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 energy 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 fields ✅ c) Quantum particles d) Wave propagation in air only

7. The speed of light in vacuum is: a) $3×10^3$ m/s b) $3×10^6$ 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 charge 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) $½CV^2$ ✅ b) CV^2 c) $2CV^2$ d) C/V^2

23. Inductor opposes: a) Voltage b) Current change ✅ c) Resistance d) Power

24. RLC circuit resonates when: a) $X_L = X_C$ ✅ b) $X_L > X_C$ c) $X_L < X_C$ 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 formula is: a) $λc = h/mc$ ✅ b) $λc = mc/h$ c) $λc = h^2/m$ 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, Gamma ✅ 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) $3×10^6$ 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) Particle 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 Bohr 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) $Δx·Δp ≥ ℏ/2$ ✅ b) $Δx·Δp ≤ ℏ/2$ c) $ΔE·Δt ≤ ℏ$ d) $ΔE·Δt ≥ ℏ$

58. Group velocity < Phase velocity in: a) Normal 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. Antinode is point of: a) Maximum amplitude ✅ b) Zero amplitude c) Half amplitude d) Random amplitude

62. EM wave energy density: a) $u = ε_0E^2/2$ ✅ b) $u = ½ε_0H^2$ 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 âœ… b) Non -zero c) Depends on shape d) Depends on charge

68. Magnetic permeability of free space: a) 4Ï€Ã—10â»â· H/m âœ… b) 8.85Ã—10 â»Â¹Â² F/m c) 1 H/m d) 0 69. Magnetic flux Î¦ = BÂ·A cosÎ¸, Î¸ is: a) Angle between B and area normal âœ… b) Angle between B and surface c) Always 0 d) Always 90Â° 70. RLC series circuit resonant frequency: a) f = 1/(2Ï€âˆšLC) âœ… b) f = 2Ï€âˆšLC c) f = âˆšLC d) f = 1/(LC) Introducti on to Computer Systems (~60 MCQ) 1. The binary number system uses how many digits? a) 2 âœ… b) 8 c) 10 d) 16 2. The octal number system uses how many digits? a) 2 b) 8 âœ… c) 10 d) 16 3. The hexadecimal number system uses how many digits? a) 8 b) 10 c) 16 âœ… d) 2 4. Which of the following is NOT an input device? a) Keyboard b) Mouse c) Printer âœ… d) Scanner 5. CPU stands for: a) Central Processing Unit âœ… 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 âœ… c) Communication d) Display 7. RAM is: a) Volatile memory âœ… b) Non -volatile memory c) Secondary storage d) Input device 8. ROM is: a) Volatile memory b) Non -volatile memory âœ… c) Cache memory d) Input device 9. Which of the following is secondary storage? a) RAM b) Hard Disk âœ… c) Cache d) Register 10. Which of the following is an example of application software? a) Windows OS b) Microsoft Word âœ… c) BIOS d) Device driver 11. Operating system manages: a) Hardware resources âœ… b) Only so ftware c) Only memory d) Only CPU 12. Assembly language uses: a) Binary code b) Mnemonics âœ… c) High -level commands d) Natural language 13. Early computers used which number system? a) Binary b) Decimal âœ… c) Octal d) Hexadecimal 14. First generation computers used: a) Vacuum tubes âœ… b) Transistors

c) ICs d) Microprocessors 15. Second generation computers used: a) Vacuum tubes b) Transistors âœ… c) ICs d) Microprocessors 16. Third generation computers used: a) Vacuum tubes b) Transistors c) ICs âœ… d) Microprocessors 17. Fourth generati on computers used: a) Vacuum tubes b) Transistors c) ICs d) Microprocessors âœ… 18. Which is NOT a main component of a computer? a) CPU b) Memory c) Printer âœ… d) I/O devices 19. The ALU performs: a) Arithmetic and logical operations âœ… b) Only arithmetic c) Only logi c d) Data storage 20. The CU (Control Unit) manages: a) Arithmetic operations b) Instruction execution âœ… c) Data storage d) Input/output 21. BIOS is stored in: a) RAM b) ROM âœ… c) Cache d) Register 22. Number of bits in a byte: a) 4 b) 8 âœ… c) 16 d) 32

23. 1 KB = ? a) 1024 Bytes âœ… b) 1000 Bytes c) 512 Bytes d) 2048 Bytes 24. Internet is an example of: a) LAN b) MAN c) WAN âœ… d) PAN 25. Which is a type of software? a) Operating system âœ… b) Compiler âœ… c) Word processor âœ… d) All of the above âœ… 26. Binary addition: 101 + 110 = ? a) 1001 âœ… b) 111 c) 1010 d) 1100 27. Decimal 15 in binary is: a) 1010 b) 1111 âœ… c) 1101 d) 1001 28. Decimal 255 in hexadecimal is: a) 0xFF âœ… b) 0xAA c) 0xF0 d) 0xFE 29. The fastest memory in computer is: a) RAM b) Cache âœ… c) ROM d) Hard Disk 30. Number of general -purpose registers in 8086: a) 4 b) 8 âœ… c) 16 d) 2 31. What is the base of the hexadecimal system? a) 2

