to the mass of the object
- ✗ 2. Infinite
- ✗ 3. Equal to acceleration
- ✓ 4. Zero

Q.25 **The main use of chlorofluorocarbons is in _____.**

Ans
- ✗ 1. smog
- ✓ 2. refrigerants
- ✗ 3. chimneys
- ✗ 4. vehicles

Q.26 **The energy that is derived from the use of radioactive isotopes is termed as _____.**

Ans
- ✗ 1. solar energy
- ✗ 2. thermal energy
- ✗ 3. geothermal energy
- ✓ 4. nuclear energy

Q.27 **Which of the following is NOT a source of release of smokestacks?**

Ans
- ✗ 1. Smelters
- ✗ 2. Thermal power plants
- ✓ 3. Rivers
- ✗ 4. Industries

Q.28 **What is the shortcut key to start a slideshow from the beginning?**

Ans
- ✓ 1. F5
- ✗ 2. Ctrl + P
- ✗ 3. Alt + Tab
- ✗ 4. Shift + F5

Q.29 **The maximum sound is generated _____.**

Ans
- ✓ 1. by the take off of a jet plane
- ✗ 2. from vehicular emissions
- ✗ 3. from industrial smoke
- ✗ 4. from house chimneys

**Q.30** Which of the following states is NOT covered under the Atal Bhujal Yojana?

**Ans**
- ✗ 1. Maharashtra
- ✗ 2. Uttar Pradesh
- ✗ 3. Rajasthan
- ✓ 4. Jharkhand

**Q.31** Inertia depends on which property of an object?

**Ans**
- ✗ 1. Shape
- ✗ 2. Acceleration
- ✗ 3. Velocity
- ✓ 4. Mass

**Q.32** According to the Tendulkar methodology, what was the estimated percentage of people below the poverty line in rural areas in 2011-12?

**Ans**
- ✗ 1. 20%
- ✗ 2. 27.5%
- ✗ 3. 15.5%
- ✓ 4. 25.7%

**Q.33** What happens when an acid reacts with a metal oxide?

**Ans**
- ✓ 1. A salt and water are formed.
- ✗ 2. Only water is formed.
- ✗ 3. Only salt is formed.
- ✗ 4. A salt and hydrogen gas are formed.

**Q.34** Which defect of vision occurs due to the weakening of ciliary muscles with age?

**Ans**
- ✗ 1. Myopia
- ✓ 2. Presbyopia
- ✗ 3. Astigmatism
- ✗ 4. Hypermetropia

**Q.35** Identify the correct formula for the compound formed between $Mg^{2+}$ and $PO_4^{3-}$ ions.

**Ans**
- ✗ 1. $Mg_2(PO_4)_3$
- ✗ 2. $MgPO_4$
- ✗ 3. $Mg(PO_4)_3$
- ✓ 4. $Mg_3(PO_4)_2$

**Q.36** What happens when a computer is put into Sleep mode?

**Ans**
- ✗ 1. It shuts down completely.
- ✗ 2. It stores data on the hard drive and powers off.
- ✓ 3. It keeps the session active in RAM while using minimal power.
- ✗ 4. It restarts automatically after a few minutes.

**Q.37** The primary agent that helps in the decomposition of biodegradable matter in domestic sewage is _____.

**Ans**
- ✗ 1. phosphate
- ✓ 2. bacterium
- ✗ 3. nitrate
- ✗ 4. chloride

Q.38 The Industrial Policy Resolution of 1956 categorised industries into how many groups?

Ans
✗ 1. Five
✗ 2. Nine
✗ 3. Seven
✓ 4. Three

Q.39 What is the primary function of the F4 key in MS Excel when editing a cell reference in a formula?

Ans
✓ 1. Toggles between absolute and relative references
✗ 2. Repeats the last action
✗ 3. Opens the Find and Replace dialog
✗ 4. Refreshes the worksheet

Q.40 What is the primary purpose of using a firewall on a Personal Computer?

Ans
✓ 1. To block unauthorised access and protect the computer
✗ 2. To clean up temporary files
✗ 3. To increase storage space
✗ 4. To speed up internet connectivity

Q.41 What is the maximum number of Ministers allowed in the Council of Ministers, including the Prime Minister, as per the 91$^{st}$ Amendment Act?

Ans
✗ 1. 20% of Lok Sabha strength
✓ 2. 15% of Lok Sabha strength
✗ 3. 10% of Lok Sabha strength
✗ 4. 12% of Lok Sabha strength

Q.42 Which of the following correctly represents the chemical formula of a compound formed by aluminium and sulphate ions?

