Basic Physics (~70 MCQ)   
1. Coulomb’s law defines the force between:   
a) Two moving charges   
b) Two point charges at rest ✅   
c) A charge and a magnetic field   
d) A current -carrying wire and a charge   
2. The SI unit of electric flux is:   
a) Volt   
b) Coulomb   
c) Newton·meter²/Coulomb ✅   
d) Tesla   
3. Gauss’s law is applicable to:   
a) Only point charges   
b) Any closed surface ✅   
c) Open surfaces   
d) Conductors only   
4. Electric potential at a point is:   
a) Energy per unit charge ✅   
b) Force per unit charge   
c) Charge per unit en ergy   
d) None of these   
5. Faraday’s law relates:   
a) Electric field and charge   
b) Induced EMF and rate of change of magnetic flux ✅   
c) Current and resistance   
d) Voltage and capacitance   
6. Maxwell’s equations describe:   
a) Motion of electrons   
b) Electromagnetic fiel ds ✅   
c) Quantum particles   
d) Wave propagation in air only   
7. The speed of light in vacuum is:   
a) 3×10³ m/s   
b) 3×10⁵ m/s   
c) 3×10⁸ m/s ✅   
d) 3×10¹⁰ m/s   
8. Photoelectric effect demonstrates that light:   
a) Travels in waves   
b) Has particle nature ✅   
c) Is longitudinal   
d) Has no energy   
9. Compton effect proves:   
a) Wave nature of light   
b) Particle nature of light ✅   
c) Magnetic field effect   
d) Electric field effect   
10. De Broglie wavelength is associated with:   
a) Photons   
b) Electrons and matter particles ✅   
c) Only protons   
d) Only neutrons   
11. Phase velocity is:   
a) Velocity of energy transfer   
b) Velocity of wave crests ✅   
c) Same as group velocity   
d) None of these   
12. Group velocity is:   
a) Speed of individual wave   
b) Speed of envelope of wave packet ✅   
c) Always greater than phase velocity   
d) Zero   
13. Quantum theory of light was proposed by:   
a) Newton   
b) Einstein ✅   
c) Maxwell   
d) Planck   
14. X-ray diffraction is used to study:   
a) Atomic structure ✅   
b) Magnetic field   
c) Electric circuits   
d) Sound waves   
15. Wave function in quantum mechanics represents:   
a) Probability amplitude ✅   
b) Energy only   
c) Force   
d) Velocity   
16. The integral of electric field over a closed surface equals:   
a) Zero   
b) Charge enclosed/ε₀ ✅   
c) Current enclosed   
d) Voltage   
17. Magnetic field is produced by:   
a) Static charges   
b) Moving charges ✅   
c) Stationary neutral objects   
d) Heat only   
18. Faraday’s law is a consequence of:   
a) Conservation of energy ✅   
b) Ohm’s law   
c) Coulomb’s law   
d) Kirchoff’s law   
19. Unit of magnetic flux is:   
a) Tesla   
b) Weber ✅   
c) Ampere   
d) Henry   
20. Lorentz force acts on:   
a) Stationary char ge   
b) Moving charge in magnetic field ✅   
c) Neutral particles   
d) Light only   
21. Capacitance is defined as:   
a) Q/V ✅   
b) V/Q   
c) I/R   
d) P/V   
22. Energy stored in a capacitor:   
a) ½ CV² ✅   
b) CV²   
c) 2CV²   
d) C/V²   
23. Inductor opposes:   
a) Voltage   
b) Current change ✅   
c) Resistan ce   
d) Power   
24. RLC circuit resonates when:   
a) XL = XC ✅   
b) XL > XC   
c) XL < XC   
d) R = 0   
25. Electric field inside a conductor is:   
a) Maximum   
b) Zero ✅   
c) Depends on charge   
d) Constant   
26. Magnetic flux density is measured in:   
a) Tesla ✅   
b) Weber   
c) Henry   
d) Ampere   
27. Ampere’s law relates:   
a) Current and magnetic field ✅   
b) Voltage and resistance   
c) Capacitance and charge   
d) Energy and power   
28. Biot-Savart law gives:   
a) Force on a charge   
b) Magnetic field due to current element ✅   
c) Electric field   
d) Voltage   
29. Self-inductance unit is:   
a) Henry ✅   
b) Farad   
c) Ohm   
d) Tesla   
30. Mutual inductance occurs between:   
a) Two resistors   
b) Two coils ✅   
c) Capacitor and coil   
d) Wire and battery   
31. Maxwell added which term to Ampere’s law?   
a) Displacement current ✅   
b) Conduction current   
c) Electric flux   
d) Magnetic flux   
32. Electromagnetic waves are:   
a) Longitudinal   
b) Transverse ✅   
c) Stationary   
d) Random   
33. Energy of a photon:   
a) hf ✅   
b) h/f   
c) h + f   
d) hf²   
34. Threshold frequency in photoelectric effect depends on:   
a) Intensity   
b) Metal type ✅   
c) Distance from source   
d) Angle of incidence   
35. Quantum number n indicates:   
a) Angular momentum   
b) Principal energy level ✅   
c) Magnetic orientation   
d) Spin   
36. Planck constant h has units:   
a) Joule·second ✅   
b) Volt   
c) Coulomb   
d) Ampere·second   
37. Compton wavelength for mula is:   
a) λc = h/mc ✅   
b) λc = mc/h   
c) λc = h²/m   
d) λc = h/m   
38. X-ray wavelength is in the range:   
a) 0.01 –10 nm ✅   
b) 1–100 μm   
c) 100 –1000 nm   
d) 10 –100 cm   
39. Electromagnetic spectrum order (low to high frequency):   
a) Radio, Microwave, IR, Visible, UV, X -ray, Gam ma ✅   
b) X-ray, UV, Visible, IR, Microwave, Radio   
c) Gamma, X -ray, UV, Visible, IR, Microwave, Radio   
d) Radio, IR, Microwave, Visible, UV, X -ray, Gamma   
40. Photoelectric current depends on:   
a) Light frequency   
b) Light intensity ✅   
c) Metal temperature   
d) None   
41. Heisenberg uncertainty principle relates:   
a) Energy and time ✅   
b) Position and momentum ✅   
c) Force and mass   
d) Both a & b ✅   
42. Wave equation describes:   
a) Electric field only   
b) Magnetic field only   
c) Propagation of waves ✅   
d) Particle motion   
43. EM wave in vacuum travels at:   
a) 3×10⁸ m/s ✅   
b) 3×10⁵ m/s   
c) 3×10³ m/s   
d) 3×10¹⁰ m/s   
44. Polarization of light involves:   
a) Frequency change   
b) Direction change of E vector ✅   
c) Amplitude only   
d) Wavelength only   
45. Brewster’s angle gives:   
a) Total reflection   
b) Zero reflection for one polarization ✅   
c) Maximum reflection   
d) None   
46. Critical angle is related to:   
a) Refraction ✅   
b) Diffraction   
c) Polarization   
d) Interference   
47. Phase difference of 180° gives:   
a) Constructive interference   
b) Destructive interference ✅   
c) No interference   
d) Random waves   
48. Energy of X -ray photon is:   
a) E = hf ✅   
b) E = h/f   
c) E = hf²   
d) E = f/h   
49. Quantum tunneling explains:   
a) Classical reflection   
b) Particle crossing potential barrier ✅   
c) Wave interference   
d) Magnetic effect   
50. Electron diffraction proves:   
a) Partic le nature   
b) Wave nature ✅   
c) EM wave   
d) Photoelectric effect   
51. Wavefunction normalization ensures:   
a) Energy conservation   
b) Total probability = 1 ✅   
c) Momentum conservation   
d) Mass conservation   
52. Schrödinger equation is:   
a) Time -independent ✅   
b) Time -dependent ✅   
c) Both   
d) None   
53. Potential energy in quantum well is:   
a) Infinite   
b) Zero   
c) Finite ✅   
d) Negative   
54. Electron in hydrogen atom has:   
a) Continuous energy   
b) Quantized energy ✅   
c) Zero energy   
d) Infinite energy   
55. First Boh r orbit radius:   
a) 0.529 Å   
b) 0.529 nm ✅   
c) 5.29 nm   
d) 5.29 cm   
56. Photon momentum is:   
a) p = mv   
b) p = hf/c ✅   
c) p = h/f   
d) p = mc   
57. Heisenberg principle formula:   
a) ΔxΔp ≥ ħ/2 ✅   
b) ΔxΔp ≤ ħ/2   
c) ΔEΔt ≤ ħ   
d) ΔEΔt ≥ ħ   
58. Group velocity < Phase velocity in:   
a) Norma l dispersion   
b) Anomalous dispersion ✅   
c) Vacuum   
d) Free space   
59. Standing wave forms due to:   
a) Single wave   
b) Superposition ✅   
c) Refraction   
d) Diffraction   
60. Node is point of:   
a) Maximum amplitude   
b) Zero amplitude ✅   
c) Half amplitude   
d) Random amplitude   
61. Antin ode is point of:   
a) Maximum amplitude ✅   
b) Zero amplitude   
c) Half amplitude   
d) Random amplitude   
62. EM wave energy density:   
a) u = ε₀E²/2 ✅   
b) u = μ₀H²   
c) u = EH   
d) u = 0   
63. Maxwell predicts:   
a) EM waves travel at speed of light ✅   
b) EM waves are longitudinal   
c) EM waves have mass   
d) EM waves stationary   
64. Quantum of light is:   
a) Electron   
b) Photon ✅   
c) Neutron   
d) Proton   
65. Wavelength of electron decreases with:   
a) Increasing momentum ✅   
b) Decreasing momentum   
c) Constant   
d) None   
66. Principle of superposition applies to:   
a) Linear systems ✅   
b) Nonlinear systems   
c) Magnetic fields only   
d) Electric fields only   
67. Electric field inside a hollow conductor:   
a) Zero ✅   
b) Non -zero   
c) Depends on shape   
d) Depends on charge   
68. Magnetic permeability of free space:   
a) 4π×10⁻⁷ H/m ✅   
b) 8.85×10 ⁻¹² F/m   
c) 1 H/m   
d) 0   
69. Magnetic flux Φ = B·A cosθ, θ is:   
a) Angle between B and area normal ✅   
b) Angle between B and surface   
c) Always 0   
d) Always 90°   
70. RLC series circuit resonant frequency:   
a) f = 1/(2π√LC) ✅   
b) f = 2π√LC   
c) f = √LC   
d) f = 1/(LC)   
Introducti on to Computer Systems (~60 MCQ)   