b) 8 c) 10 d) 16 âœ… 32. A nibble consists of: a) 2 bits b) 4 bits âœ… c) 8 bits d) 16 bits 33. CPU clock speed is measured in: a) Hertz âœ… b) Volt c) Ampere d) Joule 34. Program that translates high-level language to machine code: a) Compiler âœ… b) Assembler c) Interpreter d) Loader 35. Which memory is used to store BIOS? a) ROM âœ… b) RAM c) Cache d) Register 36. The main memory is: a) RAM âœ… b) ROM c) Hard Disk d) Cache 37. Cache memory is located: a) Between CPU and main memory âœ… 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 âœ… c) Nibble d) Word 39. ASCII is used for: a) Images b) Text âœ… c) Audio

d) Video 40. Unicode supports: a) English only b) Multip le languages âœ… c) Binary d) Hexadecimal 41. Operating system is: a) System software âœ… b) Application software c) Firmware d) Hardware 42. Instruction cycle consists of: a) Fetch âœ… b) Decode âœ… c) Execute âœ… d) All of the above âœ… 43. Which of the following is NOT a high-level language? a) C b) Python c) Assembly âœ… d) Java 44. HDD stores data in: a) RAM b) Magnetic disks âœ… c) SSD d) Cache 45. SSD is faster than HDD because: a) Uses flash memory âœ… b) Uses magnetic disks c) Less durable d) Has moving parts 46. Input devices convert : a) Digital â†’ Analog b) Human data â†’ Digital âœ… c) Digital â†’ Human readable d) None 47. Output devices convert: a) Digital â†’ Analog b) Digital â†’ Human readable âœ… c) Analog â†’ Digital d) None 48. Primary memory is:

a) Volatile âœ… b) Non -volatile c) Permanent d) Secon dary 49. Secondary memory is: a) Volatile b) Non -volatile âœ… c) Faster than RAM d) Registers 50. Software that helps run other programs: a) Operating system âœ… b) Application c) Utility d) Driver 51. Early computer â€œENIACâ€ used: a) Transistors b) Vacuum tubes âœ… c) ICs d) Microprocessors 52. Which is NOT a characteristic of computer? a) Speed b) Accuracy c) Emotions âœ… d) Storage 53. Binary subtraction: 1010 - 0110 = ? a) 0100 âœ… b) 1001 c) 0011 d) 1110 54. ASCII stands for: a) American Standard Code for Information Interchange âœ… 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 âœ… c) 32 -bit d) 64 -bit 56. Early computers were used mainly for: a) Gaming b) Calculations âœ…

c) Internet browsing d) Social media 57. Input to CPU is through: a) Registers âœ… b) ALU c) CU d) Memory 58. Output from CPU is via: a) Registers b) Memory c) I/O devices âœ… d) ALU 59. Instruction set architecture defines: a) Hardware b) Software c) CPU instructions âœ… d) Memory only 60. Which dev ice connects a computer to the internet? a) Router âœ… b) Printer c) Keyboard d) Monitor Electrical Circuits (~60 MCQ) 1. Ohmâ€™s law states: a) V = IR âœ… b) P = IVÂ² c) I = V/P d) V = IÂ²R 2. In a series circuit, the current is: a) Same in all elements âœ… 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 âœ… b) Different c) Zero d) Depends on resistance 4. Kirchhoffâ€™s Current Law (KCL) is based on: a) Energy conservation b) Charge conservation âœ… c) Ohmâ€™s law

d) Faradayâ€™s law 5. Kirchhoffâ€™s Voltage Law (KVL) is based on: a) Energy conservation âœ… b) Charge conservation c) Power conservation d) Resistance law 6. Power in a resistive circuit: a) P = VI âœ… b) P = VÂ²/R âœ… c) P = IÂ²R âœ… d) All of the above âœ… 7. Voltage divider formula: a) Vx = V(Rx/Rtotal) âœ… b) Vx = IR c) Vx = V/R d) Vx = IRÂ² 8. Current divider formula applies to: a) Series circuit b) Parallel circuit âœ… c) Both d) None 9. Theveninâ€™s theorem simplifies a circuit to: a) Voltage source and series resistor âœ… 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) $1/C_{eq} = \Sigma(1/C_i)$ ✓ b) $C_{eq} = \Sigma C_i$ c) $C_{eq} = \Sigma C^2$ d) $C_{eq} = 1/\Sigma C$ 19. Capacitors in parallel: a) $C_{eq} = \Sigma C_i$ ✓ b) $1/C_{eq} = \Sigma(1/C_i)$ c) $C_{eq} = \sqrt{\Sigma C_i}$ d) C_{eq} = None 20. Inductors in series: a) $L_{eq} = \Sigma L_i$ ✓ b) $1/L_{eq} = \Sigma(1/L_i)$ c) $L_{eq} = \sqrt{\Sigma L_i}$ d) None 21. Inductors in parallel: a) $L_{eq} = \Sigma L_i$ b) $1/L_{eq} = \Sigma(1/L_i)$ ✓

