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312316-Electronic Materials & Components (Sem II)

**As per MSBTE's K Scheme
DE / EJ / ET / EX / IE / MU**

Unit 4:

Printed Circuit Boards (12 Marks)

1). Metal surfaces of smaller areas embedded in PCB's are _____?

1. Traces
2. Planes
3. Targets
4. Regions

A firm structure containing an electrical circuit made of metal surface known as traces and metals having large areas known as planes are embedded in it known as PCB.

2). What is a firm structure with targets and planes embedded in it known as?

1. Electrical Device
2. Machine
3. System
4. PCB

The process of designing a PCB is the combination of placing components along with proper routing to ensure electrical connection.



3). Metals of large areas embedded in PCB are known as ____?

1. Traces
- 2. Planes**
3. Targets
4. Regions

A firm structure containing an electrical circuit made of metal surface known as traces and metals having large areas known as planes are embedded in it known as PCB.

4). Where the components placed on the board are soldered?

1. Traces
2. Planes
- 3. Metal Pads**
4. Regions

On board, the components placed are soldered onto the pads made of metals.

5). What allows the components on board to form interconnections?

1. Traces
2. Planes
- 3. Metal Pads**
4. Regions

On board, the components placed are soldered onto the pads made of metals.

6). How many layers does a PCB have?

1. Single
2. Double
3. Multiple
- 4. All Mentioned Above**

Board design can either consist of single, double, or maybe multiple layers based on the requirement.





7). Dielectric core used in PCB design have _____ electrical conduction?

- 1. **Poor**
- 2. High
- 3. Severe
- 4. Highest

Dielectric core form of materials that have poor properties of electrical conduction are used to build the boards.

8). What ensures pure transmission in PCB design?

- 1. Traces
- 2. Planes
- 3. Metal Pads
- 4. **Dielectric Core**

Dielectric core form of materials that have poor properties of electrical conduction are used to build the boards.

9). Dielectric material utilized in the PCBs is _____?

- 1. Resistant
- 2. PadsMetal
- 3. **Traces Flame**
- 4. Resistant

Flame-resistant used in PCB is a composite of Epoxy resin and Woven cloth made of fiberglass and referred to as FR-4.

10). Flame-resistant in PCB design consists of _____?

- 1. Epoxy Resin
- 2. Woven Fiberglass Cloth
- 3. Resistant
- 4. **a& b**

Dielectric core form of materials that have poor properties of electrical conduction are used to build the boards.

11). Traces and planes utilized in PCB designing comprises of _____?

- 1. Lead
- 2. **Copper**
- 3. Silver
- 4. Titanium



A firm structure containing an electrical circuit made of metal surface known as traces and metals having large areas known as planes are embedded in it known as PCB.

12). What are the various classes of PCB?

1. Class 12. Class 2 3. Class 3 **4.All Mentioned Above**

For various purposes, PCBs are used. Based on quality and reliability PCBs are classified.

13). What does a class of PCB determine?

1. Reliability of Design 2. Quality of Design 3.Quantity of Design **4.a & b**

For various purposes, PCBs are used. Based on quality and reliability PCBs are classified.

14). Which board is designated for consumer electronics?

- 1. Class 1** 2.Class 2 3.Class 3 4. Class 4

Based on the distinguishing characteristics PCBs are classified among various classes of which class 1 is for basic needs.

15). Where does a class 2 PCB is used?

1. High Reliability 2. Concerned Failure 3.MinimizedConsumer Electronics **4.a& b**

Reliability must be high in class 2 PCBs but not up to that crucial extent.

16). What class PCBs are used in minimizing failures?

- 1.Class 1 **2.Class 2** 3. Class 3 4. Class 4

Reliability is an important feature of Class 2 boards and are capable of minimizing failures.

**17). Which class PCB has the most exact standard of manufacturing?**

1. Class 1 2. Class 2 **3. Class 3** 4. Class 4

PCBs in airplanes make use of boards of class 3.

18). What are the general categories of PCBs?

1. Rigid 2. Flex 3. Metal-core **4. All Mentioned Above**

Based on the type of substrate placed and its nature PCBs are generally classified into Rigid, Flex, and Metal-core boards.

19). What category of PCBs are available in vast majorities?

- 1. Rigid** 2. Flex 3. Metal-core 4. All Mentioned Above

The layout of the PCB consists of a substrate i.e., rigid, and are known as Rigid boards.

20). How does the rigid PCB substrate is created?