Ans
✗ 1. $Al_2SO_4$
✗ 2. $Al(SO_4)_3$
✓ 3. $Al_2(SO_4)_3$
✗ 4. $Al_3(SO_4)_2$

Q.43 The practice of Jhum cultivation is prevalent in the _____.

Ans
✗ 1. North west
✓ 2. North east
✗ 3. South east
✗ 4. South west

Q.44 What was the main objective of the Extremists during the Indian National Movement?

Ans
✗ 1. To expand the legislative councils
✗ 2. To promote British goods in India
✓ 3. To attain complete independence (Swaraj)
✗ 4. To bring social reforms

Q.45 Which of the following is NOT a component of a CPU?

Ans
✗ 1. Cache Memory
✗ 2. Arithmetic Logic Unit (ALU)
✓ 3. Hard Disk
✗ 4. Control Unit (CU)

**Q.46** If you want the primary recipient to see that others have received a copy of an email, you should enter their email addresses in the _____ field.

**Ans**
- ✗ 1. Bcc
- ✓ 2. Cc
- ✗ 3. To
- ✗ 4. Subject

**Q.47** What is the purpose of the Collation option in the Print settings?

**Ans**
- ✗ 1. To adjust the page orientation
- ✗ 2. To select a custom print range
- ✗ 3. To change the printer selection
- ✓ 4. To print all the pages of a document as a set

**Q.48** Who among the following inaugurated the 38$^{th}$ National Games held in Dehradun in January 2025?

**Ans**
- ✗ 1. Droupadi Murmu
- ✗ 2. Pushkar Singh Dhami
- ✓ 3. Narendra Modi
- ✗ 4. Anurag Thakur

**Q.49** Which state of matter shows the highest expansion when temperature is increased?

**Ans**
- ✗ 1. Plasma
- ✗ 2. Solids
- ✓ 3. Gases
- ✗ 4. Liquids

**Q.50** Which of the following CANNOT be considered as a measure to control global warming?

**Ans**
- ✓ 1. Causing deforestation
- ✗ 2. Cutting down use of fossil fuel
- ✗ 3. Efficiently using energy
- ✗ 4. Reduction in emission of greenhouse gases

## Section : **Technical Abilities**

**Q.1** The magnetic field inside a solenoid is:

**Ans**
- ✗ 1. circular and varying with distance
- ✗ 2. zero
- ✓ 3. uniform and parallel
- ✗ 4. non-uniform and divergent

**Q.2** Co-axial cables are most commonly used in which of the following applications?

**Ans**
- ✗ 1. Underwater communication
- ✗ 2. Satellite communication
- ✓ 3. Cable television (CATV) systems
- ✗ 4. Wireless communication networks

**Q.3** For an RC phase shift oscillator, which of the following statements is INCORRECT?

**Ans**

✗ 1. The total phase shift of the RC network is 180°.

✓ 2. The magnitude of the gain of the RC network is > 1/29.

✗ 3. The magnitude of gain of the amplifier must be ≥ 29.

✗ 4. The oscillation frequency of the oscillator is $\frac{1}{2\pi RC\sqrt{6}}$.

**Q.4** What is the primary goal of simplifying a Boolean expression before implementing it with gates?

**Ans**

✗ 1. To make the circuit slower

✗ 2. To increase the number of gates

✓ 3. To reduce the number of gates and interconnections

✗ 4. To increase power consumption

**Q.5** What material is primarily used as the core in fiber optic cables?

**Ans**

✗ 1. Copper

✗ 2. Plastic

✗ 3. Aluminium

✓ 4. Glass

**Q.6** The magnetic field outside a toroidal coil:

**Ans**

✓ 1. is zero

✗ 2. is in a circular pattern around the toroid

✗ 3. is uniform and points radially outward

✗ 4. is uniform and points radially inward

**Q.7** What type of error occurs due to unpredictable variations in measurement conditions?

**Ans**

✗ 1. Gross error

✓ 2. Random error

✗ 3. Calibration error

✗ 4. Systematic error

**Q.8** Which of the following statements w.r.t. FSK demodulation using PLL circuit is/are correct?

**S1: If the input signal frequency changes, the PLL adjusts its frequency output to match the input frequency.**
**S2: The phase-locked loop is used to track the changes in the frequency of the modulated signal.**

**Ans**

✗ 1. Only S1

✗ 2. Only S2

✗ 3. Neither S1 nor S2

✓ 4. Both S1 and S2

**Q.9** Which of the following is NOT a type of loop in C?

**Ans**

✗ 1. do-while loop

✓ 2. foreach loop

✗ 3. while loop

✗ 4. for loop

Q.10 **Which of the following is an example of a Wide Area Network (WAN)?**

Ans
- ✗ 1. A home Wi-Fi network
- ✓ 2. The internet
- ✗ 3. A Bluetooth connection
- ✗ 4. A local office network