c) $L_{eq} = \sqrt{\Sigma L_i}$ 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 = $\cos\phi$, ϕ is: a) Phase difference between voltage and current ✓ b) Voltage c) Current d) Resistance 27. Energy stored in inductor: a) $W = \frac{1}{2} LI^2$ ✓ b) $W = \frac{1}{2} CV^2$ c) $W = I^2R$ d) W = VI 28. Energy stored in capacitor: a) $W = \frac{1}{2} CV^2$ ✓ b) $W = \frac{1}{2} L I^2$ 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) $Imax/\sqrt2$ ✓ c) Imax/2 d) $\sqrt2$ Imax 41. RMS value of sinusoidal voltage: a) Vmax b) $Vmax/\sqrt2$ ✓ c) Vmax/2 d) $\sqrt2$ Vmax 42. Average power in AC circuit: a) Vrms × Irms × $\cos\phi$ ✓ b) Vrms × Irms × $\sin\phi$ 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) $Vm/\sqrt2$ b) $Vm/\sqrt3$ ✓ 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 × 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 âœ… c) Curre nt d) Logic gate 21. SR flip -flop is built using: a) NAND/NOR gates âœ… b) XOR c) XNOR d) AND 22. JK flip -flop overcomes: a) Race condition in SR âœ… b) Memory loss c) Input error d) Timing error 23. D flip - flop output = a) Input D âœ… b) Input Q c) Inverted D d) Sum 24. T flip-flop toggles on: a) T=1 âœ… b) T=0 c) Clock high d) Reset 25. Asynchronous counter uses: a) Same clock âœ… b) Ripple effect c) Parallel clocking d) Both a & b âœ… 26. Synchronous counter: a) All flip - flops clocked simultaneously âœ… 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 âœ… d) Previous state 28. Moore machine output depends on: a) Present state only âœ…

b) Present input c) Previous state d) Both state & input 29. PLA stands fo r: a) Programmable Logic Array âœ… b) Parallel Logic Array c) Primary Logic Adder d) None 30. PLA used for: a) Logic function implementation âœ… b) Storage c) Multiplexing d) None 31. Race around problem occurs in: a) SR flip -flop b) JK flip -flop âœ… c) D flip -flop d) T flip-flop 32. Pulse mode design avoids: a) Multiple triggering âœ… b) Single triggering c) Flip -flop operation d) Logic minimization 33. Fundamental mode design uses: a) Only one input change at a time âœ… b) Multiple inputs c) Asynchronous d) None 34. Combinational circ uit output depends on: a) Present inputs only âœ… b) Present & past inputs c) Clock d) State 35. Sequential circuit output depends on: a) Present inputs only b) Present & past inputs âœ… c) Clock only d) None 36. Boolean expression simplification reduces: a) Gate coun t âœ… b) Power consumption âœ… c) Complexity âœ…

d) All âœ… 37. XOR gate is equivalent to: a) Aâ€™B + ABâ€™ âœ… b) AB + Aâ€™Bâ€™ c) A + B d) AÂ·B 38. XNOR gate is equivalent to: a) AB + Aâ€™Bâ€™ âœ… b) Aâ€™B + ABâ€™ c) A + B d) AÂ·B 39. NAND gate expression: a) (AB)â€™ âœ… b) A + B c) AB d) (A + B)â€™ 40. NOR gate expression: a) (A+B)â€™ âœ… b) A + B c) AB d) (AB)â€™ 41. Number of minterms for n variables: a) n b) 2â¿ âœ… c) nÂ² d) 2n 42. Number of maxterms for n variables: a) n b) 2â¿ âœ… c) nÂ² d) 2n 43. Canonical SOP uses: a) Minterms âœ… b) Maxterms c) Sum d) Product 44. Canonical POS uses: a) Minterms b) Maxterms âœ… c) Sum d) Product 45. Logic minimization reduces:

a) Cost âœ… b) Speed c) Complexity âœ… d) Both a & c âœ… 46. Flip-flop stores: a) 1 bit âœ… b) 2 bits c) 4 bits d) Variable 47. Latches are: a) Level triggered âœ… b) Edge triggered c) Pulse mode d) None 48. Flip-flops are: a) Level triggered b) Edge triggered âœ… c) Pulse mode d) None 49. Pulse -triggered flip -flops help avoid: a) Race around âœ… b) Memory loss c) Logic error d) Power consumption 50. Asynchronous counter also called: a) Ripple counter âœ… b) Ri ng counter c) Synchronous counter d) Johnson counter 51. Synchronous counter is: a) Ripple type b) Clocked simultaneously âœ… c) Level triggered d) None 52. 4-bit asynchronous counter counts: a) 0â€"7 b) 0â€"15 âœ… c) 0â€"31 d) 0â€"63 53. 3-bit synchronous counter max count: a) 7 âœ… b) 3

c) 8 d) 15 54. Edge triggering refers to: a) Clock rising/falling âœ… b) Clock high c) Clock low d) Pulse width 55. JK flip -flop toggles when: a) J=K=1 âœ… b) J=1, K=0 c) J=0, K=1 d) J=K=0 56. Clock frequency determines: a) Circuit speed âœ… b) Gate numbe r c) Power d) Output only 57. Race around occurs when propagation delay < pulse width: a) True âœ… b) False c) Sometimes d) None 58. Edge -triggered flip -flop avoids: a) Multiple toggles âœ… b) Memory c) Delay d) Logic error 59. MUX selects: a) One input âœ… b) All inputs c) Output d) Gate 60. DEMUX distributes: a) Input to one output âœ… b) Input to all outputs c) Gate d) None 61. SOP minimization reduces: a) AND gates b) OR gates c) Both âœ… d) XOR