1. The binary number system uses how many digits?   
a) 2 ✅   
b) 8   
c) 10   
d) 16   
2. The octal number system uses how many digits?   
a) 2   
b) 8 ✅   
c) 10   
d) 16   
3. The hexadecimal number system uses how many digits?   
a) 8   
b) 10   
c) 16 ✅   
d) 2   
4. Which of the following is NOT an input device?   
a) Keyboard   
b) Mouse   
c) Printer ✅   
d) Scanner   
5. CPU stands for:   
a) Central Processing Unit ✅   
b) Central Peripheral Unit   
c) Control Processing Unit   
d) Computer Processing Unit   
6. The main function of the CPU is:   
a) Storage of data   
b) Processing of data ✅   
c) Communication   
d) Display   
7. RAM is:   
a) Volatile memory ✅   
b) Non -volatile memory   
c) Secondary storage   
d) Input device   
8. ROM is:   
a) Volatile memory   
b) Non -volatile memory ✅   
c) Cache memory   
d) Input device   
9. Which of the following is secondary storage?   
a) RAM   
b) Hard Disk ✅   
c) Cache   
d) Register   
10. Which of the following is an example of application software?   
a) Windows OS   
b) Microsoft Word ✅   
c) BIOS   
d) Device driver   
11. Operating system manages:   
a) Hardware resources ✅   
b) Only so ftware   
c) Only memory   
d) Only CPU   
12. Assembly language uses:   
a) Binary code   
b) Mnemonics ✅   
c) High -level commands   
d) Natural language   
13. Early computers used which number system?   
a) Binary   
b) Decimal ✅   
c) Octal   
d) Hexadecimal   
14. First generation computers used:   
a) Vacuum tubes ✅   
b) Transistors   
c) ICs   
d) Microprocessors   
15. Second generation computers used:   
a) Vacuum tubes   
b) Transistors ✅   
c) ICs   
d) Microprocessors   
16. Third generation computers used:   
a) Vacuum tubes   
b) Transistors   
c) ICs ✅   
d) Microprocessors   
17. Fourth generati on computers used:   
a) Vacuum tubes   
b) Transistors   
c) ICs   
d) Microprocessors ✅   
18. Which is NOT a main component of a computer?   
a) CPU   
b) Memory   
c) Printer ✅   
d) I/O devices   
19. The ALU performs:   
a) Arithmetic and logical operations ✅   
b) Only arithmetic   
c) Only logi c   
d) Data storage   
20. The CU (Control Unit) manages:   
a) Arithmetic operations   
b) Instruction execution ✅   
c) Data storage   
d) Input/output   
21. BIOS is stored in:   
a) RAM   
b) ROM ✅   
c) Cache   
d) Register   
22. Number of bits in a byte:   
a) 4   
b) 8 ✅   
c) 16   
d) 32   
23. 1 KB = ?   