Q.11 **What type of distortion occurs if a signal that contains frequency components up to 15 kHz is sampled using 20 kHz?**

Ans
- ✗ 1. Quantization error
- ✓ 2. Aliasing
- ✗ 3. Slope Overload
- ✗ 4. No distortion

Q.12 **The function of pin 18 and 19 (XTAL1 and XTAL2) in 8051 Microcontroller is _____.**

Ans
- ✗ 1. to control external interrupt
- ✓ 2. oscillator connection for clock generation
- ✗ 3. address and data bus decoding
- ✗ 4. serial data transmission

Q.13 **The Multiplexed address and Data lines in the 8085 microprocessor are _____.**

Ans
- ✓ 1. AD7 - AD0
- ✗ 2. AD8- AD1
- ✗ 3. AD8- AD15
- ✗ 4. AD9 - AD16

Q.14 **Which of the following is a key feature of a microprocessor-based overcurrent relay that enhances its performance in fault detection?**

Ans
- ✗ 1. It uses analogue components to process current signals.
- ✗ 2. It only protects against short-circuit faults.
- ✓ 3. It incorporates fault analysis algorithms to identify fault types.
- ✗ 4. It does not require a power supply for operation.

Q.15 **What does 'PROM' stand for?**

Ans
- ✗ 1. Processing Read-Only Memory
- ✗ 2. Peripheral Read-Only Memory
- ✗ 3. Primary Read-Only Memory
- ✓ 4. Programmable Read-Only Memory

Q.16 **Which of the following statements are true regarding the eye diagram in the communication system?**

**a) An eye diagram is used to investigate Intersymbol interference.**
**b) The width of the eye-opening indicates an interval where the wave can be sampled without ISI.**
**c) Eye diagram is observed in Digital storage oscilloscope.**

Ans
- ✗ 1. Only a and c
- ✓ 2. a, b and c
- ✗ 3. Only a and b
- ✗ 4. Only b and c

**Q.17** The IO/M' signal in the 8085 microprocessor specifies _____.

**Ans**

✗ 1. whether an interrupt has occurred

✗ 2. whether the data is valid

✗ 3. whether the operation is read or write

✓ 4. whether the operation is memory or I/O related

**Q.18** In the 8085 microprocessor, _____ instruction is used to identify pending interrupts.

**Ans**

✗ 1. ANI

✗ 2. SIM

✓ 3. RIM

✗ 4. LXI

**Q.19** How do you declare a pointer to an integer?

**Ans**

✓ 1. int *ptr;

✗ 2. pointer int ptr;

✗ 3. int ptr*;

✗ 4. int ptr;

**Q.20** The 8051 microcontroller has _____ I/O pins.

**Ans**

✗ 1. 24

✗ 2. 40

✗ 3. 26

✓ 4. 32

**Q.21** The bandwidth of a raised cosine filter with roll-off factor β (0 to 1) and symbol rate $R_S$ is given by:

**Ans**

✗ 1. $BW = R_S(2\beta + 1)$

✗ 2. $BW = R_S(\beta + 1)$

✗ 3. $BW = \frac{R_S}{2}(\beta^2 + 1)$

✓ 4. $BW = \frac{R_S}{2}(\beta + 1)$

**Q.22** Which of the following statements best describes the operation of a bridge rectifier?

**Ans**

✗ 1. In a bridge rectifier, current flows through two diodes during both positive and negative half cycles, leading to very high-power loss.

✗ 2. The peak inverse voltage (PIV) of diode in a bridge rectifier is the same as in a center-tapped rectifier.

✗ 3. The output voltage of a bridge rectifier consists of only DC components with no AC ripples.

✓ 4. The bridge rectifier is a full-wave rectifier that does not require a center-tapped transformer, improving transformer efficiency.

**Q.23** In which of the following electrical applications is a glass insulating material commonly used?

**Ans**

✗ 1. Power cables and conductors

✓ 2. High-voltage switchgear and transformers

✗ 3. Low-voltage electronic circuits

✗ 4. Electrical wires for home appliances

Q.24 **What happens to the carry-out bit when subtracting two n-bit numbers using 2's complement and the result is positive?**

Ans
✗ 1. The carry-out bit indicates an overflow
✗ 2. The carry-out bit is added to the result
✗ 3. The carry-out bit is inverted
✓ 4. The carry-out bit is ignored

Q.25 **The output voltage of an IC 7905 is _____.**

Ans
✗ 1. 15 V
✗ 2. 5 V
✗ 3. −15 V
✓ 4. −5 V

Q.26 **Which of the options is correct for a non-inverting OP-AMP?**

Ans
✗ 1. Input is applied at the inverting terminal of OP-AMP.
✗ 2. Non-inverting terminal of OP-AMP is grounded.
✗ 3. For an negative input, output is positive.
✓ 4. Output is in phase with input.