62. POS minimization reduces: a) OR gates b) AND gates c) Both âœ… d) NAND 63. Universal gate can implement: a) All logic âœ… b) None c) Only OR d) Only AND 64. Flip-flop characteristic table lists: a) Inputs & outputs âœ… b) Inputs only c) Outputs only d) Clock only 65. Level -triggered latch changes state: a) Clock high âœ… b) Clock low c) Both d) Edge 66. Edge -trigger ed flip -flop changes state: a) Rising/falling âœ… b) Level high c) Level low d) None 67. Pulse mode design avoids: a) Multiple toggles âœ… b) Race c) Timing errors âœ… d) All âœ… 68. State diagram represents: a) Sequential behavior âœ… b) Combinational logic c) Input only d) Output only 69. Mealy machine faster than Moore because: a) Output depends on input âœ… 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 âœ…

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 âœ… c) No direction d) Depends on voltage 2. Forward biased diode has: a) High resistance b) Low resistance âœ… c) Infinite resistance d) Zero resistance 3. Reve rse biased diode has: a) High resistance âœ… b) Low resistance c) Zero resistance d) Low voltage 4. Zener diode is used for: a) Amplification b) Voltage regulation âœ… c) Switching d) Oscillation 5. Half-wave rectifier uses: a) 1 diode âœ… b) 2 diodes c) 4 diodes d) None 6. Full-wave rectifier uses: a) 1 diode b) 2 diodes âœ… c) 4 diodes d) None 7. Bridge rectifier uses: a) 2 diodes b) 3 diodes c) 4 diodes âœ… d) 1 diode 8. Clipper circuit: a) Clips voltage above/below reference âœ… b) Amplifies signal

c) Rectifies signal d) Filters signal 9. Clamper circuit: a) Shifts signal DC level âœ… b) Clips voltage c) Rectifies d) Amplifies 10. Bipolar junction transistor (BJT) has: a) 2 terminals b) 3 terminals âœ… c) 4 terminals d) 5 terminals 11. BJT modes: a) Active âœ… b) Cut -off âœ… c) Saturation âœ… d) All âœ… 12. Common emitter configuration provides: a) Voltage gain âœ… b) Current gain âœ… c) Power gain âœ… d) All âœ… 13. Common base configuration has: a) Current gain <1 âœ… b) Voltage gain high âœ… c) Input low d) Output low 14. Common collector configuratio n is also called: a) Emitter follower âœ… b) Base follower c) Collector follower d) None 15. BJT used as switch operates in: a) Active region b) Cut -off & saturation âœ… c) Reverse bias d) None 16. Load line represents: a) Relationship between V & I âœ… b) Current only c) Voltage only

d) None 17. Stability factor determines: a) BJT bias stability âœ… b) Voltage c) Current d) Resistance 18. Small signal model of BJT uses: a) h-parameters âœ… b) Z-parameters c) Y-parameters d) None 19. Voltage gain of CE amplifier: a) High âœ… b) Low c) Zer o d) Negative 20. Current gain of CE amplifier: a) High âœ… b) Low c) Zero d) Negative 21. Input impedance of CB amplifier: a) High b) Low âœ… c) Medium d) Variable 22. Output impedance of CE amplifier: a) Low b) High âœ… c) Medium d) Variable 23. Field effect transistor (FET) has: a) High input impedance âœ… b) Low input impedance c) Medium d) Variable 24. JFET gate is: a) Forward biased b) Reverse biased âœ… c) Floating d) None 25. MOSFET can be:

a) Depletion type âœ… b) Enhancement type âœ… c) Both âœ… d) None 26. FET operates on: a) Voltage contr ol âœ… b) Current control c) Both d) None 27. Diodeâ€™s knee voltage ~ a) 0.7V for silicon âœ… b) 0.3V for silicon c) 0.7V for germanium d) 0.3V for germanium 28.

Zener voltage is: a) Breakdown voltage âœ… b) Forward voltage c) Knee voltage d) None 29. Half-wave rectifier out put frequency = a) Input frequency b) Same as input âœ… c) Twice input d) Half input 30. Full-wave rectifier output frequency = a) Same as input b) Twice input âœ… c) Half input d) None 31. Capacitor filter removes: a) AC ripples âœ… b) DC c) Voltage d) Current 32. Diode re verse recovery time: a) Time to turn off âœ… b) Time to turn on c) Forward voltage d) None 33. Transistor as amplifier operates in: a) Cut -off b) Active âœ…

c) Saturation d) Reverse 34. Transistor as switch operates in: a) Active b) Cut -off & saturation âœ… c) Reverse d) None 35. BJT has: a) Base, emitter, collector âœ… b) Gate, source, drain c) Emitter, collector d) None 36. FET has: a) Base, collector, emitter b) Gate, source, drain âœ… c) Input, output d) None 37. MOSFET input impedance: a) Low b) Very high âœ… c) Medium d) Variable 38. Clipper removes: a) Part of waveform âœ… b) Entire waveform c) DC d) AC 39. Clamper shifts: a) DC level âœ… b) AC level c) Both d) None 40. Forward biased diode resistance: a) High b) Low âœ… c) Infinite d) Zero 41. Reverse biased diode leakage current: a) High b) Low âœ… c) Zero d) Medium