1. High Heat 2. Pressure Lamination 3. Low Heat **4. a & b**

Rigid substrate used in PCB makes its availability vast and it is created using high heat and by the pressure laminating process.

21). FR-4 is commonly used in _____?

- 1. Rigid** 2. Flex 3. Metal-core 4. All Mentioned Above

The layout of the PCB consists of a substrate i.e., rigid, and are known as Rigid boards.





22). Greater deflection is offered by _____ boards?

- 1.Rigid 2. **Flex** 3. Metal-core 4.All Mentioned Above

Flexible boards are made of less rigid materials.

23). Flexible boards have ____ thickness compared to standard boards?

1. **Less** 2. More 3. Severe 4.Moderate

Flexible boards have a material i.e., less rigid and the material is reminiscent of Film roll.

24). Which boards have the increase in the ability of heat dissipation?

1. Rigid 2.Flex3. **Metal-core** 4. All Mentioned Above

Increased abilities of heat dissipation leads to the circuit protection in boards made of Metal-core.

25). Metal-core PCBs are used in _____?

1. **High Current Designs** 2. Low Current Designs3. High Voltage Designs4. Low Voltage Designs

Metal-core PCBs with higher material conductivity offers faster transfer of heat.

PCB Design MCQs for Quiz



**26). How a PCB board can be designed initially?**

1. Using a Hardware **2. Using CAD Tools** 3. Using Electronic Devices 4. Using Equipment's
Initial step in designing PCB is having a Schematic capture and it is possible by using CAD tools.

27). What are the categories involved in designing a PCB?

1. Schematic Capture 2. PCB Layout 3. Equipment's **4.a& b**

PCB is built after it is designed using CAD Tools.

28). What describes the circuit connections in the diagram of PCB design?

1. **Schematic Capture** 2. PCB Layout 3. Equipment's 4.a & b

Circuit connections in the diagram form of a particular PCB can be drawn using CAD tools and a schematic is obtained.

29). What is the final category in building a PCB?

1. Schematic Capture **2.PCB Layout** 3. Equipment's 4.a& b

Actual physical board obtained from the schematic is PCB Layout.

30). What is included in library CAD parts in PCB design?

1. Schematic Symbols

2. Simulation Models





3. PCB Layout Footprints

4.All Mentioned Above

Developing a library of CAD-required parts in designing a PCB is the foremost step.

31). Three-dimensional PCB display step models are present in _____?

1. Library of CAD Parts 2.Layout 3.Hardware 4. Routing

Developing a library of CAD-required parts in designing a PCB is the foremost step.

32). What is the further step in PCB design after the libraries get ready?

- 1.Logical Presentation 2.Layout 3.Hardware 4. Routing

After library tools get ready they must be represented logically for further processing.

33). What is used in placing symbols on a sheet of the schematic in PCB design?

1. CAD Tools 2. Layout 3.Hardware 4. Routing

To place symbols on the schematic sheet and connect it forming a circuit requires CAD Tools.

34). What verifies whether the circuit connections work properly?

1. Logical Presentation 2. Layout 3.Simulation 4.Routing

After the simulation run verifies the proper connectivity schematic sends their data regards to connectivity to the layout.



35). What connects pins of components in PCB?

- 1.Traces 2.Planes **3. Nets** 4.Points

After the connectivity is received from the schematic it is processed further and the pins of components are connected.

36). What happens in the Layout of PCB?

- 1.Schematic Received 2.Components are Organized 3.Nets are Connected **4. All Mentioned Above**

After the connectivity is received from the schematic it is processed further and the pins of components are connected.

37). What governs the space and widths require in completing a design?

- 1.CAD Tools** 2. Layout 3.Hardware 4. Routing

To place symbols on the schematic sheet and connect it forming a circuit requires CAD Tools.

38). _____ is the other phase in process of designing a board where the bill of materials from schematics is verified?

- 1.CAD Tools **2. Pre-Layout** 3.Hardware 4. Routing

Obsolete components and long-lead components of time BOM is verified from the schematics provided.

**39). Validation in pre-layout of PCB design involves verification of _____?**

1. Manufacturer Part Numbers 2. Vendor Part Numbers 3. Virtual Private Network
4.a& b

Obsolete components and long-lead components of time BOM is verified from the schematics provided.

40). What prevents traces from connecting one of the nets to another?

1. **CAD Tools** 2. Layout 3. Hardware 4. Routing

To place symbols on the schematic sheet and connect it forming a circuit requires CAD Tools.

41). What are the steps involved in PCB Layout?