a) 1024 Bytes ✅   
b) 1000 Bytes   
c) 512 Bytes   
d) 2048 Bytes   
24. Internet is an example of:   
a) LAN   
b) MAN   
c) WAN ✅   
d) PAN   
25. Which is a type of software?   
a) Operating system ✅   
b) Compiler ✅   
c) Word processor ✅   
d) All of the above ✅   
26. Binary addition: 101 + 110 = ?   
a) 1001 ✅   
b) 111   
c) 1010   
d) 1100   
27. Decimal 15 in binary is:   
a) 1010   
b) 1111 ✅   
c) 1101   
d) 1001   
28. Decimal 255 in hexadecimal is:   
a) 0xFF ✅   
b) 0xAA   
c) 0xF0   
d) 0xFE   
29. The fastest memory in computer is:   
a) RAM   
b) Cache ✅   
c) ROM   
d) Hard Disk   
30. Number of general -purpose registers in 8086:   
a) 4   
b) 8 ✅   
c) 16   
d) 2   
31. What is the base of the hexadecimal system?   
a) 2   
b) 8   
c) 10   
d) 16 ✅   
32. A nibble consists of:   
a) 2 bits   
b) 4 bits ✅   
c) 8 bits   
d) 16 bits   
33. CPU clock speed is measured in:   
a) Hertz ✅   
b) Volt   
c) Ampere   
d) Joule   
34. Program that translates high-level language to machine code:   
a) Compiler ✅   
b) Assembler   
c) Interpreter   
d) Loader   
35. Which memory is used to store BIOS?   
a) ROM ✅   
b) RAM   
c) Cache   
d) Register   
36. The main memory is:   
a) RAM ✅   
b) ROM   
c) Hard Disk   
d) Cache   
37. Cache memory is located:   
a) Between CPU and main memory ✅   
b) On hard disk   
c) In I/O device   
d) In printer   
38. The smallest unit of data in a computer:   
a) Byte   
b) Bit ✅   
c) Nibble   
d) Word   
39. ASCII is used for:   
a) Images   
b) Text ✅   
c) Audio   
d) Video   
40. Unicode supports:   
a) English only   
b) Multip le languages ✅   
c) Binary   
d) Hexadecimal   
41. Operating system is:   
a) System software ✅   
b) Application software   
c) Firmware   
d) Hardware   
42. Instruction cycle consists of:   
a) Fetch ✅   
b) Decode ✅   
c) Execute ✅   
d) All of the above ✅   
43. Which of the following is NOT a high-level language?   
a) C   
b) Python   
c) Assembly ✅   
d) Java   
44. HDD stores data in:   
a) RAM   
b) Magnetic disks ✅   
c) SSD   
d) Cache   
45. SSD is faster than HDD because:   
a) Uses flash memory ✅   
b) Uses magnetic disks   
c) Less durable   
d) Has moving parts   
46. Input devices convert :   
a) Digital → Analog   
b) Human data → Digital ✅   
c) Digital → Human readable   
d) None   
47. Output devices convert:   
a) Digital → Analog   
b) Digital → Human readable ✅   
c) Analog → Digital   
d) None   
48. Primary memory is:   
a) Volatile ✅   
b) Non -volatile   
c) Permanent   
d) Secon dary   
49. Secondary memory is:   
a) Volatile   
b) Non -volatile ✅   
c) Faster than RAM   
d) Registers   
50. Software that helps run other programs:   
a) Operating system ✅   
b) Application   
c) Utility   
d) Driver   
51. Early computer “ENIAC” used:   
a) Transistors   
b) Vacuum tubes ✅   
c) ICs   
d) Microprocessors   
52. Which is NOT a characteristic of computer?   
a) Speed   
b) Accuracy   
c) Emotions ✅   
d) Storage   
53. Binary subtraction: 1010 - 0110 = ?   
a) 0100 ✅   
b) 1001   
c) 0011   
d) 1110   
54. ASCII stands for:   
a) American Standard Code for Information Interchange ✅   
b) Au tomatic System Code for Input   
c) Analog Standard Code for Information   
d) All of the above   
55. Word length in 8086 microprocessor:   
a) 8-bit   
b) 16 -bit ✅   
c) 32 -bit   
d) 64 -bit   
56. Early computers were used mainly for:   
a) Gaming   
b) Calculations ✅   
c) Internet browsing   
d) Social media   
57. Input to CPU is through:   
a) Registers ✅   
b) ALU   
c) CU   
d) Memory   
58. Output from CPU is via:   
a) Registers   
b) Memory   
c) I/O devices ✅   
d) ALU   
59. Instruction set architecture defines:   
a) Hardware   
b) Software   
c) CPU instructions ✅   
d) Memory only   
60. Which dev ice connects a computer to the internet?   
a) Router ✅   
b) Printer   
c) Keyboard   
d) Monitor   
Electrical Circuits (~60 MCQ)   
1. Ohm’s law states:   
a) V = IR ✅   
b) P = IV²   
c) I = V/P   
d) V = I²R   
2. In a series circuit, the current is:   
a) Same in all elements ✅   
b) Different in each element   
c) Zero   
d) Depends on voltage only   
3. In a parallel circuit, the voltage across each branch is:   
a) Same ✅   
b) Different   
c) Zero   
d) Depends on resistance   
4. Kirchhoff’s Current Law (KCL) is based on:   
a) Energy conservation   
b) Charge conservation ✅   
c) Ohm’s law   
d) Faraday’s law   
5. Kirchhoff’s Voltage Law (KVL) is based on:   
a) Energy conservation ✅   
b) Charge conservation   
c) Power conservation   
d) Resistance law   
6. Power in a resistive circuit:   
a) P = VI ✅   
b) P = V²/R ✅   
c) P = I²R ✅   
d) All of the above ✅   
7. Voltage divider formula:   
a) Vx = V(Rx/Rtotal) ✅   
b) Vx = IR   
c) Vx = V/R   
d) Vx = IR²   
8. Current divider formula applies to:   
a) Series circuit   
b) Parallel circuit ✅   
c) Both   
d) None   
9. Thevenin’s theorem simplifies a circuit to:   
a) Voltage source and series resistor ✅   
b) Current source and series resistor   
c) Voltage source and parallel resistor   
d) Current source and parallel resistor   
10. Norton’s theorem simplifies a circuit to:   
a) Current source and parallel resistor ✅   
b) Voltage sourc e and series resistor   
c) Current source and series resistor   
d) Voltage source and parallel resistor   
11. Maximum power transfer occurs when:   
a) Load R = Source R ✅   
b) Load R > Source R   
c) Load R < Source R   
d) Load R = 0   
12. Superposition theorem is applicable for:   
a) Linear circuits ✅   
b) Non -linear circuits   
c) Series circuits only   
d) Parallel circuits only   
13. Resistance unit is:   
a) Ohm ✅   
b) Volt   
c) Ampere   
d) Watt   
14. Voltage unit is:   
a) Ohm   
b) Volt ✅   
c) Ampere   
d) Watt   
15. Current unit is:   
a) Ohm   
b) Volt   
c) Ampere ✅   
d) Watt   
16. Capacitance unit is:   
a) Farad ✅   
b) Henry   
c) Ohm   
d) Tesla   
17. Inductance unit is:   
a) Henry ✅   
b) Farad   
c) Ohm   
d) Tesla   
18. Capacitors in series:   
a) 1/Ceq = Σ(1/Ci) ✅   
b) Ceq = ΣCi   
c) Ceq = ΣC²   
d) Ceq = 1/ΣC   
19. Capacitors in parallel:   
a) Ceq = ΣCi ✅   
b) 1/Ceq = Σ(1/Ci)   
c) Ce q = √ΣCi   
d) Ceq = None   
20. Inductors in series:   
a) Leq = ΣLi ✅   
b) 1/Leq = Σ(1/Li)   
c) Leq = √ΣLi   
d) None   
21. Inductors in parallel:   
a) Leq = ΣLi   
b) 1/Leq = Σ(1/Li) ✅   
c) Leq = √ΣLi   
d) None   
22. RLC series circuit resonance condition:   
a) XL = XC ✅   
b) XL > XC   
c) XL < XC   
d) R = 0   
23. Reactance of inductor:   
a) XL = 2πfL ✅   
b) XL = 1/2πfL   
c) XL = L/f   
d) XL = 1/L   
24. Reactance of capacitor:   
a) XC = 1/2πfC ✅   
b) XC = 2πfC   
c) XC = 1/C   
d) XC = 2C   
25. Impedance of series RLC:   
a) Z = √(R² + (XL -XC)²) ✅   
b) Z = R + XL + XC   
c) Z = R/(XL -XC)   
d) Z = R² + L² + C²   
26. Power factor = cosθ, θ is:   
a) Phase difference between voltage and current ✅   
b) Voltage   
c) Current   
d) Resistance   
27. Energy stored in inductor:   