42. Power dissipation in transistor: a) VCE Ã— IC âœ… b) VBE Ã— IB c) IC Ã— IB d) None 43. CE amplifier phase shift: a) 0Â° b) 180Â° âœ… c) 90Â° d) None 44. CB amplifier phase shift: a) 0Â° âœ… b) 180Â° c) 90Â° d) None 45. CC amplifier phase shift: a) 0Â° âœ… b) 180 Â° c) 90Â° d) None 46. Small signal model helps determine: a) Gain âœ… b) Impedance âœ… c) Both âœ… d) None 47. Junction diode symbol: a) Triangle â†' line âœ… b) Line â†' triangle c) Circle d) Square 48. Zener diode symbol: a) Line with bent bar âœ… b) Triangle â†' line c) Circle d) Square 49. Half-wave rectifier uses: a) Transformer âœ… b) Diode âœ… c) Capacitor âœ… d) All âœ… 50. Full-wave rectifier bridge has: a) 2 diodes

b) 4 diodes âœ… c) 3 diodes d) 1 diode 51. Peak inverse voltage (PIV) in diode: a) Max reverse voltage âœ… b) Forward voltage c) Average voltage d) None 52. Transistor cutoff: a) IB=0 âœ… b) IC=0 c) VCE small d) Active 53. Transistor saturation: a) VCEâ‰ˆ0 âœ… b) ICâ‰ˆ0 c) IBâ‰ˆ0 d) Active 54. JFET operates: a) Forward biased âœ… b) Reverse biased c) Zero bias d) None 55. MOSFET enhancement mode needs: a) Gate voltage âœ… b) Gate current c) Source voltage d) Drain voltage 56. MOSFET depletion mode: a) Naturally conducting âœ… b) Needs gate voltage c) Switch off d) None 57. Load line intersects: a) DC and AC curves âœ… b) Input curve c) Output curve d) None 58. Diode cut -in voltage: a) Minimum voltage to conduct âœ… b) Maximum c) Zero

d) Infinite 59. Voltage multiplier uses: a) Diodes & capacitors âœ… b) Transistors c) Resistors d) Inductors 60. Zener regulator provides: a) Constant voltage âœ… 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 âœ… c) Memory chip d) Input device 2. Difference between microprocessor and microcontroller: a) Microprocessor lacks RAM/ROM âœ… b) Microcontroller has built -in RAM/ROM âœ… c) Both a & b âœ… d) None 3. 8086/8088 belongs to: a) 4-bit family b) 8-bit family c) 16 -bit family âœ… d) 32 -bit family 4. 8086 has: a) 8-bit data bus b) 16 -bit data bus âœ… c) 32 -bit data bu s d) 64 -bit data bus 5. Memory segmentation in 8086: a) Code, data, stack, extra âœ… b) Input, output c) Registers only d) None 6. Instruction set of 8086 contains: a) Data transfer âœ… b) Arithmetic âœ… c) Logical âœ… d) All âœ…

7. Addressing mode specifies: a) How to acces s operands âœ… b) Data size c) Clock d) Power 8. Immediate addressing uses: a) Constant value âœ… b) Memory address c) Register d) Input 9. Register addressing uses: a) CPU register âœ… b) Memory c) Input d) Constant 10. Direct addressing uses: a) Memory address âœ… b) Regi ster c) Immediate d) Port 11. Indirect addressing uses: a) Register contains address âœ… b) Memory contains address c) Immediate d) Port 12. Single -processor system has: a) One CPU âœ… b) Multiple CPUs c) None d) All 13. Multi -processor system: a) One CPU b) Multiple CPUs âœ… c) None d) All 14. Assembler converts: a) Assembly â†' Machine code âœ… b) High - level â†' Assembly c) Machine â†' Assembly d) None 15. Debugger is used for: a) Detecting errors âœ…

b) Writing code c) Compiling d) Executing only 16. 8255A is: a) Programmable Peripheral Interf ace âœ… b) Timer c) DMA d) Memory 17. 8254 is: a) Programmable interval timer âœ… b) PPI c) Interrupt controller d) UART 18. Keyboard interfacing can be done via: a) 8255 âœ… b) 8254 c) 8259 d) DMA 19. LCD interfacing uses: a) 8255 âœ… b) 8254 c) 8259 d) None 20. Printer interfac ing uses: a) Parallel âœ… b) Serial c) Both âœ… d) None 21. Stepper motor interfacing: a) 8255 âœ… b) 8259 c) 8254 d) None 22. A/D converter converts: a) Analog â†' Digital âœ… b) Digital â†' Analog c) Voltage d) Current 23. D/A converter converts: a) Analog â†' Digital b) Digital â†' Analog âœ… c) Both

