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312316-Electronic Materials & Components (Sem II)

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

Unit II

Electronic Components (18 Marks)

1. An active device is one which _____

- a) Mechanically controls electron flow
- b) Electrically controls electron flow
- c) Pneumatically controls electron flow
- d) Automatically controls electron flow

Answer: b

Explanation: An active device is any type of circuit component with the ability to electrically control electron flow (electricity controlling electricity). For a circuit to be properly called electronic, it must contain at least one active device.

2. Which of the following elements comprise of the passive devices?

- a) Resistors, Capacitors and SCRs
- b) Vacuum Tubes, SCRs and Diodes
- c) Transformers, Inductors and Diodes
- d) Transformers, TRIACs and DIACs

Answer: c

Explanation: A passive device is any type of circuit component which cannot control the flow of electrons by means of any electric control. All these devices do not have the ability to electrically control the flow of electrons.

3. A transistor is a current controlled device because _____

- a) In the base region movement of charge carrier is because of the electrons which are minority charge carrier in the base region
- b) In the collector region movement of charge carrier is because of the electrons which are minority charge carrier in the collector region
- c) In the base region movement of charge carrier is because of the holes which are majority charge carrier in the base region
- d) In the collector region movement of charge carrier is because of the holes which are majority charge carrier in the base region

Answer: a

Explanation: In the base region movement of charge carrier is because of the electrons which is minority charge carrier in the base region. So, a BJT can said to be minority current controlled device. Base current flows between base and emitter in the BJT to induce a larger current flow between emitter and collector.

4. Active devices can also be used as _____

- a) Amplifiers
- b) Choppers
- c) Converters
- d) Inverters

Answer: a

Explanation: Active devices may be employed to a govern large amount of power by application of small amount of power. This behaviour is known as amplification. Therefore, active devices can be used as amplifiers.

5. How do amplifiers work without violating Law of Conservation of Energy?

- a) They amplify one factor of the input and reduce others
- b) They work on the law of conservation of mass
- c) They violate the Law of Conservation of Energy
- d) They amplify the signal by taking an input from an external source

Answer: d

Explanation: The Law of Conservation of Energy is not violated because the additional power is supplied by an external source, usually a DC battery or equivalent. The amplifier neither creates nor destroys energy, but merely reshapes it into the waveform desired.

7. To overcome the problem of representation of large values of gain, which of the following units was introduced?

- a) Decibels
- b) Joules
- c) Pascals
- d) Farads

Answer: a

Explanation: Since $1\text{dB}=(1/10)\log_{10}(A_2/A_1)$ it is a logarithmic scale of representation and very large values can be expressed by smaller numbers. Decibels is a convenient unit of measurement for a variety of applications.

8. Attenuators are active devices.

- a) True
- b) False

Answer: b

Explanation: Attenuators weaken or attenuate the high-level output of a signal generator and thus cannot control the signals electronically. This makes them passive devices and they can only be present in a circuit with an active device.

9. Tunnel diode can be used as an active device because _____

- a) its negative resistance region is used
- b) it conducts at a faster rate
- c) it triggers the flow of electrons in reverse bias
- d) of tunneling effect

Answer: a

Explanation: It is an active device since its impedance is positive and the V-I characteristics lie in the first & second quadrants, tunnel diodes can be used as an active device even though it is a diode which falls under the category of passive devices.

10. The unit of gain is _____

- a) Joules
- b) Decibels
- c) Its unit less
- d) Watts

Answer: c

Explanation: Gain is the ratio of same type of values i.e. either volt/volt or current(amp)/current(amp) or watts/watts thus this makes it unit less. If it is expressed in decibels i.e. on a logarithmic scale, then they have the unit dB

11. Which is the most striking feature in monolithic integrated circuit transistor?

- a) Collector contact is present at the bottom of IC
- b) Collector contact is present at the top of IC
- c) Collector contact is absent
- d) Collector contact is present on one of the sides of IC

Answer: b

Explanation: In IC transistor, the collector contact has to be taken from the top because collector is isolated from the substrate and next isolation island by reverse biased diodes.

12. Why monolithic IC transistor is preferred over discrete planar epitaxial transistor?

- a) Due to structural difference
- b) Increase in V_{CE} (sat) and collector series resistor
- c) Improvement in circuit performance
- d) All of the mentioned

Answer: d

Explanation: As the collector contact is present on the top of IC transistor, it makes structural difference. Hence, it increases collector series resistance and $V_{CE}(\text{sat})$ of device. From this, circuit performance is highly improved as matched transistor can be obtained.

13. Name the process that is used to overcome the increase in collector series resistance, which occurs due to the presence of collector contact at the top of integrated transistor.

- a) Buried n^+ layer
- b) Buried p^+ layer
- c) Triple diffused layer
- d) Buried epitaxial layer

Answer: a

Explanation: The value of collector series resistance of an integrated transistor can be easily reduced by a process known as “buried layer” or “Buried n^+ layer”.

14. What is the reason for using Lateral pnp transistor in Integrated Circuits?

- a) Requires simple process control
- b) Simultaneous fabrication of pnp and npn transistors
- c) Provide good isolation
- d) Miniaturization and cost reduction

Answer: b

Explanation: During the p-type base diffusion for npn transistor, two adjacent p-regions are diffused to form the emitter and collector region of the lateral pnp transistor (n-type epitaxial layer is used as base of the pnp transistor). Thus, pnp and npn transistors are fabricated simultaneously.

15. Which of the following transistor has the limitation, due to the requirement of additional fabrication steps and design consideration?