Q.27 **A Zener diode has a breakdown voltage of Vz = 7 V at 300 K, with a temperature coefficient of 2.3 mV/°C. What is the new breakdown voltage Vz at 400 K?**

Ans
✗ 1. 7 V
✓ 2. 7.23 V
✗ 3. 6.77 V
✗ 4. 6.977 V

Q.28 **For a diode operating in forward bias, which of the following statements is INCORRECT?**

Ans
✗ 1. The reduction in the width of the depletion region is due to the recombination of charge carriers and immobile ions near the junction.
✗ 2. The reduction in the potential barrier occurs due to the narrowing of the depletion region.
✗ 3. The reduction in the depletion region allows a majority carrier flow across the junction.
✓ 4. The reduction in the depletion region causes a heavy flow of minority carriers across the junction.

Q.29 **A bridge-rectifier is connected to a 24 sin(ωt) V supply. What is the peak inverse voltage (PIV) across the diode?**

Ans
✗ 1. $48/\pi$ V
✓ 2. 24 V
✗ 3. 12 V
✗ 4. $24/\pi$ V

Q.30 **What is the primary function of the cathode ray tube (CRT) in an oscilloscope?**

Ans
✓ 1. To display waveforms of the electrical signals
✗ 2. To amplify the electrical signals
✗ 3. To measure the frequency of the signals
✗ 4. To convert the electrical signals into sound

**Q.31** **Which of the following statements is correct regarding the ripple factor of different rectifiers?**

**Ans**

✗ 1. A bridge rectifier has a better ripple factor than a centre-tapped rectifier.

✗ 2. A full-wave rectifier has a higher ripple factor than a half-wave rectifier.

✓ 3. A half-wave rectifier has more than twice the ripple factor of a full-wave rectifier.

✗ 4. A rectifier with a higher ripple factor is more preferable for DC power supply than one with a lower ripple factor.

**Q.32** **What are the input and output impedances of a voltage-series feedback amplifier?**
**Given:**
**Input impedance without feedback: $R_i$ = 5 kΩ**
**Output impedance without feedback: $R_o$ = 10 kΩ**
**Feedback factor: Aβ = 19**

**Ans**

✗ 1. 0.25 kΩ, 0.5 kΩ

✗ 2. 100 kΩ, 200 kΩ

✗ 3. 0.25 kΩ, 200 kΩ

✓ 4. 100 kΩ, 0.5 kΩ

**Q.33** **In common collector configuration of BJT, which of the following options is correct?**

**Ans**

✓ 1. It has very high input impedance due to the presence of emitter resistance.

✗ 2. It has a lower input impedance than a common-emitter amplifier.

✗ 3. The input characteristics are a plot of input current (IB) vs. input voltage (VBE) for a constant IE.

✗ 4. If the emitter resistance is bypassed with a capacitor, the input impedance increases.

**Q.34** **In circuit switching, a dedicated communication path is established between the sender and the receiver. This technique is primarily used in which of the following networks?**

**Ans**

✗ 1. Cellular networks

✗ 2. Internet

✗ 3. Wireless Local Area Networks (WLANs)

✓ 4. Public Switched Telephone Network (PSTN)

**Q.35** **Which modulation technique is used to avoid phase ambiguity in BPSK?**

**Ans**

✗ 1. QPSK (Quadrature Phase Shift Keying)

✗ 2. ASK (Amplitude Shift Keying)

✗ 3. FSK (Frequency Shift Keying)

✓ 4. DPSK (Differential Phase Shift Keying)

**Q.36** **Which Boolean expression correctly represents the Difference (D) output of a Full Subtractor?**

**Ans**

✗ 1. D = A ⊕ B

✗ 2. D = A AND B

✗ 3. D = A ⊕ B ⊕ Cout

✓ 4. D = A ⊕ B ⊕ Bin

**Q.37** **One of the main advantages of AAAC (All Aluminium Alloy Conductor) over AAC (All Aluminium Conductor) is:**

**Ans**

✗ 1. increased weight for better mechanical strength

✗ 2. higher corrosion resistance

✓ 3. reduced cost of production

✗ 4. lower conductivity

**Q.38** In the case of a 360° phase shift between two signals, the time delay will be equal to:

**Ans**
- ✗ 1. half the period of the signal
- ✗ 2. a quarter of the period of the signal
- ✗ 3. twice the period of the signal
- ✓ 4. one period of the signal

**Q.39** Which of the following are Pulse Time Modulation (PTM) techniques?

**Ans**
- ✗ 1. PAM and PCM
- ✗ 2. PDM and PCM
- ✗ 3. PPM and PAM
- ✓ 4. PWM and PPM

**Q.40** Which of the following factors is directly proportional to the eddy current loss in magnetic materials?

**Ans**
- ✗ 1. Magnetic field frequency
- ✓ 2. Thickness of the material
- ✗ 3. Temperature of the material
- ✗ 4. Permeability of the material

**Q.41** In a circuit, if the voltage across a resistor is doubled and the resistance remains constant, what happens to the current?