d) None 24. 8259A is: a) Programmable interrupt controller âœ… b) Timer c) PPI d) DMA 25. Interrupt vector table stores: a) Addresses of interrupt routines âœ… b) Data c) Instructions d) None 26. DMA stands for: a) Direct Memory Access âœ… b) Dynamic Memory Access c) Dual Memory Access d) Data Memory Access 27. Serial communication can be: a) Synchronous âœ… b) Asynchronous âœ… c) Both âœ… d) None 28. EIA RS232 is: a) Physical communication standard âœ… b) Protocol c) Memory d) Timer 29. Microprocessor clock controls: a) Instruction timing âœ… b) Data c) Voltage d) Current 30. Bus demultiplexer separates: a) Address & data lines âœ… b) Input lines c) Output lines d) Power 31. Bus controller manages: a) Data transfer âœ… b) Instruction fetch c) Clock d) None 32. Programmed I/O means:

a) CPU actively polls âœ… b) CPU interrupts c) DMA d) None 33. Interrupt driven I/O: a) CPU waits b) CPU responds to interrupt âœ… c) CPU ignores d) None 34. Parallel I/O port transfers: a) 1 bit b) Multiple bits simultaneously âœ… c) Serially d) None 35. SRAM stands for: a) Static RAM âœ… b) Serial RAM c) Synchronous RAM d) None 36. EEPROM stands for: a) Electrically Erasable Programmable ROM âœ… b) RAM c) Flash d) None 37. Clock generator produces: a) Timing pulses âœ… b) Data c) Instructions d) None 38. Stepper m otor moves in: a) Continuous rotation b) Steps âœ… c) Random d) None 39. Timer applications include: a) Delay âœ… b) Event counting âœ… c) Pulse generation âœ… d) All âœ… 40. Asynchronous serial communication uses: a) Start & stop bits âœ… b) Clock

c) Both d) None 41. Microproces sor I/O address decoding ensures: a) Correct device access âœ… b) Timing c) Speed d) None 42. Interrupt vector points to: a) Interrupt routine âœ… b) Main program c) Data d) Timer 43. Single -step execution helps in: a) Debugging âœ… b) Speeding c) Storage d) Communicati on 44. Flag registers store: a) Status âœ… b) Data c) Address d) Control 45. Carry flag is set when: a) Addition exceeds limit âœ… b) Subtraction negative c) Overflow d) Zero 46. Zero flag is set when: a) Result = 0 âœ… b) Result > 0 c) Carry occurs d) None 47. Sign flag indica tes: a) Positive/negative âœ… b) Zero c) Carry d) Overflow 48. Parity flag checks: a) Even/odd bits âœ… b) Zero c) Carry d) Sign

49. Program counter stores: a) Next instruction address âœ… b) Current instruction c) Data d) Stack pointer 50. Stack pointer points to: a) Top of stack âœ… b) Bottom c) Memory d) None 51. PUSH instruction: a) Store in stack âœ… b) Retrieve from stack c) Clear stack d) None 52. POP instruction: a) Store b) Retrieve âœ… c) Clear d) None 53. Software interrupt generated by: a) Instruction âœ… b) External device c) Timer d) DMA 54. Hardware interrupt generated by: a) Device âœ… b) Instruction c) Program d) Memory 55. Instruction cycle includes: a) Fetch âœ… b) Decode âœ… c) Execute âœ… d) All âœ… 56. Data bus width determines: a) Data size per transfer âœ… b) Address c) Instruction d) Clock 57. Address bus width determines: a) Maximum memory accessible âœ…

b) Data size c) Instruction size d) Clock 58. Control signals include: a) RD, WR âœ… b) ALE âœ… c) INTA âœ… d) All âœ… 59. Microprocessor interfacing requires: a) Address decoding âœ… b) Timing c) Data bus d) All âœ… 60. Multi-processor system advantage: a) High speed âœ… b) Parallel processing âœ… c) Reliability âœ… d) All âœ… Communication Theory (~50 MCQ) 1. Fourier series represents: a) Continuous signals âœ… b) Discrete signals c) Both d) None 2. Fourier transform converts: a) Time → Frequency âœ… b) Frequency → Time c) Voltage → Current d) None 3. Convolution in time domain equals: a) Multiplication in frequency domain âœ… b) Addition c) Subtraction d) Division 4. Parseval's theorem relates: a) Energy in time & frequency âœ… b) Power c) Voltage d) Current 5. Entropy in information theory measures: a) Uncertainty âœ…

b) Speed c) Bandwidth d) Amplitude 6. Shannon's theorem gives: a) Maximum channel capacity âœ… b) Minimum noise c) Maximum power d) None 7. Channel capacity depends on: a) Bandwidth âœ… b) Signal-to-noise ratio âœ… c) Both âœ… d) None 8. Analog modulation includes: a) AM âœ… b) FM âœ… c) PM âœ… d) All âœ… 9. AM stands for: a) Amplitude Modulation âœ… b) Angular Modulation c) Analog Modulation d) None 10. FM stands for: a) Frequency Modulation âœ… b) Phase Modulation c) Amplitude Modulation d) None 11. PM stands for: a) Phase Modulation âœ… b) Frequency Modulation c) Amplitude Modulation d) None 12. Modulation purpose: a) Efficient transmission âœ… b) Amplification c) Rectification d) None 13. Demodulation recovers: a) Original signal âœ… b) Noise c) Carrier