- a) Vertical pnp transistor
- b) Lateral pnp transistor
- c) Triple diffused pnp transistor
- d) Substrate pnp transistor

Answer: c

Explanation: In triple diffused pnp transistor fabrication process, an extra p-type diffusion is added to a standard npn-transistor after the n-diffusion to obtain a pnp transistor. However, the usefulness of such a structure is not used due to its limitation.

16. The 'buried layer' reduces collector series resistance by providing,

- a) A low resistivity current path from n-type layer to n^+ contact layer
- b) A low resistivity current path from p-type layer to n^+ contact layer
- c) A high resistivity current path from n-type layer to n^+ contact layer
- d) A high resistivity current path from p-type layer to n^+ contact layer

Answer: a

Explanation: A heavily doped n^+ region is sandwiched between the n -type epitaxial collector and p -type substrate. This buried n^+ region provides a low resistivity current path from active collector region (n -type layer) to the collector contact (n^+ contact layer). In effect, the n^+ layer shunts n -layer of collector region with respect to flow of current, thus effectively reduces the collector resistance.

17. At what potential, the substrate of a vertical pnp transistor should be kept to attain good isolation?

- a) Same potential
- b) Positive potential
- c) Different potential
- d) Negative potential

Answer: d

Explanation: The limitation of vertical pnp transistor is that, collector has to be held at a fixed negative potential, as substrate is to be held at the most negative potential in the circuit for providing good isolation.

18. Which method is used in the fabrication of pnp transistor?

- a) Vertical substrate pnp
- b) Triple diffused pnp
- c) Lateral pnp
- d) All of the mentioned

Answer: d

Explanation: pnp transistors in Integrated Circuits are fabricated in one of the following three ways.

20. The diffusion of collector impurities in npn transistor should be small because,

- a) No additional diffusion or masking steps required
- b) Bandwidth is controlled by lateral diffusion of p-type impurity
- c) Collector need not be kept at negative potential
- d) None of the mentioned

Answer: d

Explanation: Generally, n-type impurities have smaller diffusion constant than p-type impurities, the n-type collector moves very little while p-type moves appreciably. Therefore, the diffusion coefficient of the collector impurities should be as small as possible to avoid the movement of the collector junction.

21. The advantage of Multi-emitter transistor is

- a) To reduce fabrication steps
- b) To save chip area
- c) To lower design consideration
- d) To provide linear output

Answer: b

Explanation: In Multi-emitter transistor n^+ emitter is diffused at three places in the p-type base. Thus, it is possible to save chip area and enhance component density of an IC.

22. Which transistor is best suitable to achieve very fast switching in digital circuits?

- a) Lateral pnp transistor
- b) Schottky transistor
- c) Multi-emitter transistor
- d) NPN transistor

Answer: b

Explanation: Fast switching can be achieved, if the transistor is prevented from entering into saturation. In schottky transistor, schottky diode is used to clamp between base and collector. Whenever the base current increases to saturation, the diode conducts. Thus, the base to collector voltage drops to 0.4v (less than $V_{BE}(\text{cut-in})=0.5$) and the transistor does not enter into saturation .

23. Choose the appropriate value of diode to get a speedy diode from the given values of storage time (n) in sec and forward voltage (V_γ).

- a) $n = 56$, $V_\gamma = 0.96$
- b) $n = 100$, $V_\gamma = 0.92$
- c) $n = 9$, $V_\gamma = 0.85$
- d) $n = 53$, $V_\gamma = 0.95$

Answer: c

Explanation: The diode with lowest storage time and lowest forward voltage drop is useful for getting high speed diode to be used in digital integrated circuit.

24. The number of leads in schottky barrier diode are

- a) Four
- b) Three
- c) Two
- d) Six

Answer: c

Explanation: Schottky barrier diode has two contact leads namely,

1. Schottky Barrier contact
2. Ohmic contact.

25. In Schottky barrier diode, which contact has similar characteristics to that of an ordinary PN diode?

- a) Ohmic contact
- b) Schottky barrier contact
- c) Both ohmic and Schottky barrier contact
- d) None of the mentioned

Answer: b

Explanation: A metal semiconductor is formed when aluminium is deposited directly upon n-type silicon. Its characteristics is found to be same as in an ordinary PN junction diode (Although the physical mechanism is different).. Find the symbol for Schottky barrier diode from the given circuit diagram?

26. How the ohmic contact is formed in metal semiconductor diode? (AL-Aluminium)

- a) n^+ diffusion in p-region near AL lead
- b) p^+ diffusion in p-region near AL lead
- c) n^+ diffusion in n-region near AL lead
- d) p^+ diffusion in n-region near AL lead

Answer: c

Explanation: Aluminium is p-type impurity in silicon. So, when it is used to make a contact with n-type silicon, its essential contact is ohmic and no PN-junction is formed. Therefore, the contact is done by making n^+ diffusion in the region near the surface where aluminium is deposited.

27. The flow of current in Schottky barrier diode is due to

- a) Majority and Minority carriers
- b) Majority carriers
- c) Minority carriers
- d) None of the mentioned

Answer: b

Explanation: When the diode is forward biased, electron flow from semiconductor to metal (where electrons are abundant). Hence, the majority carrier 'electrons' carry current in Schottky diode.

28. Find the application areas, where Schottky diode can be used?

- a) Radio frequency
- b) Power rectifier
- c) Clamping diode
- d) All of the mentioned

Answer: d

Explanation: Schottky diode can be used for ideal clamping or as detector in high frequency microwave ICs. Therefore, it is used for all these applications.

29. Which of the following resistor is not used as an integrated resistor?

- a) Poly gate resistor
- b) Pinched resistor
- c) Epitaxial resistor
- d) Thin film resistor

Answer: a

Explanation: Except poly gate resistor, other resistors are integrated resistor.