a) W = ½ LI² ✅   
b) W = ½ CV²   
c) W = I²R   
d) W = VI   
28. Energy stored in capacitor:   
a) W = ½ CV² ✅   
b) W = ½ L I²   
c) W = VI   
d) W = I²R   
29. Node voltage method is used for:   
a) Parallel analysis ✅   
b) Series analysis   
c) Superposition   
d) None   
30. Mesh current method is used for:   
a) Series analysis   
b) Loop analysis ✅   
c) Node analysis   
d) Both   
31. Source transformation converts:   
a) Voltage source + series R → Current source + parallel R ✅   
b) Current source + parallel R → Voltage source + series R ✅   
c) Both a & b ✅   
d) None   
32. Dependent source is:   
a) Independent voltage   
b) Controlled by another circuit variable ✅   
c) Uncontrol led   
d) Always current source   
33. Capacitor blocks:   
a) DC ✅   
b) AC   
c) Both   
d) None   
34. Inductor blocks:   
a) AC ✅   
b) DC   
c) Both   
d) None   
35. Time constant of RC circuit:   
a) τ = RC ✅   
b) τ = L/R   
c) τ = R/L   
d) τ = 1/RC   
36. Time constant of RL circuit:   
a) τ = RC   
b) τ = L/R ✅   
c) τ = R/L   
d) τ = 1/L   
37. For AC series RLC, resonance frequency:   
a) f = 1/2π√LC ✅   
b) f = √LC   
c) f = 2π√LC   
d) f = LC   
38. In resonance, current is:   
a) Minimum   
b) Maximum ✅   
c) Zero   
d) Constant   
39. Voltage across L or C at resonance:   
a) Less than supply   
b) Equal to supply   
c) Can be greater than supply ✅   
d) Zero   
40. RMS value of sinusoidal current:   
a) Imax   
b) Imax/√2 ✅   
c) Imax/2   
d) √2 Imax   
41. RMS value of sinusoidal voltage:   
a) Vmax   
b) Vmax/√2 ✅   
c) Vmax/2   
d) √2 Vmax   
42. Average power in AC circuit:   
a) Vrms × Irms × cosθ ✅   
b) Vrms × Irms × sinθ   
c) Vrms × Irms   
d) Irms² × R   
43. Impedance in series AC circuit:   
a) Z = R + j(XL - XC) ✅   
b) Z = R + XL + XC   
c) Z = R + 1/(XL - XC)   
d) Z = R² + (XL -XC)²   
44. Admittance Y =   
a) 1/Z ✅   
b) Z   
c) R/Z   
d) Z/R   
45. Phase angle φ =   
a) tan⁻¹((XL -XC)/R) ✅   
b) tan⁻¹(R/(XL -XC))   
c) cos⁻¹((XL -XC)/R)   
d) sin⁻¹((XL -XC)/R)   
46. Wye to Delta conversion is used for:   
a) Resistors ✅   
b) Capacitors ✅   
c) Inductors ✅   
d) All ✅   
47. Delta to Wye conversion is used for:   
a) Resistors ✅   
b) Capacitors ✅   
c) Inductors ✅   
d) All ✅   
48. RMS voltage of triangular waveform :   
a) Vm/√2   
b) Vm/√3 ✅   
c) Vm/2   
d) Vm   
49. In AC circuits, instantaneous power:   
a) p = vi ✅   
b) p = i²R   
c) p = v²/R   
d) p = Vavg × Iavg   
50. Current leads voltage in:   
a) Capacitive circuit ✅   
b) Inductive circuit   
c) Resistive circuit   
d) None   
51. Current lags voltage in:   
a) Capacitive   
b) Inductive ✅   
c) Resistive   
d) None   
52. Power dissipated in resistor:   
a) I²R ✅   
b) V²/R ✅   
c) VI ✅   
d) All of the above ✅   
53. Series LC circuit at resonance:   
a) Impedance minimum ✅   
b) Impedance maximum   
c) Current minimum   
d) Voltage minimum   
54. Parallel LC circu it at resonance:   
a) Impedance minimum   
b) Impedance maximum ✅   
c) Current maximum   
d) Voltage zero   
55. Quality factor Q =   
a) XL/R ✅   
b) XC/R   
c) R/XL   
d) R/XC   
56. Transient response occurs in:   
a) DC circuits with L or C ✅   
b) Pure resistive DC circuits   
c) AC steady -state   
d) None   
57. Charging capacitor current:   
a) Maximum at t=0 ✅   
b) Zero at t=0   
c) Constant   
d) None   
58. Discharging capacitor current:   
a) Maximum at t=0 ✅   
b) Zero at t=0   
c) Constant   
d) None   
59. DC steady -state inductor acts as:   
a) Open circuit   
b) Short circuit ✅   
c) Capacitor   
d) Resistor   
60. DC steady -state capacitor acts as:   
a) Open circuit ✅   
b) Short circuit   
c) Inductor   
d) Resistor   
Digital Logic Design (~70 MCQ)   
1. Boolean algebra was introduced by:   
a) Newton   
b) Boole ✅   
c) Einstein   
d) Maxwell   
2. The AND gate output is 1 only when:   
a) Both inputs are 0   
b) Both inputs are 1 ✅   
c) One input is 1   
d) Any input is 0   
3. The OR gate output is 0 only when:   
a) Both inputs are 0 ✅   
b) Both inputs are 1   
c) One input is 1   
d) Any input is 1   
4. The NOT gate inverts:   
a) 1→0, 0→1 ✅   
b) 1→1, 0→0   
c) 1→1, 0→1   
d) None   
5. De Morgan’s theorem states:   
a) (A·B)’ = A’ + B’ ✅   
b) (A+B)’ = A + B   
c) (A+B)’ = A’B’ ✅   
d) Both a & c ✅   
6. NAND gate is called:   
a) Universal gate ✅   
b) Basic gate   
c) Logic gate   
d) None   
7. NOR gate is called:   
a) Universal gate ✅   
b) Basic gate   
c) Logic gate   
d) None   
8. XOR gate output is 1 when:   
a) Inputs same   
b) Inputs different ✅   
c) Both inputs 0   
d) Both inputs 1   
9. XNOR gate output is 1 when:   
a) Inputs same ✅   
b) Inputs different   
c) Both 0   
d) Both 1   
10. Sum-of-Products (SOP) is:   
a) OR of AND terms ✅   
b) AND of OR terms   
c) XOR of AND terms   
d) NAND of OR terms   
11. Product -of-Sums (POS) is:   
a) OR of AND terms   
b) AND of OR terms ✅   
c) XOR of OR terms   
d) NOR of AND terms   
12. K-map is used for:   
a) Minimization of Boolean expression ✅   
b) Maximization   
c) M ultiplexing   
d) Latching   
13. 2-to-1 multiplexer has:   
a) 2 inputs, 1 select ✅   
b) 2 outputs, 1 input   
c) 1 input, 2 select   
d) 2 outputs, 2 select   
14. 4-to-1 multiplexer has:   
a) 4 inputs, 2 select ✅   
b) 4 outputs, 2 select   
c) 2 inputs, 4 select   
d) 1 input, 4 select   
15. Demu ltiplexer converts:   
a) 1 input → many outputs ✅   
b) Many inputs → 1 output   
c) OR operation   
d) AND operation   
16. Decoder converts:   
a) n inputs → 2ⁿ outputs ✅   
b) 2ⁿ inputs → n outputs   
c) n outputs → n inputs   
d) None   
17. Encoder converts:   
a) 2ⁿ inputs → n outputs ✅   
b) n inputs → 2ⁿ outputs   
c) OR → AND   
d) None   
18. Half adder produces:   
a) Sum only   
b) Carry only   
c) Sum & Carry ✅   
d) Difference & Borrow   
19. Full adder has:   
a) 2 inputs   
b) 3 inputs ✅   
c) 4 inputs   
d) 1 input   
20. Flip-flops store:   
a) Voltage   
b) Bit of information ✅   
c) Curre nt   
d) Logic gate   
21. SR flip -flop is built using:   
a) NAND/NOR gates ✅   
b) XOR   
c) XNOR   
d) AND   
22. JK flip -flop overcomes:   
a) Race condition in SR ✅   
b) Memory loss   
c) Input error   
d) Timing error   
23. D flip -flop output =   
a) Input D ✅   
b) Input Q   
c) Inverted D   
d) Sum   
24. T flip-flop toggles on:   
a) T=1 ✅   
b) T=0   
c) Clock high   
d) Reset   
25. Asynchronous counter uses:   
a) Same clock ✅   
b) Ripple effect   
c) Parallel clocking   
d) Both a & b ✅   
26. Synchronous counter:   
a) All flip -flops clocked simultaneously ✅   
b) Ripple clocked   
c) Not clocked   
d) None   
27. Mealy machine output depends on:   
a) Present state only   
b) Present input only   
c) Present state & input ✅   
d) Previous state   
28. Moore machine output depends on:   
a) Present state only ✅   
b) Present input   
c) Previous state   
d) Both state & input   
29. PLA stands fo r:   
a) Programmable Logic Array ✅   
b) Parallel Logic Array   
c) Primary Logic Adder   
d) None   