1. Setting Board Parameters 2. Determining Outline 3. Routing Components **4.All Mentioned Above**

After the connectivity is received from the schematic it is processed further and the pins of components are connected.

42). Logic symbols for implementation of various parts are created in _____?

1. **Schematic Symbols** 2. Simulation Models 3. PCB Layout Footprints 4. All Mentioned Above





Logic symbols of various parts like Resistors, Inductors, Capacitors, ICs, and connectors are created using Schematic symbols.

43). During _____ parts of the process are moved in PCB design?

1. Schematic Symbols 2. Simulation Models 3.PCB Layout Footprints 4.Schematic Capture

Process parts moved as required in creating a schematic that must be clear and legible.

44). What is the further step in PCB design after the schematic?

1.Schematic Symbols **2. Simulation Models** 3.PCB Layout Footprints 4.CAD Tool Setup

To verify whether the designed circuit works as it is intended after schematic completion will undergo simulation.

45). What is the Integrated Circuit Emphasis Tool used in PCB Design?

1. SPICE 2. MATLAB 3.Linux 4.DOS

Engineers while designing PCB test the schematic using simulation tools known as SPICE.

46). What is the common variety of PCBs available?

1. Single-sided 2.Double-sided 3. Multilayer 4. Rigid

Electrical components are placed on boards at a particular side in single-sided PCBs.



47). Which type of PCB has a single layer of conduction?

1. **Single-sided** 2. Double-sided 3. Multilayer 4. Rigid

Single layer of copper is placed above the substrate and has etched the entire circuit on another side in a Single-sided PCB.

48). How many conducting layers are present in Single-sided PCB?

1. **One** 2. Two 3. Three 4. Four

Paths of conduction in single-sided PCBs don't overlap because of one layer of conduction.

49). Why do single-sided PCBs accommodate or require more space?

1. **One Conduction Layer** 2. Two Conduction Layers 3. Multiple Conduction Layers

Single layer of copper is placed above the substrate and has etched the entire circuit on another side in a Single-sided PCB.

50). _____ are used for Low-density Design requirements?

1. **Single-sided** 2. Double-sided 3. Multilayer 4. Rigid

Single layer of copper is placed above the substrate and has etched the entire circuit on another side in a Single-sided PCB.

51). What are the various applications of Single-sided PCBs?

1. Calculators 2. LED Lighting Boards 3. FM Radios 4. **All Mentioned Above**



Single-sided PCB is the most common variety of PCB and is preferred in Low-cost instruments.

52). Which of the PCB s are easier to repair?

1.**Single-sided** 2. Double-sided 3.Multilayer 4. Rigid

Single layer of copper is placed above the substrate and has etched the entire circuit on another side in a Single-sided PCB.

53). What are the advantages of Single-side PCBs?

1.**Cost-Effective** 2. Hard to Manufacture 3.Hard to Repair 4. Difficult to Design

Due to the single conduction layer in single-sided PCBs the cost of manufacture is reduced.

54). Conducting layer added on bottom and top of board in _____ PCBs.

1.Single-sided 2.**Double-sided** 3. Multilayer 4. Rigid

Based on the conduction layer present on the sides PCBs are classified into double-sided PCBs.

55). What connects the metallic parts on the Double-sided board of PCBs?

1. Traces 2. Planes 3. Regions 4.**Holes**





Holes on the board make it possible to connect the metallic part of a side to another one by drilling.

56). What are the various methods of mounting used in connecting PCBs?

1. Surface Mount Technology 2. Through-hole Technology 3. **a& b** 4. None

There exist two methods used in PCBs to mount the devices.

57). Which technology makes the components to be inserted on board with Pre-drilled holes?

1.Surface Mount Technology 2. **Through-hole Technology** 3.a & b 4.None

Lead components are installed through the holes present on board and are pre-drilled in Through-hole technology.

58). Which technology ensures the placement of components precisely on the board's surface?

1. **Surface Mount Technology** 2. Through-hole Technology 3.a& b 4. SPICE

Components are placed on the surface of the boards precisely using Surface-Mount Technology.

59). UPS systems contain _____ PCBs?

1.Single-sided 2. **Double-sided** 3.Multiplayer 4.Rigid

Increase in the density of the circuits because of conduction layers present on the bottom and top of the boards in double-sided PCBs.



60). What are the various applications involving Double-sided PCBs?

1.Cell Phone Systems 2. Power Monitoring 3.Amplifiers 4.**All Mentioned Above**

Increase in the circuit density of double-sided PCBs makes it used conveniently in Advanced electronics.