30. Which of the following is not true about diffused resistor?

- a) Limitation due to small range of resistance
- b) Resistance depends upon surface geometry
- c) Resistance depends on diffusion characteristic of material
- d) Diffused resistors are non-economical

Answer: d

Explanation: In diffused resistor method, the resistors are very economical as no extra fabrication steps are required.

31. Determine the formula for sheet resistance (R_s).

- a) $R \times L \times W$
- b) $R \times (L \times \rho) / W$
- c) $R \times (W / L)$
- d) $R \times (W \times \rho) / L$

Answer: c

Explanation: The formula for sheet resistance of a material of surface dimension L and W is

$$R_s = R \times (W / L).$$

32. Consider a 52cm×52cm material of uniform resistivity 100Ωm and thickness 3cm. Find the area and resistance of this sheet of material.

- a) 16 m², 1.923 Ω/square
- b) 8112 cm², 1.733 Ω/square
- c) 156 cm², 33.33 Ω/square
- d) 901 cm², 3.333 Ω/square

Answer: c

Explanation: Area = $L \times t = 52\text{cm} \times 3\text{cm} = 156 \text{ cm}^2$

=> Sheet resistance $R_s = (\rho \times L) / (L \times t) = \rho / t = 100 \text{ } \Omega \text{ m} / 3\text{m} = 33.33 \text{ } \Omega / \text{square}$.

33. If a 25Ω diffused resistor is to be designed for an emitter resistor, determine the pattern in which it is fabricated?

- a) 20mil long by 5mil wide
- b) 25mil long by 1mil wide
- c) 5mil long by 1mil wide
- d) 16mil long by 4mil wide

Answer: b

Explanation: The sheet resistance of n-type diffused resistor is $5\Omega/\text{square}$.

=> $L/W = R/R_s = 25\Omega / 5\Omega = 5/1$

=> 5mil long by 1mil wide.

34. The number of square contained in the integrated resistor by diffused resistor method depend on ratio of

- a) ρ/t
- b) $\rho \times L/W$
- c) $W/L \times t$
- d) L/W

Answer: d

Explanation: The number of square contained in the resistor depends on the surface geometry. Which is given by, the ratio L/W is called the aspect ratio of surface geometry.

35. Match the sheet resistance value for the following region in diffused resistor

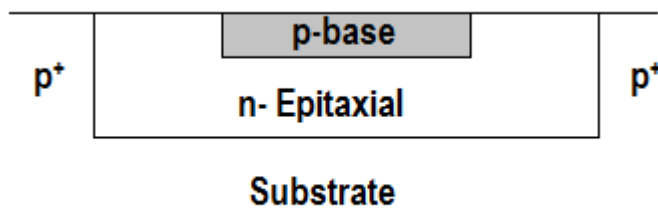
1. Epitaxial Collector region	i. $200\Omega/\text{square}$
2. p-type base region	ii. 1 to $10\text{k}\Omega/\text{square}$
3. n-type emitter region	iii. $5\Omega/\text{square}$

- a) 1-I, 2-ii, 3-iii
- b) 1-ii, 2-I, 3-iii
- c) 1-iii, 2-I, 3-ii
- d) 1-iii, 2-ii, 3-i

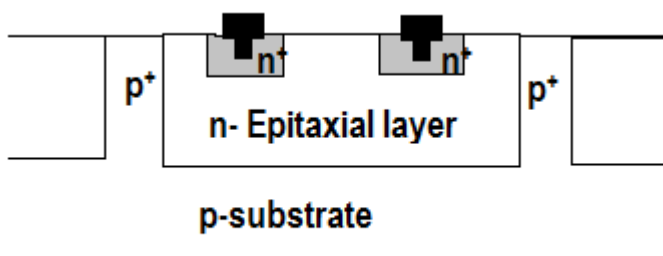
Answer: b

Explanation: The mentioned values are sheet resistance values for respective diffused resistor.

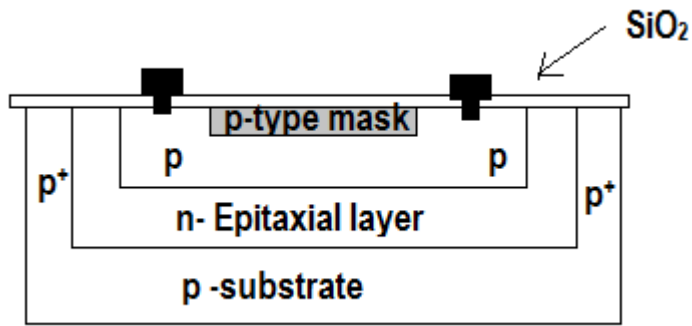
36. Find the epitaxial resistor from the given cross-sectional view diagram?



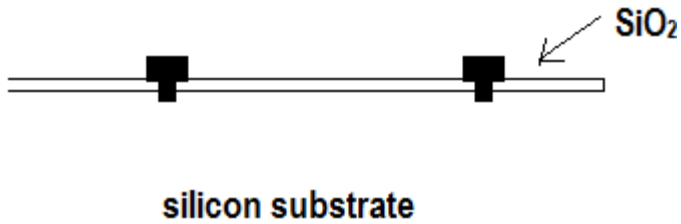
a)



b)



c)



d)

Answer: a

Explanation: The mention figure is the cross sectional view of epitaxial resistor. The remaining diagrams are the cross-sectional view of pinched, thin film and diffused resistor.

37. Which integrated resistor can achieve high value of sheet resistance?

- a) Pinched resistor
- b) Epitaxial resistor
- c) Thin film resistor
- d) All of the mentioned

Answer: a

Explanation: In a pinched resistor, the sheet resistivity can be increased by reducing its effective area. This technique is used to achieve high value of sheet resistance from ordinary diffused resistor.