30. PLA used for:   
a) Logic function implementation ✅   
b) Storage   
c) Multiplexing   
d) None   
31. Race around problem occurs in:   
a) SR flip -flop   
b) JK flip -flop ✅   
c) D flip -flop   
d) T flip-flop   
32. Pulse mode design avoids:   
a) Multiple triggering ✅   
b) Single triggering   
c) Flip -flop operation   
d) Logic minimization   
33. Fundamental mode design uses:   
a) Only one input change at a time ✅   
b) Multiple inputs   
c) Asynchronous   
d) None   
34. Combinational circ uit output depends on:   
a) Present inputs only ✅   
b) Present & past inputs   
c) Clock   
d) State   
35. Sequential circuit output depends on:   
a) Present inputs only   
b) Present & past inputs ✅   
c) Clock only   
d) None   
36. Boolean expression simplification reduces:   
a) Gate coun t ✅   
b) Power consumption ✅   
c) Complexity ✅   
d) All ✅   
37. XOR gate is equivalent to:   
a) A’B + AB’ ✅   
b) AB + A’B’   
c) A + B   
d) A·B   
38. XNOR gate is equivalent to:   
a) AB + A’B’ ✅   
b) A’B + AB’   
c) A + B   
d) A·B   
39. NAND gate expression:   
a) (AB)’ ✅   
b) A + B   
c) AB   
d) (A + B)’   
40. NOR gate expression:   
a) (A+B)’ ✅   
b) A + B   
c) AB   
d) (AB)’   
41. Number of minterms for n variables:   
a) n   
b) 2ⁿ ✅   
c) n²   
d) 2n   
42. Number of maxterms for n variables:   
a) n   
b) 2ⁿ ✅   
c) n²   
d) 2n   
43. Canonical SOP uses:   
a) Minterms ✅   
b) Maxterms   
c) Sum   
d) Product   
44. Canonical POS uses:   
a) Minterms   
b) Maxterms ✅   
c) Sum   
d) Product   
45. Logic minimization reduces:   
a) Cost ✅   
b) Speed   
c) Complexity ✅   
d) Both a & c ✅   
46. Flip-flop stores:   
a) 1 bit ✅   
b) 2 bits   
c) 4 bits   
d) Variable   
47. Latches are:   
a) Level triggered ✅   
b) Edge triggered   
c) Pulse mode   
d) None   
48. Flip-flops are:   
a) Level triggered   
b) Edge triggered ✅   
c) Pulse mode   
d) None   
49. Pulse -triggered flip -flops help avoid:   
a) Race around ✅   
b) Memory loss   
c) Logic error   
d) Power consumption   
50. Asynchronous counter also called:   
a) Ripple counter ✅   
b) Ri ng counter   
c) Synchronous counter   
d) Johnson counter   
51. Synchronous counter is:   
a) Ripple type   
b) Clocked simultaneously ✅   
c) Level triggered   
d) None   
52. 4-bit asynchronous counter counts:   
a) 0–7   
b) 0–15 ✅   
c) 0–31   
d) 0–63   
53. 3-bit synchronous counter max count:   
a) 7 ✅   
b) 3   
c) 8   
d) 15   
54. Edge triggering refers to:   
a) Clock rising/falling ✅   
b) Clock high   
c) Clock low   
d) Pulse width   
55. JK flip -flop toggles when:   
a) J=K=1 ✅   
b) J=1, K=0   
c) J=0, K=1   
d) J=K=0   
56. Clock frequency determines:   
a) Circuit speed ✅   
b) Gate numbe r   
c) Power   
d) Output only   
57. Race around occurs when propagation delay < pulse width:   
a) True ✅   
b) False   
c) Sometimes   
d) None   
58. Edge -triggered flip -flop avoids:   
a) Multiple toggles ✅   
b) Memory   
c) Delay   
d) Logic error   
59. MUX selects:   
a) One input ✅   
b) All inputs   
c) Output   
d) Gate   
60. DEMUX distributes:   
a) Input to one output ✅   
b) Input to all outputs   
c) Gate   
d) None   
61. SOP minimization reduces:   
a) AND gates   
b) OR gates   
c) Both ✅   
d) XOR   
62. POS minimization reduces:   
a) OR gates   
b) AND gates   
c) Both ✅   
d) NAND   
63. Universal gate can implement:   
a) All logic ✅   
b) None   
c) Only OR   
d) Only AND   
64. Flip-flop characteristic table lists:   
a) Inputs & outputs ✅   
b) Inputs only   
c) Outputs only   
d) Clock only   
65. Level -triggered latch changes state:   
a) Clock high ✅   
b) Clock low   
c) Both   
d) Edge   
66. Edge -trigger ed flip -flop changes state:   
a) Rising/falling ✅   
b) Level high   
c) Level low   
d) None   
67. Pulse mode design avoids:   
a) Multiple toggles ✅   
b) Race   
c) Timing errors ✅   
d) All ✅   
68. State diagram represents:   
a) Sequential behavior ✅   
b) Combinational logic   
c) Input only   
d) Output only   
69. Mealy machine faster than Moore because:   
a) Output depends on input ✅   
b) Output depends on state   
c) Uses fewer flip -flops   
d) None   
70. Fundamental mode design ensures:   
a) Only one input changes at a time ✅   
b) Multiple input changes   
c) Synchronous   
d) None   
Basic Electronics (~60 MCQ)   
1. Diode allows current to flow in:   
a) Both directions   
b) One direction ✅   
c) No direction   
d) Depends on voltage   
2. Forward biased diode has:   
a) High resistance   
b) Low resistance ✅   
c) Infinite resistance   
d) Zero resistance   
3. Reve rse biased diode has:   
a) High resistance ✅   
b) Low resistance   
c) Zero resistance   
d) Low voltage   
4. Zener diode is used for:   
a) Amplification   
b) Voltage regulation ✅   
c) Switching   
d) Oscillation   
5. Half-wave rectifier uses:   
a) 1 diode ✅   
b) 2 diodes   
c) 4 diodes   
d) None   
6. Full-wave rectifier uses:   
a) 1 diode   
b) 2 diodes ✅   
c) 4 diodes   
d) None   
7. Bridge rectifier uses:   
a) 2 diodes   
b) 3 diodes   
c) 4 diodes ✅   
d) 1 diode   
8. Clipper circuit:   
a) Clips voltage above/below reference ✅   
b) Amplifies signal   
c) Rectifies signal   
d) Filters signal   
9. Clamper circuit:   
a) Shifts signal DC level ✅   
b) Clips voltage   
c) Rectifies   
d) Amplifies   
10. Bipolar junction transistor (BJT) has:   
a) 2 terminals   
b) 3 terminals ✅   
c) 4 terminals   
d) 5 terminals   
11. BJT modes:   
a) Active ✅   
b) Cut -off ✅   
c) Saturation ✅   
d) All ✅   
12. Common emitter configuration provides:   
a) Voltage gain ✅   
b) Current gain ✅   
c) Power gain ✅   
d) All ✅   
13. Common base configuration has:   
a) Current gain <1 ✅   
b) Voltage gain high ✅   
c) Input low   
d) Output low   
14. Common collector configuratio n is also called:   
a) Emitter follower ✅   
b) Base follower   
c) Collector follower   
d) None   
15. BJT used as switch operates in:   
a) Active region   
b) Cut -off & saturation ✅   
c) Reverse bias   
d) None   
16. Load line represents:   
a) Relationship between V & I ✅   
b) Current only   
c) Voltage only   
d) None   
17. Stability factor determines:   
a) BJT bias stability ✅   
b) Voltage   
c) Current   
d) Resistance   
18. Small signal model of BJT uses:   
a) h-parameters ✅   
b) Z-parameters   
c) Y-parameters   
d) None   
19. Voltage gain of CE amplifier:   
a) High ✅   
b) Low   
c) Zer o   
d) Negative   
20. Current gain of CE amplifier:   
a) High ✅   
b) Low   
c) Zero   
d) Negative   
21. Input impedance of CB amplifier:   
a) High   
b) Low ✅   
c) Medium   
d) Variable   
22. Output impedance of CE amplifier:   
a) Low   
b) High ✅   
c) Medium   
d) Variable   
23. Field effect transistor (FET) has:   
a) High input impedance ✅   
b) Low input impedance   
c) Medium   
d) Variable   
24. JFET gate is:   
a) Forward biased   
b) Reverse biased ✅   
c) Floating   
d) None   
25. MOSFET can be:   
a) Depletion type ✅   
b) Enhancement type ✅   
