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·meter^2/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) 3×10^3 m/s

b) 3×10^5 m/s

c) 3×10^8 m/s ✅

d) 3×10^{10} 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/ε_0 ✅
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 CV^2 ✅
b) CV^2
c) $2CV^2$
d) C/V^2
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) hf^2
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) $\lambda c = h/mc$ ✅
b) $\lambda c = mc/h$
c) $\lambda c = h^2/m$
d) $\lambda c = h/m$
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) 3×10^8 m/s ✅

b) 3×10^5 m/s

c) 3×10^3 m/s

d) 3×10^{10} 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) $E = hf^2$

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) $\Delta x \Delta p \geq \hbar/2$ ✅
b) $\Delta x \Delta p \leq \hbar/2$
c) $\Delta E \Delta t \leq \hbar$
d) $\Delta E \Delta t \geq \hbar$
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) $u = \varepsilon_0 E^2/2$ ✅
b) $u = \mu_0 H^2$
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) $4\pi \times 10^{-7}$ H/m ✅
b) 8.85×10^{-12} F/m
c) 1 H/m
d) 0
69. Magnetic flux $\Phi = B \cdot A \cos\theta$, 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) $f = 1/(2\pi\sqrt{LC})$ ✅
b) $f = 2\pi\sqrt{LC}$
c) $f = \sqrt{LC}$
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) $P = IV^2$
c) $I = V/P$
d) $V = I^2R$
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) $P = V^2/R$ ✅

c) $P = I^2R$ ✅

d) All of the above ✅

7. Voltage divider formula:

a) $Vx = V(Rx/Rtotal)$ ✅

b) $Vx = IR$

c) $Vx = V/R$

d) $Vx = IR^2$

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) $1/Ceq = \Sigma(1/Ci)$ ✅
b) $Ceq = \Sigma Ci$
c) $Ceq = \Sigma C^2$
d) $Ceq = 1/\Sigma C$
19. Capacitors in parallel:
a) $Ceq = \Sigma Ci$ ✅
b) $1/Ceq = \Sigma(1/Ci)$
c) Ce q = $\sqrt{\Sigma Ci}$
d) Ceq = None
20. Inductors in series:
a) $Leq = \Sigma Li$ ✅
b) $1/Leq = \Sigma(1/Li)$
c) $Leq = \sqrt{\Sigma Li}$
d) None
21. Inductors in parallel:
a) $Leq = \Sigma Li$
b) $1/Leq = \Sigma(1/Li)$ ✅

c) $Leq = \sqrt{\Sigma Li}$
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) $XL = 2\pi fL$ ✅
b) $XL = 1/2\pi fL$
c) $XL = L/f$
d) $XL = 1/L$
24. Reactance of capacitor:
a) $XC = 1/2\pi fC$ ✅
b) $XC = 2\pi fC$
c) $XC = 1/C$
d) $XC = 2C$
25. Impedance of series RLC:
a) $Z = \sqrt{(R^2 + (XL - XC)^2)}$ ✅
b) $Z = R + XL + XC$
c) $Z = R/(XL - XC)$
d) $Z = R^2 + L^2 + C^2$
26. Power factor = $\cos\theta$, θ is:
a) Phase difference between voltage and current ✅
b) Voltage
c) Current
d) Resistance
27. Energy stored in inductor:
a) $W = ½ LI^2$ ✅
b) $W = ½ CV^2$
c) $W = I^2R$
d) $W = VI$
28. Energy stored in capacitor:
a) $W = ½ CV^2$ ✅
b) $W = ½ L I^2$
c) $W = VI$
d) $W = I^2R$
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) $\tau = RC$ ✅
b) $\tau = L/R$
c) $\tau = R/L$
d) $\tau = 1/RC$
36. Time constant of RL circuit:
a) $\tau = RC$
b) $\tau = L/R$ ✅
c) $\tau = R/L$
d) $\tau = 1/L$
37. For AC series RLC, resonance frequency:
a) $f = 1/2\pi\sqrt{LC}$ ✅
b) $f = \sqrt{LC}$
c) $f = 2\pi\sqrt{LC}$
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/$\sqrt{2}$ ✅
c) Imax/2
d) $\sqrt{2}$ Imax
41. RMS value of sinusoidal voltage:
a) Vmax
b) Vmax/$\sqrt{2}$ ✅
c) Vmax/2
d) $\sqrt{2}$ Vmax
42. Average power in AC circuit:
a) Vrms × Irms × cosθ ✅
b) Vrms × Irms × sinθ
c) Vrms × Irms
d) $Irms^2$ × 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) $Z = R^2 + (XL - XC)^2$
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) $Vm/\sqrt{2}$

b) $Vm/\sqrt{3}$ ✅

c) $Vm/2$

d) Vm

49. In AC circuits, instantaneous power:

a) $p = vi$ ✅

b) $p = i^2R$

c) $p = v^2/R$

d) $p = Vavg \times Iavg$

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) I^2R ✅

b) V^2/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 → 2^n outputs ✅
b) 2^n inputs → n outputs
c) n outputs → n inputs
d) None
17. Encoder converts:
a) 2^n inputs → n outputs ✅
b) n inputs → 2^n 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) 2^n ✅

c) n^2

d) 2n

42. Number of maxterms for n variables:

a) n

b) 2^n ✅

c) n^2

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