**Ans**
- ✗ 1. The current remains the same.
- ✗ 2. The current is halved.
- ✓ 3. The current doubles.
- ✗ 4. The current quadruples.

**Q.42** Which of the following characteristics is true for ferromagnetic materials?

**Ans**
- ✓ 1. They retain their magnetisation even after the external magnetic field is removed.
- ✗ 2. They are weakly repelled by a magnetic field and have negative magnetic susceptibility.
- ✗ 3. They show no effect in a magnetic field and are considered neutral.
- ✗ 4. They are strongly attracted to a magnetic field but do not exhibit hysteresis.

**Q.43** What is the purpose of fscanf() in C?

**Ans**
- ✗ 1. Writes formatted data to a file
- ✓ 2. Reads formatted data from a file
- ✗ 3. Closes a file
- ✗ 4. Reads a single character from a file

**Q.44** Which Boolean expression correctly represents the Difference (D) output of a Full Subtractor?

**Ans**
- ✗ 1. $D = A \oplus B \oplus Cout$
- ✓ 2. $D = A \oplus B \oplus Bin$
- ✗ 3. $D = A \oplus B$
- ✗ 4. D = A AND B

**Q.45** In Frequency Modulation (FM), the carrier wave's _____ varies according to the message signal.

**Ans**
- ✗ 1. phase
- ✗ 2. wavelenth
- ✗ 3. amplitude
- ✓ 4. frequency

**Q.46** Which of the following gases is commonly used as an insulating material in electrical equipment due to its non-flammable nature and good dielectric strength?

**Ans**

✗ 1. Hydrogen

✓ 2. Nitrogen

✗ 3. Carbon dioxide

✗ 4. Oxygen

**Q.47** How is a multi-dimensional array stored in the memory?

**Ans**

✗ 1. Column-wise (Column-major order)

✗ 2. Randomly

✗ 3. Depends on the compiler

✓ 4. Row-wise (Row-major order)

**Q.48** If the open-loop gain of an op-amp is 105 and the input voltage is 100 mV, the value of output voltage is _____ assuming a supply of ±15 V.

**Ans**

✗ 1. $10^4$ V

✓ 2. 15 V

✗ 3. 0 V

✗ 4. 100 V

**Q.49** Which of the following factors primarily affects the insulation resistance of a material?

**Ans**

✓ 1. The temperature of the material

✗ 2. The colour of the insulation

✗ 3. The frequency of the applied voltage

✗ 4. The thickness of the conductor

**Q.50** Which of the following best defines the sensitivity of a protective relay?

**Ans**

✗ 1. The ability of the relay to discriminate between different types of faults.

✗ 2. The capacity of the relay to handle high fault currents without damage.

✓ 3. The ability of the relay to detect and respond to very small fault currents.

✗ 4. The time it takes for the relay to react after detecting a fault.

**Q.51** What is the primary effect of the annealing process on conducting materials such as copper and aluminium?

**Ans**

✗ 1. It increases tensile strength and hardness.

✗ 2. It causes oxidation of the material's surface.

✓ 3. It reduces electrical resistance by decreasing the number of dislocations.

✗ 4. It increases the material's brittleness.

**Q.52** Which of the following is/are an example of guided transmission media?

**Ans**

✗ 1. Satellite communication

✓ 2. Optical fibre

✗ 3. Radio waves

✗ 4. Infrared signals

**Q.53** DSB-SC, VSB and SSB modulation are types of:

**Ans**

✗ 1. Frequency Modulation (FM)

✓ 2. Amplitude Modulation (AM)

✗ 3. Phase Modulation (PM)

✗ 4. Digital Modulation

**Q.54** The high-frequency gain of a common-emitter amplifier is mainly affected by:

**Ans**

✗ 1. collector-base junction capacitance and bypass capacitor

✓ 2. collector-base junction capacitance and emitter-base capacitance

✗ 3. coupling capacitor and collector-base junction capacitance

✗ 4. coupling capacitor and bypass capacitor

**Q.55** What will happen if a break statement is omitted in a switch case?

**Ans**

✗ 1. The compiler will show an error.