38. How pinched resistor can give resistance in order of mega-ohm in a reasonably small area?

- a) By increasing fabrication steps
- b) By offering bulk resistance in n-region
- c) By reducing conduction path
- d) By limiting the thickness of are

Answer: c

Explanation: In pinched resistor structure, one of the diode conducts in reverse direction and only a small reverse saturation current can flow through n-type material. By doing so, the effective cross-sectional area of the conduction path will be reduced and resistance between two contact lead increases.

39. Which of the following is not used as metallic film in the thin film resistor?

- a) Nichrome (NiCr)
- b) Tantalum (Ta)
- c) Stannic oxide (SnO₂)
- d) Silicon dioxide (SiO₂)

Answer: d

Explanation: Silicon dioxide is the non-metallic layer on which the metallic thin films are deposited.

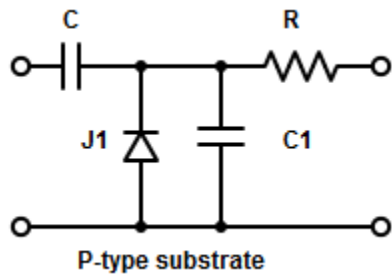
40. Pick out the incorrect statement

- a) Sheet resistance have smaller and lesser parasitic components
- b) Value of resistor can be easily adjusted after fabrication
- c) Resistance in the range 100kΩ possible using nichrome resistors
- d) Thin film resistors are more stable

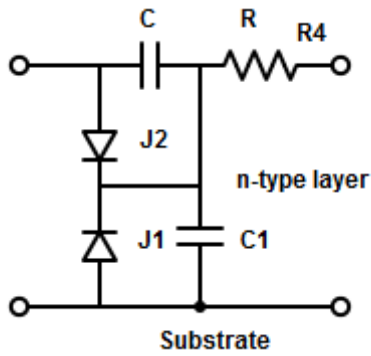
Answer: c

Explanation: Typically, sheet resistance value of nichrome is 40 – 400Ω/square (depending upon film thickness). So, the resistance in the range 20 to 50kΩ can only be obtained

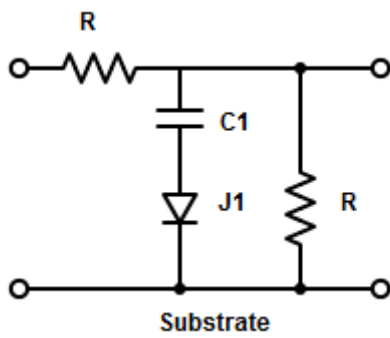
41. Find the equivalent circuit of junction capacitor?



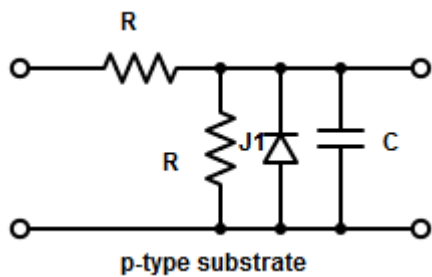
a)



b)



c)



d)

Answer: b

Explanation: The mentioned diagram is the equivalent circuit diagram of junction capacitor.

42. The capacitance of junction capacitor does not depend upon

- a) Impurity concentration of p-type epitaxial layer
- b) Impurity concentration of n-type epitaxial layer
- c) Area of the junction
- d) Voltage across the junction

Answer: a

Explanation: There is no p-type epitaxial layer present in junction capacitor. But a p-type substrate is present and it forms one of the junctions in the junction type IC capacitor.

43. Which is used as the dielectric layer in MOS Capacitor?

- a) Silicon Nitride (Si_3N_4)
- b) Aluminium oxide (Al_2O_3)
- c) Tantalum oxide (Ta_2O_5)
- d) All of the mentioned

44. Which is considered to be a serious disadvantages of thin film capacitor, when

Al_2O_3 is used as dielectric.

- a) Additional fabrication step required
- b) It require over voltage protection
- c) Higher dielectric constant value is required
- d) All of the mentioned

Answer: b

Explanation: One of the serious disadvantages of thin film capacitor is that it fails, when the voltage rating exceeds due to breakdown of the dielectric, which is a destructive and irreversible failure mechanism and it require over voltage protection.

45. In MOS capacitor, the preference in dielectric layer is given to Silicon Nitride (Si_3N_4) because

- a) It makes capacitor non-polar
- b) It contain a small resistance
- c) It offers less processing step
- d) It reduces failure mechanism

Answer: a

Explanation: Si_3N_4 gives more circuit flexibility by being non-polar, that is, it does not matter which plate is positive or negative and the voltage applied.

46. Why inductor is avoided in Integrated Circuit component?

- a) They provide many losses compared to other IC components
- b) IC devices are essentially two dimensions
- c) Device density of IC increases
- d) Fabrication process of these components are complicated

Answer: b

Explanation: Usually, IC devices are very small (~ 1 to $10\mu\text{m}$). Even if IC inductor is made in form of a flat metallic thin film spirals. Very small value of the order nanohenry with low quality factor can only be obtained.

47. Which circuit is used to replace inductor in IC components?

- a) RC active network
- b) PN-junction diode
- c) LC active network
- d) None of the mentioned

Answer: a

Explanation: Circuit designer go to great lengths to avoid the use of inductors or otherwise simulate them by using RC active networks.