c) Both ✅   
d) None   
26. FET operates on:   
a) Voltage contr ol ✅   
b) Current control   
c) Both   
d) None   
27. Diode’s knee voltage ~   
a) 0.7V for silicon ✅   
b) 0.3V for silicon   
c) 0.7V for germanium   
d) 0.3V for germanium   
28. Zener voltage is:   
a) Breakdown voltage ✅   
b) Forward voltage   
c) Knee voltage   
d) None   
29. Half-wave rectifier out put frequency =   
a) Input frequency   
b) Same as input ✅   
c) Twice input   
d) Half input   
30. Full-wave rectifier output frequency =   
a) Same as input   
b) Twice input ✅   
c) Half input   
d) None   
31. Capacitor filter removes:   
a) AC ripples ✅   
b) DC   
c) Voltage   
d) Current   
32. Diode re verse recovery time:   
a) Time to turn off ✅   
b) Time to turn on   
c) Forward voltage   
d) None   
33. Transistor as amplifier operates in:   
a) Cut -off   
b) Active ✅   
c) Saturation   
d) Reverse   
34. Transistor as switch operates in:   
a) Active   
b) Cut -off & saturation ✅   
c) Reverse   
d) None   
35. BJT has:   
a) Base, emitter, collector ✅   
b) Gate, source, drain   
c) Emitter, collector   
d) None   
36. FET has:   
a) Base, collector, emitter   
b) Gate, source, drain ✅   
c) Input, output   
d) None   
37. MOSFET input impedance:   
a) Low   
b) Very high ✅   
c) Medium   
d) Variable   
38. Clipper removes:   
a) Part of waveform ✅   
b) Entire waveform   
c) DC   
d) AC   
39. Clamper shifts:   
a) DC level ✅   
b) AC level   
c) Both   
d) None   
40. Forward biased diode resistance:   
a) High   
b) Low ✅   
c) Infinite   
d) Zero   
41. Reverse biased diode leakage current:   
a) High   
b) Low ✅   
c) Zero   
d) Medium   
42. Power dissipation in transistor:   
a) VCE × IC ✅   
b) VBE × IB   
c) IC × IB   
d) None   
43. CE amplifier phase shift:   
a) 0°   
b) 180° ✅   
c) 90°   
d) None   
44. CB amplifier phase shift:   
a) 0° ✅   
b) 180°   
c) 90°   
d) None   
45. CC amplifier phase shift:   
a) 0° ✅   
b) 180 °   
c) 90°   
d) None   
46. Small signal model helps determine:   
a) Gain ✅   
b) Impedance ✅   
c) Both ✅   
d) None   
47. Junction diode symbol:   
a) Triangle → line ✅   
b) Line → triangle   
c) Circle   
d) Square   
48. Zener diode symbol:   
a) Line with bent bar ✅   
b) Triangle → line   
c) Circle   
d) Square   
49. Half-wave rectifier uses:   
a) Transformer ✅   
b) Diode ✅   
c) Capacitor ✅   
d) All ✅   
50. Full-wave rectifier bridge has:   
a) 2 diodes   
b) 4 diodes ✅   
c) 3 diodes   
d) 1 diode   
51. Peak inverse voltage (PIV) in diode:   
a) Max reverse voltage ✅   
b) Forward voltage   
c) Average voltage   
d) None   
52. Transistor cutoff:   
a) IB=0 ✅   
b) IC=0   
c) VCE small   
d) Active   
53. Transistor saturation:   
a) VCE≈0 ✅   
b) IC≈0   
c) IB≈0   
d) Active   
54. JFET operates:   
a) Forward biased ✅   
b) Reverse biased   
c) Zero bias   
d) None   
55. MOSFET enhancement mode needs:   
a) Gate voltage ✅   
b) Gate current   
c) Source voltage   
d) Drain voltage   
56. MOSFET depletion mode:   
a) Naturally conducting ✅   
b) Needs gate voltage   
c) Switch off   
d) None   
57. Load line intersects:   
a) DC and AC curves ✅   
b) Input curve   
c) Output curve   
d) None   
58. Diode cut -in voltage:   
a) Minimum voltage to conduct ✅   
b) Maximum   
c) Zero   
d) Infinite   
59. Voltage multiplier uses:   
a) Diodes & capacitors ✅   
b) Transistors   
c) Resistors   
d) Inductors   
60. Zener regulator provides:   
a) Constant voltage ✅   
b) Constant current   
c) Constant resistance   
d) None   
Microprocessor & Interfacing (~60 MCQ)   
1. Microprocessor is:   
a) A software   
b) Central processing unit on a single chip ✅   
c) Memory chip   
d) Input device   
2. Difference between microprocessor and microcontroller:   
a) Microprocessor lacks RAM/ROM ✅   
b) Microcontroller has built -in RAM/ROM ✅   
c) Both a & b ✅   
d) None   
3. 8086/8088 belongs to:   
a) 4-bit family   
b) 8-bit family   
c) 16 -bit family ✅   
d) 32 -bit family   
4. 8086 has:   
a) 8-bit data bus   
b) 16 -bit data bus ✅   
c) 32 -bit data bu s   
d) 64 -bit data bus   
5. Memory segmentation in 8086:   
a) Code, data, stack, extra ✅   
b) Input, output   
c) Registers only   
d) None   
6. Instruction set of 8086 contains:   
a) Data transfer ✅   
b) Arithmetic ✅   
c) Logical ✅   
d) All ✅   
7. Addressing mode specifies:   
a) How to acces s operands ✅   
b) Data size   
c) Clock   
d) Power   
8. Immediate addressing uses:   
a) Constant value ✅   
b) Memory address   
c) Register   
d) Input   
9. Register addressing uses:   
a) CPU register ✅   
b) Memory   
c) Input   
d) Constant   
10. Direct addressing uses:   
a) Memory address ✅   
b) Regi ster   
c) Immediate   
d) Port   
11. Indirect addressing uses:   
a) Register contains address ✅   
b) Memory contains address   
c) Immediate   
d) Port   
12. Single -processor system has:   
a) One CPU ✅   
b) Multiple CPUs   
c) None   
d) All   
13. Multi -processor system:   
a) One CPU   
b) Multiple CPUs ✅   
c) None   
d) All   
14. Assembler converts:   
a) Assembly → Machine code ✅   
b) High -level → Assembly   
c) Machine → Assembly   
d) None   
15. Debugger is used for:   
a) Detecting errors ✅   
b) Writing code   
c) Compiling   
d) Executing only   
16. 8255A is:   
a) Programmable Peripheral Interf ace ✅   
b) Timer   
c) DMA   
d) Memory   
17. 8254 is:   
a) Programmable interval timer ✅   
b) PPI   
c) Interrupt controller   
d) UART   
18. Keyboard interfacing can be done via:   
a) 8255 ✅   
b) 8254   
c) 8259   
d) DMA   
19. LCD interfacing uses:   
a) 8255 ✅   
b) 8254   
c) 8259   
d) None   
20. Printer interfac ing uses:   
a) Parallel ✅   
b) Serial   
c) Both ✅   
d) None   
21. Stepper motor interfacing:   
a) 8255 ✅   
b) 8259   
c) 8254   
d) None   
22. A/D converter converts:   
a) Analog → Digital ✅   
b) Digital → Analog   
c) Voltage   
d) Current   
23. D/A converter converts:   
a) Analog → Digital   
b) Digital → Analog ✅   
c) Both   
d) None   
24. 8259A is:   
a) Programmable interrupt controller ✅   
b) Timer   
c) PPI   
d) DMA   
25. Interrupt vector table stores:   
a) Addresses of interrupt routines ✅   
b) Data   
c) Instructions   
d) None   
26. DMA stands for:   
a) Direct Memory Access ✅   
b) Dynamic Memory Access   
c) Dual Memory Access   
d) Data Memory Access   
27. Serial communication can be:   
a) Synchronous ✅   
b) Asynchronous ✅   
c) Both ✅   
d) None   
28. EIA RS232 is:   
a) Physical communication standard ✅   
b) Protocol   
c) Memory   
d) Timer   
29. Microprocessor clock controls:   
a) Instruction timing ✅   
b) Data   
c) Voltage   
d) Current   
30. Bus demultiplexer separates:   
a) Address & data lines ✅   
b) Input lines   
c) Output lines   
d) Power   
31. Bus controller manages:   
a) Data transfer ✅   
b) Instruction fetch   
c) Clock   
d) None   
32. Programmed I/O means:   
a) CPU actively polls ✅   
b) CPU interrupts   
c) DMA   
d) None   