✓ 2. The next case will continue to be executed.

✗ 3. The program will stop execution.

✗ 4. The program will exit.

**Q.56** To increase the word size of a memory system, which of the following techniques is typically used?

**Ans**

✗ 1. Memory interleaving

✗ 2. Memory mapping

✓ 3. Address decoding

✗ 4. Parallel memory modules

**Q.57** Which of the following is the correct octal representation of the hexadecimal number 1A3?

**Ans**

✗ 1. 346

✗ 2. 124

✗ 3. 634

✓ 4. 643

**Q.58** In a PLL-based FM demodulator, the output of the phase detector is proportional to _____.

**Ans**

✗ 1. the carrier frequency of the FM signal

✗ 2. the amplitude of the FM signal

✗ 3. the frequency deviation of the FM signal

✓ 4. the phase difference between the FM signal and the VCO output

**Q.59** In a series magnetic circuit, if the reluctance of one path increases, what will happen to the total magnetic flux in the circuit?

**Ans**

✗ 1. The total flux will increase.

✗ 2. The total flux will remain unchanged.

✗ 3. The flux will divide equally between paths.

✓ 4. The total flux will decrease.

**Q.60** A radio receiver is tuned to 560 kHz, and its local oscillator frequency is 1,000 kHz. At the output, another signal is also received along with the desired signal. What is the frequency of the other station?

**Ans**

✗ 1. 2,440 kHz

✗ 2. 560 kHz

✗ 3. 440 kHz

✓ 4. 1,440 kHz

**Q.61** Which of the following is a primary characteristic of low resistivity materials used in electrical conductors?

**Ans**
- ✗ 1. High insulation properties and poor conductivity
- ✗ 2. High thermal resistance and poor conductivity
- ✗ 3. High cost and low flexibility
- ✓ 4. High conductivity and low resistivity

**Q.62** Which function is used to read a single character from the console in C?

**Ans**
- ✓ 1. getchar()
- ✗ 2. scanf()
- ✗ 3. printf()
- ✗ 4. puts()

**Q.63** The vertical deflection of the CRT oscilloscope is proportional to the:

**Ans**
- ✗ 1. frequency of the input signal
- ✗ 2. horizontal sweep rate
- ✓ 3. amplitude of the input signal
- ✗ 4. phosphor intensity

**Q.64** What is the primary purpose of the graticule in an oscilloscope screen?

**Ans**
- ✗ 1. To focus the electron beam
- ✓ 2. To provide a scale for measuring waveform amplitude and time
- ✗ 3. To convert electrical signals into light
- ✗ 4. To display the frequency of the signal

**Q.65** The function of a low pass filter in phase locked loop is _____.

**Ans**
- ✓ 1. to remove the high frequency noise present
- ✗ 2. to demodulate the output signal
- ✗ 3. to remove the dc component from the signal
- ✗ 4. to increase the frequency of the input signal

**Q.66** _____ is a DMA controller which has four independent channels, CH0 to CH3.

**Ans**
- ✗ 1. 8086
- ✓ 2. 8237
- ✗ 3. 8088
- ✗ 4. 8051

**Q.67** What is the result of applying the complement law A + A' in Boolean algebra?

**Ans**
- ✗ 1. $A$
- ✓ 2. $1$
- ✗ 3. $0$
- ✗ 4. $\overline{A}$

**Q.68** Which of the following is a major advantage of Unshielded Twisted Pair (UTP) cables compared to Shielded Twisted Pair (STP)?

**Ans**
- ✗ 1. Better performance in industrial environments
- ✓ 2. Lower cost and easier installation
- ✗ 3. Complete resistance to EMI
- ✗ 4. Higher durability

**Q.69** How many distinct states are there are in an n-bit ring counter?

**Ans**

✗ 1. $\frac{n}{2}$

✓ 2. n

✗ 3. 2n

✗ 4. $2^n$

**Q.70** What is the primary purpose of the metallic shield in a co-axial cable?

**Ans**

✗ 1. To increase bandwidth capacity

✗ 2. To provide structural support

✓ 3. To protect against electromagnetic interference (EMI)

✗ 4. To reduce signal attenuation

**Q.71** A memory chip has a capacity of 4 kB. How many address lines are required?

**Ans**

✗ 1. 10

✓ 2. 12

✗ 3. 16

✗ 4. 14

**Q.72** Which of the following is NOT correct for a voltage-series feedback amplifier?

**Ans**

✓ 1. Also known as a transconductance amplifier.

✗ 2. Increases input impedance and decreases output impedance.

✗ 3. A non-inverting op-amp is an example of a voltage-series feedback amplifier.

✗ 4. Also known as a voltage-controlled voltage source.