48. In application such as RF and IF circuits, inductor cannot be avoided. How to manage such situation?

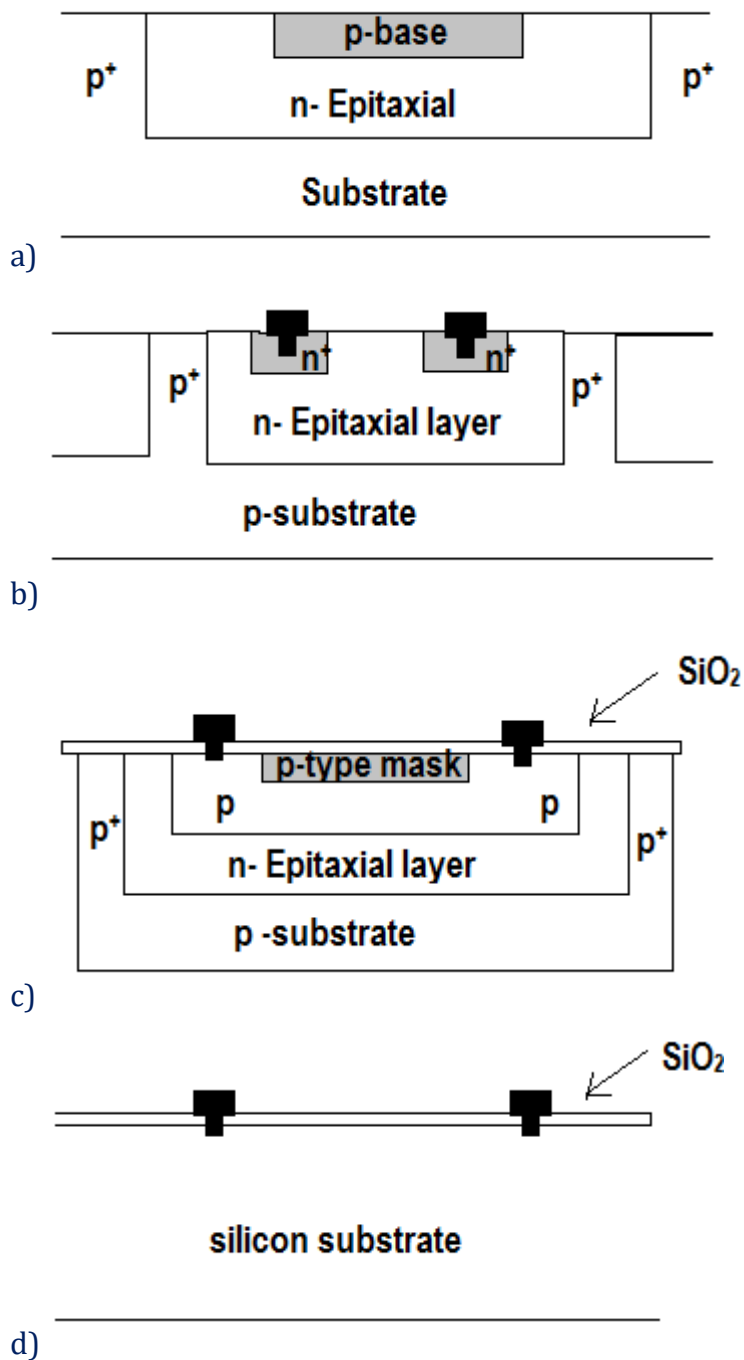
- a) Using inductors external to IC package
- b) Thin film inductor spiral are used
- c) Thin film hybrid microwave can be used
- d) All of the mentioned

Answer: d

Explanation: In most cases, inductors external to IC packages are used. However, thin

film hybrid Microwave IC (MIC) and thin film inductor spiral can provide inductance up to 250nH.

49 Find the epitaxial resistor from the given cross-sectional view diagram?



Answer: a

Explanation: The mention figure is the cross sectional view of epitaxial resistor. The remaining diagrams are the cross-sectional view of pinched, thin film and diffused resistor.

50. Which integrated resistor can achieve high value of sheet resistance?

- a) Pinched resistor
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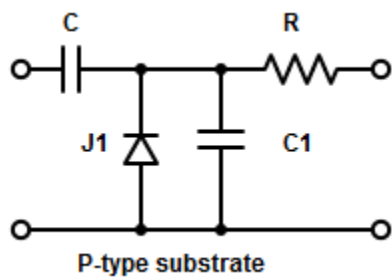
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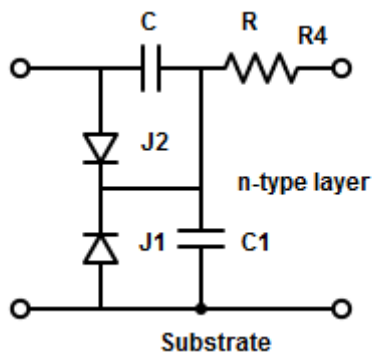
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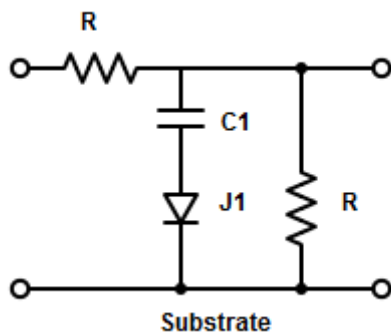
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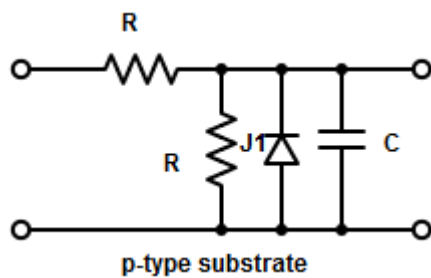
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d)

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Answer: d

Explanation: In most cases, inductors external to IC packages are used. However, thin film hybrid Microwave IC (MIC) and thin film inductor spiral can provide inductance up to 250nH.