33. Interrupt driven I/O:   
a) CPU waits   
b) CPU responds to interrupt ✅   
c) CPU ignores   
d) None   
34. Parallel I/O port transfers:   
a) 1 bit   
b) Multiple bits simultaneously ✅   
c) Serially   
d) None   
35. SRAM stands for:   
a) Static RAM ✅   
b) Serial RAM   
c) Synchronous RAM   
d) None   
36. EEPROM stands for:   
a) Electrically Erasable Programmable ROM ✅   
b) RAM   
c) Flash   
d) None   
37. Clock generator produces:   
a) Timing pulses ✅   
b) Data   
c) Instructions   
d) None   
38. Stepper m otor moves in:   
a) Continuous rotation   
b) Steps ✅   
c) Random   
d) None   
39. Timer applications include:   
a) Delay ✅   
b) Event counting ✅   
c) Pulse generation ✅   
d) All ✅   
40. Asynchronous serial communication uses:   
a) Start & stop bits ✅   
b) Clock   
c) Both   
d) None   
41. Microproces sor I/O address decoding ensures:   
a) Correct device access ✅   
b) Timing   
c) Speed   
d) None   
42. Interrupt vector points to:   
a) Interrupt routine ✅   
b) Main program   
c) Data   
d) Timer   
43. Single -step execution helps in:   
a) Debugging ✅   
b) Speeding   
c) Storage   
d) Communicati on   
44. Flag registers store:   
a) Status ✅   
b) Data   
c) Address   
d) Control   
45. Carry flag is set when:   
a) Addition exceeds limit ✅   
b) Subtraction negative   
c) Overflow   
d) Zero   
46. Zero flag is set when:   
a) Result = 0 ✅   
b) Result > 0   
c) Carry occurs   
d) None   
47. Sign flag indica tes:   
a) Positive/negative ✅   
b) Zero   
c) Carry   
d) Overflow   
48. Parity flag checks:   
a) Even/odd bits ✅   
b) Zero   
c) Carry   
d) Sign   
49. Program counter stores:   
a) Next instruction address ✅   
b) Current instruction   
c) Data   
d) Stack pointer   
50. Stack pointer points to:   
a) Top o f stack ✅   
b) Bottom   
c) Memory   
d) None   
51. PUSH instruction:   
a) Store in stack ✅   
b) Retrieve from stack   
c) Clear stack   
d) None   
52. POP instruction:   
a) Store   
b) Retrieve ✅   
c) Clear   
d) None   
53. Software interrupt generated by:   
a) Instruction ✅   
b) External device   
c) Timer   
d) DMA   
54. Hardware interrupt generated by:   
a) Device ✅   
b) Instruction   
c) Program   
d) Memory   
55. Instruction cycle includes:   
a) Fetch ✅   
b) Decode ✅   
c) Execute ✅   
d) All ✅   
56. Data bus width determines:   
a) Data size per transfer ✅   
b) Address   
c) Instruction   
d) Clock   
57. Address bus width determines:   
a) Maximum memory accessible ✅   
b) Data size   
c) Instruction size   
d) Clock   
58. Control signals include:   
a) RD, WR ✅   
b) ALE ✅   
c) INTA ✅   
d) All ✅   
59. Microprocessor interfacing requires:   
a) Address decoding ✅   
b) Timing   
c) Data bus   
d) All ✅   
60. Multi -processor system advantage:   
a) High speed ✅   
b) Parallel processing ✅   
c) Reliability ✅   
d) All ✅   
Communication Theory (~50 MCQ)   
1. Fourier series represents:   
a) Continuous signals ✅   
b) Discrete signals   
c) Both   
d) None   
2. Fourier transform converts:   
a) Time → Frequency ✅   
b) Frequency → Time   
c) Voltage → Current   
d) None   
3. Convolution in time domain equals:   
a) Multiplication in frequency domain ✅   
b) Addition   
c) Subtraction   
d) Division   
4. Parseval’s theorem relates:   
a) Energy in time & frequency ✅   
b) Power   
c) Voltage   
d) Current   
5. Entropy in information theory measures:   
a) Uncertainty ✅   
b) Speed   
c) Bandwidth   
d) Amplitude   
6. Shannon’s theorem gives:   
a) Maximum channel capacity ✅   
b) Minimum noise   
c) Maximum power   
d) None   
7. Channel capacity depends on:   
a) Bandwidth ✅   
b) Signal -to-noise ratio ✅   
c) Both ✅   
d) None   
8. Analog modulation includes:   
a) AM ✅   
b) FM ✅   
c) PM ✅   
d) All ✅   
9. AM stands for:   
a) Amplitude Modulation ✅   
b) Angular Modulation   
c) Analog Modulation   
d) None   
10. FM stands for:   
a) Frequency Modulation ✅   
b) Phase Modulation   
c) Amplitude Modulation   
d) None   
11. PM stands for:   
a) Phase Modulation ✅   
b) Frequency Modulation   
c) Amplitude Modulation   
d) None   
12. Modulation purpose:   
a) Efficient transmission ✅   
b) Amplification   
c) Rectification   
d) None   
13. Demodulation recovers:   
a) Original signal ✅   
b) Noise   
c) Carrier   
d) None   
14. Pulse Amplitude Modulation (PAM) uses:   
a) Amplitude of pulses ✅   
b) Frequency   
c) Phase   
d) None   
15. Pulse Code Modulation (PCM) is:   
a) Digital modulation ✅   
b) Analog modulation   
c) Hybrid   
d) None   
16. Delta modulation (DM) encodes:   
a) Di fference between samples ✅   
b) Absolute value   
c) Average   
d) None   
17. Adaptive delta modulation (ADM) adjusts:   
a) Step size ✅   
b) Frequency   
c) Phase   
d) None   
18. Time -Division Multiplexing (TDM) divides:   
a) Time slots ✅   
b) Frequency   
c) Phase   
d) None   
19. Frequency -Division Multiplexing (FDM) divides:   
a) Frequency ✅   
b) Time   
c) Phase   
d) None   
20. TDMA is:   
a) Time -division multiple access ✅   
b) Frequency -division   
c) Code -division   
d) None   
21. FDMA is:   
a) Time -division   
b) Frequency -division multiple access ✅   
c) Code -division   
d) None   
22. CDMA uses:   
a) Codes to separate users ✅   
b) Time slots   
c) Frequency bands   
d) None   
23. Nyquist sampling theorem states:   
a) Fs ≥ 2 × fmax ✅   
b) Fs < fmax   
c) Fs = fmax   
d) None   
24. Aliasing occurs if:   
a) Fs < 2 × fmax ✅   
b) Fs ≥ 2 × fmax   
c) Fs = 2 × fmax   
d) None   
25. SNR stands for:   
a) Signal -to-Noise Ratio ✅   
b) Signal -to-Number   
c) Sound -to-Noise   
d) None   
26. Power spectrum represents:   
a) Distribution of power over frequency ✅   
b) Time   
c) Amplitude   
d) None   
27. Baseband signal is:   
a) Original signal ✅   
b) Modulated signal   
c) Carrier   
d) None   
28. Bandpass signal is:   
a) Centered around carrier ✅   
b) Original signal   
c) Noise   
d) None   
29. AM modulated signal has:   
a) Carrier + sidebands ✅   
b) Carrier only   
c) Sidebands only   
d) None   
30. FM bandwidth depends on:   
a) Frequency deviation ✅   
b) Amplitude   
c) Phase   
d) None   
31. PM bandwidth depends on:   
a) Phase deviation ✅   
b) Frequency   
c) Amplitude   
d) None   
32. Coherent detection used for:   
a) AM demodulation ✅   
b) FM   
c) PM   
d) None   
33. Envelope detection used for:   
a) AM ✅   
b) FM   
c) PM   
d) None   
34. Multiplexing purpose:   
a) Efficient utiliz ation ✅   
b) Amplification   
c) Modulation   
d) None   
35. Information rate formula:   
a) R = H × symbols/sec ✅   
b) R = H × f   
c) R = P × t   
d) None   
36. Signal bandwidth affects:   
a) Data rate ✅   
b) Power   
c) Voltage   
d) None   
37. Noise degrades:   
a) SNR ✅   
b) Bandwidth   
c) Time   
d) None   
38. Shannon capacity formula:   
a) C = B log2(1 + S/N) ✅   
b) C = B × S/N   
c) C = B / S/N   
d) None   
39. Analog vs digital communication:   
a) Analog continuous ✅   
b) Digital discrete ✅   