61). What are the various advantages of double-sided PCBs?

1.Reduced Size 2.More Flexible 3. Compact Circuit 4.**All Mentioned Above**

Double-sided PCBs consist of conduction layers on both sides increasing the circuit density.

62). How many layers of copper does a Multilayer PCB have?

1.Zero 2. One 3.Two 4. **More Than Two**

At least there must be three layers of conduction to make it a Multilayer PCB.

63). Complex devices and circuits make use of _____ PCBs?

1.Single-sided 2. Double-sided 3.**Multilayer** 4. Rigid

Multilayer PCBs have multiple layers of conduction making them worth using in complex circuitry.

64). GPS Trackers uses _____ boards?

1. Single-sided 2. Double-sided 3.**Multilayer** 4. Rigid

Multilayer PCBs have multiple layers of conduction making them worth using in complex circuitry.

65). What are the various applications of multilayer PCBs?

1. Medical Equipment's 2. GPS Trackers 3. Laptops 4. **All Mentioned Above**

Multilayer PCBs are used in complex circuits.

66). _____ is not the application of Multilayer PCB?

1. **Amplifiers** 2. Medical Equipment 3. Laptops 4. GPS Trackers

Double-side layer PCBs with an increase in component density are used in amplifiers.

67). Which PCBs have higher levels of flexibility in terms of design?

1. Single-sided 2. Double-sided 3. **Multilayer** 4. Rigid

Multiple layer PCBs are more robust compared to other types of PCBs.

68). What are the various advantages of Multilayer PCBs?

1. Compact Size 2. Used in High-Speed Circuits 3. Design Flexibility is High 4. **All Mentioned Above**

More than two layers of copper are present in multilayer PCBs.

69). What are the various layers composed in Rigid PCBs?

1. Substrate Layer 2. Copper Layer 3. Solder Mask Layer 4. **All Mentioned Above**

All layers in Rigid PCBs together adhere with heat and adhesives.



70). MRI systems uses _____ PCBs?

1. Rigid 2. Flex 3. Rigid-flex 4. Robust

PCBs that are not folded or twisted are known as Rigid PCBs.

71). What PCBs can absorb vibrations?

1. Rigid 2. Flex 3. Rigid-flex 4. Robust

Rigid PCBs after manufacture are unable to modify or change.

72). What are the various advantages of Rigid PCBs?

1. Ease of Diagnostics 2. Ease of Repair 3. Low Electric Noise 4. All Mentioned Above

PCBs that are not folded or twisted are known as Rigid PCBs.

73). Flexible PCBs are made of _____?

1. Polyamide 2. Transparent Conductive Polyester Film 3. Polyethylene 4. a & b

PCBs contain the flexible type of substrate known as Versatile PCBs.

74). _____ are used in the fabrication of OLEDs.

1. Rigid 2. Flex 3. Rigid-flex 4. Robust

Flex PCBs available in various forms of single, double, and multilayers reduce the complexity of assembling a unit.



75). Connectors are eliminated from _____ PCBs?

1.Rigid **2. Flex** 3. Rigid-flex 4. Robust

Flex PCBs are made from similar components utilized in Rigid PCBs.

76). _____ PCBs increase repeatability and reliability?

1.Rigid **2. Flex** 3. Rigid-flex 4. Robust

Flex PCBs available in various forms of single, double, and multilayers reduce the complexity of assembling a unit.

77). Flex PCBs provide uniform Electrical characteristics in _____?

1. Low-speed Circuitry **2. High-speed Circuitry** 3. Low-Density Circuitry 4. Low Temperature Circuitry

Flex PCBs eliminate connectors and thermal management is provided.

78). Hybrid circuit combining rigid and flex boards known as ____?

1.Rigid 2. Flex **3. Rigid-flex** 4. Robust

A board will get flexed continuously or folded and shaped curve or flexed while manufacturing known as Rigid-flex Boards.

79). What is the purpose of the flexible part on Rigid-flex PCB?

- a. Interconnections among Rigid Boards
- b. Allows Narrow Conductor Lines
- c. Allows Wide Conductors Lines
- d. a& b**

Flexible portion of Rigid-flex boards allows the conducting lines such that it takes less space.

80). What PCB designs are complicated and constructed in three-dimension?

- a. Rigid
- b. Flex
- c. Rigid-flex**
- d. Robust

To mould the product in the desired way the boards are twisted or folded in Rigid-flex PCBs.

81). Interconnections makes _____ boards light-weight?