62. The _____ of a resistor is determined mainly by its physical size.

- a. Resistance
- b. Power
- c. Current
- d. a & b are correct

Answer: b

63. Resistor is an _____ component/device.

- a. Active
- b. Passive

Answer: b

64. There are two main characteristics of a resistor are _____.

- a. Current and Voltage
- b. Current and Power
- c. Resistance and Power
- d. Resistance and Current

Answer: c

65. Resistors are generally available in the maximum value of _____ ohm.

- a. Mega ($M \Omega$)
- b. Gega ($G \Omega$)
- c. Kilo ($K \Omega$)
- d. Tera ($T \Omega$)

Answer: a

66. Does Resistor dissipate power? YES / NO

Answer: YES

67. The power rating of a resistor should be _____ than from actual power dissipation (Waste) as heat for the reason of Safety factor (Burning).

- a. Less
- b. More

Answer: b

67. What is the Power Dissipation formulae?

- a. $P = V \times I$
- b. $P = V^2 / R$
- c. $P = I^2 \times R$
- d. All are correct

Answer: d

68. Most common type of Resistor is _____

- a. Wire Wound Resistor
- b. Carbon Resistor
- c. Film Type Resistor
- d. Fusible Resistor

Answer: b

69. Resistors are _____ devices.

- a. Polarity Devices
- b. Non-Polarity

Answer: b

70. What happens with the requirement of Power rating when the resistance increases ?

- a. Lower Power Rating
- b. Higher Power Rating

Answer: a

71. Power Rating is _____ proportional to the Resistance R of a Resistor

- a. Directly
- b. In-Directly

Answer: b

72. Power Rating and Physical Size of Resistor is _____ proportional.

- a. Directly
- b. In-Directly

Answer: a

74. Wire Wound Resistors are usually used (Applications) for _____.

- a. High Current
- b. Low Resistance
- c. Desired (Appreciable) Power
- d. All are Correct

Answer: d

75. Wire Wound Resistor is only used for _____.

- a. Low Frequency
- b. High Frequency

Answer: a

76. At High Frequency, Wire Wound Resistor Acts As _____.

- a. Capacitor
- b. Inductor
- c. Diode
- d. a & b are correct

Answer: b

77. How the Carbon Composition Resistors are made (Construction) by _____.

Answer: Carbon/Graphite Powder with Insulating Material (Ceramic / Resin) to bond the Mixer

78. Carbon Composition Resistors are most popular because _____

- a. Low Price
- b. Small Size
- c. High inductance
- d. a & b are correct

Answer: b

79. The Resistance of a Carbon Composition Resistor is depends of _____.

- a. Size
- b. Current
- c. Ratio of Powders (**Carbon & Ceramic**)
- d. a & b are correct

Answer: c

80. Carbon Composition Resistors generally used for _____

- a. Inductive Component
- b. Surge Protection
- c. Voltage Pulse Reduction
- d. b & c are correct

Answer: d

81. The applications of carbon composition resistors are _____

- a. Power Supplies
- b. Welding Controls
- c. a & b are correct

Answer: c

82. Advantages of carbon composition resistor are _____

- a. Small Size
- b. Low Cost
- c. Withstand at high energy pulses
- d. All are Correct

Answer: d

83. The value of Carbon Composition Resistor could be changed by _____

- a. If not in use for a year (**5%**)

- b. Soldering (Heat) – 3 %
- c. Operate at 70°C Temperature (15%)
- d. All are Correct

Answer: d

84. Disadvantages of carbon composition resistor are _____

- a. Instability of Resistance Value
- b. High Temperature Coefficient
- c. High Noise
- d. All are Correct

Answer: d

85. The type of Film Resistors are _____

- a. Chip Film Resistor
- b. Carbon Film
- c. Metal Film Resistor
- d. b & c are correct

Answer: d

86. Advantages of Carbon Film Resistors are _____

- a. Low Noise
- b. Temperature Stability
- c. Precise Resistance
- d. All are correct

Answer: d

87. The more precise value of Resistor will be _____

- a. Carbon Film Resistor
- b. Meta Film Resistor

Answer: b

89. Meta Film Resistors are always coated with Lacquer that protects _____

- a. Electrically
- b. Mechanically
- c. Climate (Temperature/Humidity)
- d. All are correct

Answer: d

90. SMD Stands for _____

Answer: Service Mount Device

91. SMT Stands for _____

Answer: Service Mount Technology

91. Advantages of Surface-Mount (SMD) Resistors are _____

- a. Small in Size (Space Saving)
- b. Low Price
- c. More efficient
- d. All are correct

Answer: d

92. Fusible Resistor plays important roles _____

- a. Resistor
- b. Fuse
- c. Thermostat
- d. a & b are correct

Answer: d

93. Fusible Resistor are used (Applications) in _____

- a. Low Power
- b. Low Surge
- c. a & b are correct
- d. High Power

Answer: c

94. A thermistor changes the value of resistance by Changing in operating _____

- a. Voltage
- b. Current
- c. Temperature
- d. All are correct

Answer: c

95. When the resistance increase due to increasing of operating temperature called_____

- a. **Positive Temperature Coefficient (PTC)**
- b. Negative Temperature Coefficient (NTC)

Answer: a

96. When the resistance decreases due to increasing of operating temperature called_____

- a. Positive Temperature Coefficient (PTC)
- b. **Negative Temperature Coefficient (NTC)**

Answer: b

97. The word “ Thermistor” is derived from _____

- a. Thermal
- b. Resistance
- c. Thermometer
- d. a & b are correct

Answer: d

98.The Color Coding is used to indicate _____ value/rating of Resistor.