**Q.73** Which of the following is the main purpose of SNMP?

**Ans**

✗ 1. Encrypting network data

✓ 2. Monitoring and managing network devices

✗ 3. Providing authentication for web servers

✗ 4. Facilitating file transfers

**Q.74** Which of the following is a characteristic of serial binary adders?

**Ans**

✓ 1. Each full adder waits for the carry from the previous full adder.

✗ 2. The carry propagation delay is minimised.

✗ 3. They perform addition in parallel.

✗ 4. They use a carry lookahead mechanism.

**Q.75** Which of the following is the correct definition of the capacity of a battery?

**Ans**

✗ 1. The maximum current a battery can provide

✗ 2. The maximum voltage a battery can generate

✗ 3. The total energy a battery can deliver over a period of time

✓ 4. The amount of charge a battery can store and deliver over a specific time period

**Q.76** What does the format specifier %10d in printf("%10d", num); do?

**Ans**

✗ 1. Prints the number with leading zeros in a field of 10 columns

✓ 2. Prints the number in a field of 10 columns

✗ 3. Prints only the number without any extra spaces

✗ 4. Prints the number left-aligned in a field of 10 columns

**Q.77** **Which of the following characteristics does a piezoelectric transducer exhibit when subjected to mechanical stress?**

**Ans**

✗ 1. Change in temperature

✗ 2. Change in frequency

✗ 3. Resistance change

✓ 4. Voltage generation

**Q.78** **Narrowband FM is used in which of the following applications?**

**Ans**

✗ 1. Television transmission

✗ 2. High-fidelity audio systems

✗ 3. FM radio broadcasting

✓ 4. Two-way mobile radio communication

**Q.79** **What is the main role of Port 2 in the 8051 microcontroller during external memory access?**

**Ans**

✗ 1. It serves as a control signal for serial communication.

✗ 2. It acts as a general-purpose I/O port.

✗ 3. It functions as a data register.

✓ 4. It provides the high-order address byte.

**Q.80** **Which port of the 8051 microcontroller functions as a bidirectional I/O and simultaneously acts as an address/data bus for external memory access?**

**Ans**

✗ 1. Port 1

✗ 2. Port 3

✓ 3. Port 0

✗ 4. Port 4

**Q.81** **A special diode with 0 Ω forward resistance and 1 kΩ reverse resistance is connected in series with a 1 kΩ load resistor. A square wave input is applied with:**
**Maximum voltage ($V_{max}$) = 4 V**
**Minimum voltage ($V_{min}$) = −4 V**
**What is the output voltage across the load when the diode is in reverse bias?**

**Ans**

✓ 1. −2 V

✗ 2. −4 V

✗ 3. +2 V

✗ 4. 0 V

**Q.82** **Which factor is primarily responsible for distortion in a transmitted signal?**

**Ans**

✗ 1. External electromagnetic interference

✗ 2. Signal attenuation

✓ 3. Variations in the propagation speed of different frequencies

✗ 4. Excessive bandwidth usage

**Q.83** **Which of the following statements about a Hartley oscillator is correct?**

**Ans**

✗ 1. An RL network is used in the design of Hartley oscillators.

✗ 2. The Hartley oscillator is commonly used to generate signals below 50 Hz

✗ 3. An RC network is used in the design of Hartley oscillators.

✓ 4. It operates on the principle of parallel resonance.

**Q.84** **Which of the following statements is/are correct?**

**S1: Filter controls the lock range of the PLL.**
**S2: Filter controls the capture range of the PLL.**

**Ans**

✗ 1. Both S1 and S2

✗ 2. Neither S1 nor S2

✗ 3. Only S1

✓ 4. Only S2

**Q.85** **Which of the following options is correct regarding the open-loop differential amplifier?**

**Ans**

✗ 1. Input is applied at inverting terminal only.

✗ 2. Input is applied at non-inverting terminal only.

✓ 3. Inputs are applied at both the inverting and non-inverting terminals.

✗ 4. Output is always zero irrespective of the input applied at terminals.

**Q.86** **Which of the following statements is/are NOT correct regarding an IC 723?**
**S1: The output voltage ranges from 2 to 37 volts.**
**S2: The output current is up to 150 mA.**

**Ans**

✓ 1. Neither S1 nor S2

✗ 2. Only S2

✗ 3. Only S1

✗ 4. Both S1 and S2

**Q.87** **Manganin is a copper-manganese alloy that is widely used in precision resistors and temperature-sensitive applications. Which of the following properties makes manganin particularly useful in these applications?**

**Ans**

✗ 1. High tensile strength and ductility

✗ 2. High electrical conductivity

✓ 3. Low temperature coefficient of resistance

✗ 4. High thermal coefficient of resistance

**Q.88** **In a Cathode Ray Oscilloscope (CRO), how is a time delay measured?**

**Ans**

✗ 1. By varying the intensity of the electron beam

✗ 2. By adjusting the brightness of the display

✓ 3. By using the time base control and measuring the horizontal shift

✗ 4. By changing the vertical deflection voltage

**Q.89** **Which of the following statements is FALSE for a common-base (CB) amplifier using a BJT?**

**Ans**

✗ 1. It has lower input impedance and higher output impedance.