d) None 14. Pulse Amplitude Modulation (PAM) uses: a) Amplitude of pulses âœ… b) Frequency c) Phase d) None 15. Pulse Code Modulation (PCM) is: a) Digital modulation âœ… b) Analog modulation c) Hybrid d) None 16. Delta modulation (DM) encodes: a) Difference between samples âœ… b) Absolute value c) Average d) None 17. Adaptive delta modulation (ADM) adjusts: a) Step size âœ… b) Frequency c) Phase d) None 18. Time-Division Multiplexing (TDM) divides: a) Time slots âœ… b) Frequency c) Phase d) None 19. Frequency-Division Multiplexing (FDM) divides: a) Frequency âœ… b) Time c) Phase d) None 20. TDMA is: a) Time-division multiple access âœ… b) Frequency-division c) Code-division d) None 21. FDMA is: a) Time-division b) Frequency-division multiple access âœ… c) Code-division d) None 22. CDMA uses:

a) Codes to separate users âœ… b) Time slots c) Frequency bands d) None 23. Nyquist sampling theorem states: a) Fs ≥ 2 × fmax âœ… b) Fs < fmax c) Fs = fmax d) None 24. Aliasing occurs if: a) Fs < 2 × fmax âœ… b) Fs ≥ 2 × fmax c) Fs = 2 × fmax d) None 25. SNR stands for: a) Signal-to-Noise Ratio âœ… b) Signal-to-Number c) Sound-to-Noise d) None 26. Power spectrum represents: a) Distribution of power over frequency âœ… b) Time c) Amplitude d) None 27. Baseband signal is: a) Original signal âœ… b) Modulated signal c) Carrier d) None 28. Bandpass signal is: a) Centered around carrier âœ… b) Original signal c) Noise d) None 29. AM modulated signal has: a) Carrier + sidebands âœ… b) Carrier only c) Sidebands only d) None 30. FM bandwidth depends on: a) Frequency deviation âœ… b) Amplitude

c) Phase d) None 31. PM bandwidth depends on: a) Phase deviation âœ… b) Frequency c) Amplitude d) None 32. Coherent detection used for: a) AM demodulation âœ… b) FM c) PM d) None 33. Envelope detection used for: a) AM âœ… b) FM c) PM d) None 34. Multiplexing purpose: a) Efficient utilization âœ… b) Amplification c) Modulation d) None 35. Information rate formula: a) R = H × symbols/sec âœ… b) R = H × f c) R = P × t d) None 36. Signal bandwidth affects: a) Data rate âœ… b) Power c) Voltage d) None 37. Noise degrades: a) SNR âœ… b) Bandwidth c) Time d) None 38. Shannon capacity formula: a) C = B log2(1 + S/N) âœ… b) C = B × S/N c) C = B / S/N d) None

39. Analog vs digital communication: a) Analog continuous âœ… b) Digital discrete âœ… c) Both correct âœ… d) None 40. Multiplexing reduces: a) Number of channels âœ… b) Bandwidth c) Noise d) None 41. Demultiplexer separates: a) Combined signals âœ… b) Carrier c) Modulation d) None 42. Fourier series uses: a) Sin & cos âœ… b) Exponential only c) Step function d) None 43. Power spectrum integral = a) Signal energy âœ… b) Noise c) Bandwidth d) None 44. Pulse duration affects: a) Bandwidth âœ… b) Power c) Noise d) None 45. PCM uses: a) Sampling âœ… b) Quantization âœ… c) Encoding âœ… d) All âœ… 46. Delta modulation advantage: a) Simple âœ… b) Requires low bandwidth âœ… c) Adaptive possible âœ… d) All âœ… 47. CDMA allows:

a) Multiple users âœ… b) Single user c) Only one channel d) None 48. Nyquist rate = a) 2 × fmax âœ… b) fmax c) fmax / 2 d) None 49. Pulse shaping reduces: a) Inter-symbol interference âœ… b) Noise c) Bandwidth d) None 50. Communication system goal: a) Reliable data transfer âœ… b) Maximum noise c) Minimum bandwidth d) None Computer Networking & Security (~60 MCQ) 1. Protocol hierarchy defines: a) Layered communication âœ… b) Hardware only c) Software only d) None 2. Data link layer provides: a) Reliable link âœ… b) Routing c) Application d) Transport 3. HLDC stands for: a) High-Level Data Link Control âœ… b) High-Level Device Control c) Hardware Link Device Control d) None 4. LAN protocols include: a) IEEE 802.3 âœ… b) IEEE 802.11 âœ… c) Both âœ… d) None 5. Hub operates at: a) Physical layer âœ…

b) Data link c) Network d) Transport 6. Switch operates at: a) Physical b) Data link âœ… c) Network d) Transport 7. Bridge connects: a) Two LANs âœ… b) Two computers c) Router d) None 8. FDDI uses: a) Fiber optic âœ… b) Copper c) Wireless d) None 9. Fast Ethernet speed: a) 10 Mbps b) 100 Mbps âœ… c) 1 Gbps d) 10 Gbps 10. Routing algorithm decides: a) Path selection âœ… b) Bandwidth c) Speed d) None 11. Congestion control prevents: a) Network overload âœ… b) Data loss c) Security d) None 12. Internetworking involves: a) Connecting LANs/WANs âœ… b) Hardware only c) Software only d) None 13. Fragmentation occurs when: a) Packet > MTU âœ… b) Packet < MTU c) Router fails

d) None 14. Firewall purpose: a) Network security âœ… b) Routing c) Switching d) None 15. IPV4 address length: a) 32 bits âœ… b) 64 bits c) 128 bits d) 16 bits 16. IPV6 address length: a) 32 bits b) 64 bits c) 128 bits âœ… d) 16 bits 17. ARP resolves: a) IP → MAC âœ… b) MAC