- a. Numerical
- b. Alphabetical
- c. Resistance
- d. a & c are correct

Answer: a

99. The Resistor Color Code was developed by _____.

- a. International Organization for Standardization (ISO)
- b. Electronics Industries Alliance (EIA)
- c. Radio Manufacturers Association (RMA)
- d. a & b are correct

Answer: c

100. Recently, _____standard Color Coding is used for Resistor’s values.

- a. World Standardized Corporation (WSC)
- b. Electronics Industries Alliance (EIA)
- c. Radio Manufacturers Association (RMA)

d. International Organization for Standardization (ISO)

Answer: b

101. The color code standard was developed in _____.

- a. 1890
- b. 1920
- c. 1940
- d. 1900

Answer: b

102. RCC stands for _____.

Answer: Resistors Colour Code

103 Why is Color Coding used for Resistors ?

- a. Small Size
- b. Cylindrical Shape
- c. Due to Through Hole Component
- d. a & b are correct

Answer: d

104. How many colour bands used on Resistors _____

- a. 4
- b. 5
- c. 6
- d. 7

Answer: c

105 How to read color bands on Resistors ?

- ▲ a. Right to Left
- b. Left to Right
- c. From both sides
- d. All are correct

Answer: b

106. The first two bands on the resistors are _____

- a. Two digits
- b. Decimal Multiplier

- c. Tolerance
- d. All are incorrect

Answer: a

107 The tolerance of the Silver band on Resistor is _____

- a. 3%
- b. 5%
- c. 10%
- d. 20%

Answer: c

108 The gold band tolerance on Resistor is _____

- a. 3%
- b. 5%
- c. 10%
- d. 20%

Answer: b

109 If there is no band on Resistor then tolerance is _____

- a. 3%
- b. 5%
- c. 10%
- d. 20%

Answer: d

110 Which digit is represented by a Green band on a Resistor?

- a. 4
- b. 5
- c. 6
- d. 3

Answer: b

111 The decimal multiplier means, how many _____ add after the first digits.

- a. Zeros
- b. Digits
- c. Tolerance

d. Resistance

Answer: a

112 What color is a 340 K Ω resistor with 5% tolerance?

- a. Orange, Yellow and Yellow with Gold
- b. Orange, Green and Yellow with Gold
- c. Orange, Blue and Orange with Gold
- d. Orange, Yellow and Green with Gold

Answer: a

113. A zero-ohm resistor is indicated by a single black color ring around the body of the resistor.

YES / NO

Answer: Yes

114. Why zero ohm resistors are used?

- a. Connect the Tracks
- b. As Jumpers
- c. Increase Machine Production Time
- d. All are correct

Answer: d

115: The _____ of a resistor is determined generally by its physical size.

- 1. Resistance
- 2. Current
- 3. Power
- 4. a & b are correct

Ans: The correct option is (2) Current.

Explanation: Every resistor possesses a maximum power rating which is determined by its physical size generally, and the greater its surface area the more power it can dissipate safely into the ambient air or into a heatsink. As long as its “Dissipating Power Rating” is not exceeded by the resistor power rating, a resistor can be used at any combination of voltage (within reason) and current, indicating how much power the resistor can convert into heat or absorb without any damage to itself.

116. The two main characteristics of a resistor are _____.

1. **Resistance and Power**
2. **Current and Power**
3. **Current and Voltage**
4. **Resistance and Current**

Ans: The correct answer is (1) Resistance and Power.

Explanation: The two main characteristics of a resistor are its resistance, R , in ohms, and its power rating, P , in Watts. The resistance provides the desired drop in voltage or the required reduction in current. The wattage rating determines the amount of power the resistor can safely dissipate as heat. The wattage rating, as a safety factor, is always more than the actual amount of power dissipated by the resistor.

117: Resistor is an _____ component or device.

1. **Active**
2. **Passive**

Ans: The correct answer is (2) Passive.

Explanation: The resistor is a **passive component** as it opposes the flow of electrical current through it. Resistors don't need an external power source to function. They use some other property to control the electrical signal. As a result, they only require the current to travel through the connected circuit.

118. Mainly resistors are available in the maximum value of _____ ohm.

1. **Kilo ($K \Omega$)**
2. **Giga ($G \Omega$)**
3. **Mega ($M \Omega$)**
4. **Tera ($T \Omega$)**

Ans: The correct option is (3) Mega.

Explanation: The resistive value of a resistor, and its ability to limit current flow is measured in Ohm's (Ω) that range from less than one Ohm each to **many millions of**

Ohm's, (Mega-Ohm's). Resistors can be of a fixed value, for example, 100 Ohms, (100Ω) or variable as in 0 to 100Ω .

119. Ohm's law is true for:

1. **Metallic conductors at low temperature**
2. **Metallic conductors at high temperature**
3. **For diode when current flows**
4. **For electrolytes, when current passes through them**

Ans: The correct answer is: (1) Metallic conductors at low temperature

Explanation: According to Ohm's law, in metallic conductors at constant temperature and zero magnetic fields, the current flowing is proportional to the voltage across the ends of the conductor, and is inversely proportional to the conductor's resistance.

120 The power rating of a resistor has to be _____ than from actual power dissipation as heat for the reason of the Safety factor (Burning).

1. **Less**
2. **More**

Ans: The correct answer is (2) more.

Explanation: A resistor can be used at any combination of voltage (within reason) and current so long as its "Dissipating Power Rating" is not exceeded, and with the resistor power rating indicating how much power the resistor can convert into heat or absorb without any damage to itself.

121. What among the options is the Power Dissipation formulae?

1. **$P = V \times I$**
2. **$P = V^2 / R$**
3. **$P = I^2 \times R$**
4. **All are correct**

Ans: The correct option is (4).