- a. Rigid
- b. Flex
- c. Rigid-flex**
- d. Robust

Rigid-flex allows interconnections that remove the need for connectors decreasing the weight of the boards.

82). What are the various advantages of Rigid-flex PCBs?

- a. Reduce Space Requirement
- b. Shock Resistance
- c. Light-weight
- d. All Mentioned Above**

Rigid-flex PCBs are complicated and are designed in three dimensions to reduce space.

83). What maximizes the effectiveness of testing a PCB?

- a. Board Side
- b. Minimum Test Point Distance**
- c. Test Point Distribution
- d. Tolerances

Test points must be separated by a minimum of 0.1 inches which maximizes the effectiveness of testing PCB.

84). Test points must be present on ____ side of the board that facilitates testing?

- a. Same**
- b. Distinct
- c. Different
- d. Multiple

Testing single-sided PCBs is easier because of Single layer of copper is placed above the substrate and has etched the entire circuit on another side in a Single-sided PCB.

85). What defines the structure of a Multilayer circuit PCB?

- a. **Stack-up**
- b. Structure
- c. Impedances
- d. Signal Quality

Material thickness and the weight of copper information is provided by stack-up.

86). Precisely stacked PCBs reduce _____?

- a. Electromagnetic Emissions
- b. Crosstalk
- c. Signal Integrity
- d. **a& b**

Multilayer board structure is determined sequentially using stack-ups.

87). What improves the integrity of signals of Multilayer circuit PCB?

- a. **Stack-up**
- b. Structure
- c. Impedances
- d. Crosstalk

Multilayer boards stacked precisely improves the integrity of signals.

88). What impacts the multiple layers on board during PCB design?

- a. Number of Differential Pairs
- b. Routing Density
- c. Controlled Impedances Requirements
- d. All Mentioned Above**

Multiple layers on the board gets affected by the thickness and the height of components.

89). PCB material must have _____?

- a. Slow Rise Time
- b. Fast Rise Time**
- c. Fast Fall Time
- d. Slow Cut-off

Materials chosen in designing PCBs must rise fast to enhance the speed of processing.

90). Properly placed components on board during design give rise to _____?

- a. Better Performance
- b. Improved Signal Quality
- c. Increased Crosstalk
- d. a& b**

Components must be placed at the locations specified based on the requirements of the design.



91). What rules must be followed while routing begins?

- a. Design Rules
- b. Impedance Rules
- c. a& b**
- d. Density Rules

All the impedances controlled should have a Continuous Plane layer of reference.

92). What is calculated based on various circuits' current necessities?

- a. Impedances
- b. Number of Layers
- c. Trace Width**
- d. Plane Width

Based on the current requirement of distinct circuits widths of traces are calculated.

93). Traces of copper layered among the nodes in ____?

- a. Schematic Check
- b. Stack-up
- c. Routing**
- d. Fabrication

Placing traces, arcs, and vias that connect nodes define the path of conduction.



94). What are the connections provided after routing?

- a. Microcontrollers
- b. Power Plane
- c. Ground Plane
- d. b& c**

After the traces of copper are layered among nodes ground or power plane connections are established.

95). What are the benefits of a well-fabricated PCB design?

- a. Time Saved
- b. Reduced Costs
- c. Hassle-free
- d. All Mentioned Above**

Fab drawings consist of all required information on board fabrication.

96). What are the details required for the fabrication of the board?

- a. Board Dimensions and Outline
- b. Drilling Chart
- c. Stack-up Drawing
- d. All Mentioned Above**

Information about Fabrication is stored in PDFs and passed to manufacturers.



97). What does Assembly Drawing in PCB design consist of?

- a. Component Outlines
- b. Additional Side Views
- c. Assembly Notes
- d. All Mentioned Above**

PCB Assembly drawing has all the required information about assembling a board.

98). Information about Manufacturing labels is present in _____?

- a. Assembly Drawing**
- b. Stack Drawing
- c. Fabrication Drawing
- d. Component Drawing

Information about barcodes or assembling tags referencing it is stored in Manufacturing Labels.

99). What is DFM in PCB design?

- a. Description of Masses
- b. Design for Manufacturability**
- c. Description of Manufacturing

Details of Masses

Performing DFM in PCB design verifies the underlying design issues.



100). Why the color of PCB is green?

- a. Due to Components Used
- b. Due to Solder Masks**
- c. Due to Fabrication
- d. Due to Assembly

Soldering masks present on boards protect copper circuit printed on the fibre-glass core. This prevents short-circuits, Errors due to soldering, etc...

Thank You

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