✗ 2. The output characteristics is a plot of output current ($I_C$) vs. output voltage ($V_{CB}$).

✓ 3. The output impedance is lower than that of a common-emitter amplifier.

✗ 4. The input characteristics is a plot of input current ($I_E$) vs. input voltage ($V_{EB}$).

**Q.90** **According to Laplace's Law of Magnetic Circuits, the magnetic field strength H in a core is directly proportional to the magnetomotive force (MMF) and inversely proportional to the length of the magnetic path. If the MMF is increased by a factor of 2, and the length of the magnetic path is halved, what will be the change in the magnetic field strength H?**

**Ans**

✗ 1. It will increase by a factor of 2.

✗ 2. It will remain the same.

✗ 3. It will double.

✓ 4. It will increase by a factor of 4.

**Q.91** **If the input I = 1 and the select lines are S1 = 1, and S0 = 0, what will be the values of the four outputs in a 1-to-4 Demultiplexer?**

**Ans**

✗ 1. Output 0 = 0, Output 1 = 1, Output 2 = 0, Output 3 = 0

✗ 2. Output 0 = 0, Output 1 = 0, Output 2 = 0, Output 3 = 1

✗ 3. Output 0 = 0, Output 1 = 0, Output 2 = 0, Output 3 = 0

✓ 4. Output 0 = 0, Output 1 = 0, Output 2 = 1, Output 3 = 0

**Q.92** **The Time Setting Multiplier (TSM) of a relay is used to:**

**Ans**

✗ 1. adjust the operating current threshold of the relay

✗ 2. increase the current setting of the relay

✓ 3. modify the time delay based on fault severity

✗ 4. decrease the time delay of the relay

**Q.93** **In Digital Electronics, what does 'EE' in EEPROM stand for?**

**Ans**

✗ 1. Extended Execution

✗ 2. External Enable

✓ 3. Electrically Erasable

✗ 4. Enhanced Encryption

**Q.94** **According to Carson's Rule, what is the approximate bandwidth required for a VHF/UHF two-way radio signal using FM with a 5 kHz maximum frequency deviation and a maximum audio frequency of 3 kHz?**

**Ans**

✗ 1. 30 kHz

✗ 2. 20 kHz

✗ 3. 10 kHz

✓ 4. 16 kHz

**Q.95** **Sinc pulse shaping is derived from the Fourier Transform of a _____ function.**

**Ans**

✗ 1. sine

✗ 2. sawtooth

✗ 3. triangular

✓ 4. rectangular

**Q.96** **In a Common Emitter (CE) BJT amplifier, which of the following options is correct?**

**Ans**

✗ 1. The CE amplifier has the lowest input impedance among all the configurations.

✗ 2. Its input impedance is lower than CB configuration but higher than CC configuration.

✗ 3. The input characteristics are plotted between the input current (IB) and input voltage (VBE) at a constant IC.

✓ 4. If the magnitude of the output voltage increases, the input current decreases.

**Q.97** **Which of the following statements is NOT true about if-else statement in C?**

**Ans**

✓ 1. An if-else statement cannot be nested inside another if-else statement.

✗ 2. If a condition is true, it is replaced by 1, if it false, it is replaced by 0.

✗ 3. An if need not always be associated with an else. However, an else must always be associated with an if.

✗ 4. The default scope of if and else statement is only the next statement. So, to execute multiple statements they must be written in a pair of braces.

**Q.98** **Which of the following defines accuracy in measurement?**

**Ans**

✗ 1. The variation in measurements due to environmental factors

✓ 2. The closeness of a measured value to the true value

✗ 3. The ability to repeat the same measurement

✗ 4. The smallest change that can be detected by an instrument

**Q.99** What is a recursive function?

**Ans**

✔ 1. A function that calls itself

✘ 2. A function that calls other functions

✘ 3. A function without parameters

✘ 4. A function without a return type

**Q.100** How does DDR RAM achieve double the data transfer rate compared to SDRAM?

**Ans**

✘ 1. By increasing the clock frequency

✘ 2. By using a wider data bus

✘ 3. By reducing the refresh rate

✔ 4. By transferring data on both the rising and falling edges of the clock signal