c) Both correct ✅   
d) None   
40. Multiplexing reduces:   
a) Number of channels ✅   
b) Bandwidth   
c) Noise   
d) None   
41. Demultiplexer separates:   
a) Combined signals ✅   
b) Carrier   
c) Modulation   
d) None   
42. Fourier series uses:   
a) Sin & cos ✅   
b) Exponential only   
c) Step function   
d) None   
43. Power spectrum integral =   
a) Signal energy ✅   
b) Noise   
c) Bandwidth   
d) None   
44. Pulse duration affects:   
a) Bandwidth ✅   
b) Power   
c) Noise   
d) None   
45. PCM uses:   
a) Sampling ✅   
b) Quantization ✅   
c) Encoding ✅   
d) All ✅   
46. Delta modulation advantage:   
a) Simple ✅   
b) Requires low bandwidth ✅   
c) Adaptive possible ✅   
d) All ✅   
47. CDMA allows:   
a) Multiple use rs ✅   
b) Single user   
c) Only one channel   
d) None   
48. Nyquist rate =   
a) 2 × fmax ✅   
b) fmax   
c) fmax / 2   
d) None   
49. Pulse shaping reduces:   
a) Inter -symbol interference ✅   
b) Noise   
c) Bandwidth   
d) None   
50. Communication system goal:   
a) Reliable data transfer ✅   
b) Maximum n oise   
c) Minimum bandwidth   
d) None   
Computer Networking & Security (~60 MCQ)   
1. Protocol hierarchy defines:   
a) Layered communication ✅   
b) Hardware only   
c) Software only   
d) None   
2. Data link layer provides:   
a) Reliable link ✅   
b) Routing   
c) Application   
d) Transport   
3. HLDC stands for:   
a) High -Level Data Link Control ✅   
b) High -Level Device Control   
c) Hardware Link Device Control   
d) None   
4. LAN protocols include:   
a) IEEE 802.3 ✅   
b) IEEE 802.11 ✅   
c) Both ✅   
d) None   
5. Hub operates at:   
a) Physical layer ✅   
b) Data link   
c) Network   
d) Transport   
6. Switch operates at:   
a) Physical   
b) Data link ✅   
c) Network   
d) Transport   
7. Bridge connects:   
a) Two LANs ✅   
b) Two computers   
c) Router   
d) None   
8. FDDI uses:   
a) Fiber optic ✅   
b) Copper   
c) Wireless   
d) None   
9. Fast Ethernet speed:   
a) 10 Mbps   
b) 100 Mbps ✅   
c) 1 Gbps   
d) 10 Gbps   
10. Routing algorithm decides:   
a) Path selection ✅   
b) Bandwidth   
c) Speed   
d) None   
11. Congestion control prevents:   
a) Network overload ✅   
b) Data loss   
c) Security   
d) None   
12. Internetworking involves:   
a) Connecting LANs/WANs ✅   
b) Hardware onl y   
c) Software only   
d) None   
13. Fragmentation occurs when:   
a) Packet > MTU ✅   
b) Packet < MTU   
c) Router fails   
d) None   
14. Firewall purpose:   
a) Network security ✅   
b) Routing   
c) Switching   
d) None   
15. IPV4 address length:   
a) 32 bits ✅   
b) 64 bits   
c) 128 bits   
d) 16 bits   
16. IPV6 address length:   
a) 32 bits   
b) 64 bits   
c) 128 bits ✅   
d) 16 bits   
17. ARP resolves:   
a) IP → MAC ✅   
b) MAC → IP   
c) Port → IP   
d) None   
18. RARP resolves:   
a) MAC → IP ✅   
b) IP → MAC   
c) Port → IP   
d) None   
19. Mobile IP enables:   
a) Device mobility ✅   
b) Routing   
c) Switching   
d) None   
20. Transport protocol for reliable communication:   
a) TCP ✅   
b) UDP   
c) ICMP   
d) None   
21. TCP provides:   
a) Connection -oriented ✅   
b) Error checking ✅   
c) Flow control ✅   
d) All ✅   
22. UDP provides:   
a) Connectionless ✅   
b) No guarantee ✅   
c) Both ✅   
d) None   
23. AAL of ATM:   
a) Adaptation layer ✅   
b) Application layer   
c) Transport layer   
d) None   
24. Network security includes:   
a) Cryptography ✅   
b) Authentication ✅   
c) Digital signatures ✅   
d) All ✅   
25. DES stands for:   
a) Data Encryption Standard ✅   
b) Digital Encryption Standard   
c) Data Encoding System   
d) None   
26. IDEA stands for:   
a) International Data Encryption Algorithm ✅   
b) Data Encryption Algorithm   
c) Information Encoding   
d) None   
27. Public key algorithm uses:   
a) Two keys ✅   
b) One key   
c) Both   
d) None   
28. Authentication ensures:   
a) Identity verification ✅   
b) Data transfer   
c) Speed   
d) None   
29. Digital signature ensures:   
a) Authentication ✅   
b) Integrity ✅   
c) Both ✅   
d) None   
30. Gigabit Ethernet speed:   
a) 100 Mbps   
b) 1 Gbps ✅   
c) 10 Gbps   
d) None   
31. DNS resolves:   
a) Domain → IP ✅   
b) IP → Domain   
c) MAC → IP   
d) None   
32. Name servers store:   
a) Domain name info ✅   
b) IP only   
c) MAC only   
d) None   
33. Email privacy is ensured by:   
a) Encryption ✅   
b) Routing   
c) Firewall   
d) None   
34. SNMP stands for:   
a) Simple Network Management Protocol ✅   
b) Secure Network   
c) Standard Ne twork   
d) None   
35. HTTP operates at:   
a) Application layer ✅   
b) Transport   
c) Network   
d) Data link   
36. HTTPS ensures:   
a) Secure HTTP ✅   
b) Fast HTTP   
c) Normal HTTP   
d) None   
37. LAN uses:   
a) Ethernet ✅   
b) FDDI ✅   
c) Both ✅   
d) None   
38. WAN connects:   
a) Large area networks ✅   
b) Si ngle computer   
c) Router only   
d) None   
39. Fragmentation handled by:   
a) Network layer ✅   
b) Transport   
c) Data link   
d) None   
40. IPV4 provides:   
a) 4 billion addresses ✅   
b) 1 billion   
c) 128 bit   
d) None   
41. IPV6 provides:   
a) 128 -bit address ✅   
b) 32 -bit   
c) 64 -bit   
d) None   
42. TCP uses:   
a) Three -way handshake ✅   
b) UDP   
c) ICMP   
d) None   
43. UDP uses:   
a) No handshake ✅   
b) Handshake   
c) Connection -oriented   
d) None   
44. Firewalls can be:   
a) Packet filtering ✅   
b) Proxy ✅   
c) Both ✅   
d) None   
45. Cryptography converts:   
a) Plaintext → Ciphertext ✅   
b) Ciphert ext → Plaintext   
c) Data only   
d) None   
46. VPN ensures:   
a) Secure private network ✅   
b) Open network   
c) LAN only   
d) None   
47. Transport layer manages:   
a) End -to-end communication ✅   
b) Node -to-node   
c) Data link   
d) Physical   
48. ARP used in:   
a) Local network ✅   
b) Internet   
c) WAN   
d) None   
49. RARP used to:   
a) Assign IP from MAC ✅   
b) Assign MAC   
c) DNS   
d) None   
50. ICMP used for:   
a) Error reporting ✅   
b) Data transfer   
c) Encryption   
d) None   
51. SMTP used for:   
a) Sending emails ✅   
b) Receiving emails   
c) Browsing   
d) None   
52. POP3 used for:   
a) Receiving emails ✅   
b) Sending emails   
c) Browsing   
d) None   
53. IMAP used for:   
a) Receiving emails ✅   
b) Sending   
c) Browsing   
d) None   
54. VPN tunnel provides:   
a) Encrypted path ✅   
b) Open path   
c) Wireless path   
d) None   
55. Network congestion occurs due to:   
a) Excessive tr affic ✅   
b) Low traffic   
c) Short cable   
d) None   
56. Routing algorithms include:   
a) Distance vector ✅   
b) Link state ✅   
c) Both ✅   
d) None   
57. MAC address is:   
a) Hardware address ✅   
b) IP address   
c) Domain name   
d) None   
58. IPv4 address written in:   
a) Dot -decimal ✅   
b) Hex   
c) Binary only   
d) None   
59. IPv6 address written in:   
a) Hexadecimal ✅   
b) Decimal   
c) Binary   
d) None   
60. Network layer provides:   
a) Logical addressing ✅   
b) Physical addressing   
c) Transport   
d) Application