→ IP c) Port → IP d) None 18. RARP resolves: a) MAC → IP âœ… b) IP → MAC c) Port → IP d) None 19. Mobile IP enables: a) Device mobility âœ… b) Routing c) Switching d) None 20. Transport protocol for reliable communication: a) TCP âœ… b) UDP c) ICMP d) None 21. TCP provides: a) Connection -oriented âœ… b) Error checking âœ… c) Flow control âœ… d) All âœ… 22. UDP provides:

a) Connectionless âœ… b) No guarantee âœ… c) Both âœ… d) None 23. AAL of ATM: a) Adaptation layer âœ… b) Application layer c) Transport layer d) None 24. Network security includes: a) Cryptography âœ… b) Authentication âœ… c) Digital signatures âœ… d) All âœ… 25. DES stands for: a) Data Encryption Standard âœ… b) Digital Encryption Standard c) Data Encoding System d) None 26. IDEA stands for: a) International Data Encryption Algorithm âœ… b) Data Encryption Algorithm c) Information Encoding d) None 27. Public key algorithm uses: a) Two keys âœ… b) One key c) Both d) None 28. Authentication ensures: a) Identity verification âœ… b) Data transfer c) Speed d) None 29. Digital signature ensures: a) Authentication âœ… b) Integrity âœ… c) Both âœ… d) None 30. Gigabit Ethernet speed: a) 100 Mbps

b) 1 Gbps âœ… c) 10 Gbps d) None 31. DNS resolves: a) Domain → IP âœ… b) IP → Domain c) MAC → IP d) None 32. Name servers store: a) Domain name info âœ… b) IP only c) MAC only d) None 33. Email privacy is ensured by: a) Encryption âœ… b) Routing c) Firewall d) None 34. SNMP stands for: a) Simple Network Management Protocol âœ… b) Secure Network c) Standard Ne twork d) None 35. HTTP operates at: a) Application layer âœ… b) Transport c) Network d) Data link 36. HTTPS ensures: a) Secure HTTP âœ… b) Fast HTTP c) Normal HTTP d) None 37. LAN uses: a) Ethernet âœ… b) FDDI âœ… c) Both âœ… d) None 38. WAN connects: a) Large area networks âœ… b) Si ngle computer c) Router only

d) None 39. Fragmentation handled by: a) Network layer âœ… b) Transport c) Data link d) None 40. IPV4 provides: a) 4 billion addresses âœ… b) 1 billion c) 128 bit d) None 41. IPV6 provides: a) 128 -bit address âœ… b) 32 -bit c) 64 -bit d) None 42. TCP uses: a) Three -way handshake âœ… b) UDP c) ICMP d) None 43. UDP uses: a) No handshake âœ… b) Handshake c) Connection -oriented d) None 44. Firewalls can be: a) Packet filtering âœ… b) Proxy âœ… c) Both âœ… d) None 45. Cryptography converts: a) Plaintext → Ciphertext âœ… b) Ciphert ext → Plaintext c) Data only d) None 46. VPN ensures: a) Secure private network âœ… b) Open network c) LAN only d) None 47. Transport layer manages:

a) End -to-end communication âœ… b) Node -to-node c) Data link d) Physical 48. ARP used in: a) Local network âœ… b) Internet c) WAN d) None 49. RARP used to: a) Assign IP from MAC âœ… b) Assign MAC c) DNS d) None 50. ICMP used for: a) Error reporting âœ… b) Data transfer c) Encryption d) None 51. SMTP used for: a) Sending emails âœ… b) Receiving emails c) Browsing d) None 52. POP3 used for: a) Receiving emails âœ… b) Sending emails c) Browsing d) None 53. IMAP used for: a) Receiving emails âœ… b) Sending c) Browsing d) None 54. VPN tunnel provides: a) Encrypted path âœ… b) Open path c) Wireless path d) None 55. Network congestion occurs due to: a) Excessive tr affic âœ… b) Low traffic

c) Short cable d) None 56. Routing algorithms include: a) Distance vector âœ… b) Link state âœ… c) Both âœ… d) None 57. MAC address is: a) Hardware address âœ… b) IP address c) Domain name d) None 58. IPv4 address written in: a) Dot -decimal âœ… b) Hex c) Binary only d) None 59. IPv6 address written in: a) Hexadecimal âœ… b) Decimal c) Binary d) None 60. Network layer provides: a) Logical addressing âœ… b) Physical addressing c) Transport d) Application