Explanation: All these are the formulas of power. But in one of the formulas, P is directly proportional to R, and in other, it is inversely proportional to R. V^2/R is used when the

potential in the circuit is the same. i.e. if the two resistance are connected parallel then we will use V^2/R to calculate the power. Similarly, if resistances are connected in series then the current will be constant in the circuit. Then, we will use the I^2R formula to calculate power. If we know the current and potential then VI is used to find out the power.

122. Most common type of Resistor is _____?

1. **Film Type Resistor**
2. **Carbon Resistor**
3. **Wire Wound Resistor**
4. **Fusible Resistor**

Ans: The correct answer is (2) Carbon Resistor.

Explanation: Carbon resistor types are very cheap to make which is why commonly used in electrical circuits. However, due to their manufacturing process carbon-type resistors have very large tolerances so for more precision and high-value resistances, film-type resistors are used instead.

123: Resistors are _____ devices.

1. **Polarity Devices**
2. **Non-Polarity**

The correct answer is (2) Non-Polarity.

Explanation: The resistance does not have polarity because it opposes the flow of electrons. The flow of electrons is from the lower potential to the higher potential. However, if the resistor is not intrinsic, if or has impurities changing its resistance throughout the length then there occurs a difference in the V-I characteristics of the resistor.

124. An example of non-ohmic resistance is:

1. **Tungsten wire**
2. **Diode**
3. **Carbon resistance**
4. **Copper wire**

Ans: The correct answer is (2) Diode.

Explanation: A non-ohmic resistance is a resistance that does not follow Ohm's law. Ohm's law states that the current through a conductor between two points is directly proportional to the voltage across the two points. And the diode is non-ohmic.

125. What happens with the requirement of Power rating when the resistance increases?

1. **Lower Power Rating**
2. **Higher Power Rating**

Ans: The correct answer is (1)

Explanation: Resistors oppose the current so they will dissipate some power. According to this equation, $V^2/R = P = I^2 \cdot R$, power is inversely proportional to resistance on the left side and directly proportional to resistance on the right side. So power rating is important in such a way that dissipated power should be lower than the power rating of the resistor.

126. The Resistance of a Carbon Composition Resistor depends on_____.

1. Size
2. Current
3. The ratio of Powders (**Carbon & Ceramic**)
4. a & b are correct

Ans: The correct answer is (3)

Explanation: The resistance of the carbon composition resistor depends on the amount of carbon added, the length of the solid cylindrical rod, and cross sectional area of the solid cylindrical rod.

127: Power Rating is _____ proportional to the Resistance \otimes of a Resistor:

1. **Directly**
2. **In-Directly**

The correct option is (2) Indirectly.

Explanation: As $R = L/A$, therefore Resistance is Indirectly proportional to the surface area. In the case of the resistor as power rating increases, the size also increases in order to facilitate higher area for power dissipation.

128: Wire Wound Resistors are usually used (Applications) for _____.

1. **High Current**
2. **Low Resistance**
3. **Desired (Appreciable) Power**
4. **All are Correct**

Ans: The correct answer is (4)

Explanation: Wire wound resistors are often used in circuit breakers or as fuses. In order to make a fusible resistor, the manufacturer attaches a small spring to one end of the resistor. Due to their high power capabilities, wire wound resistors are common in circuit breaker applications. They may be used as components in a large circuit breaker device or may act as circuit breakers themselves.

129 Wire Wound Resistor is only used for _____.

1. **Low Frequency**
2. **High Frequency**

The correct answer is (1) Low Frequency.

Explanation: Wire wound resistors are very good for low frequency as well as DC operation, however, the effects of inductance and capacitance become more noticeable as the frequency of operation rises. The inductance arises from the fact that the resistor is effectively a coil of resistance wire and is affecting an inductor.

130: At High Frequency, Wire Wound Resistor Acts As _____.

1. **Capacitor**
2. **Inductor**
3. **Diode**

4. **a & b are correct**

Ans: The correct answer is (2) Inductor.

Explanation: The wire-wound resistance comprises various turns around it. If there is a number of turns in the element then it acts as an inductor. But due to less number of turns very small inductive property exhibited in the wire-wound resistance

131. Who discovered the magnetic effect of electric current?

- a) Grueblerowen
- b) Joseph Henry
- c) Oersted
- d) Robert Abalakov

Answer: c

Explanation: Oersted discovered the magnetic effect of electric current. He accidentally discovered this phenomenon in the year 1820. He proved this phenomenon with the deflecting needle of magnetic compass.

132. What is the working principle of DC motor?

- a) Fleming's right hand rule
- b) Fleming's left hand rule
- c) Maxwell's second law
- d) Maxwell's third law

133. What is the full form of CPR with respect to motor movement?

- a) Clocks per rotation
- b) Counts per revolution
- c) Counts per rotation
- d) Clocks per revolution

Answer: b

Explanation: CPR stands for Counts per revolution with respect to motor movement. 2 square pulses are generated at a time by a typical motor encoder, CPR (Counts per revolution) is the is the number of quadrature decode states that exists between these two square pulses.

134. How many leads does a 2 phase bipolar stepper motor have?

- a) 1
- b) 3
- c) 4
- d) 5

Answer: c

Explanation: A bipolar stepper motor has 4 leads. Bipolar stepper motors have two windings; one winding per stator phase. Each coil or winding has 2 leads. Therefore total 2 windings (coils) will have 4 leads.

135. Speed of an induction motor remains same even if we increase the rotor resistance.

- a) True
- b) False

136. Speed control of an ac motor can be achieved by varying the input frequency.

- a) True
- b) False

Answer: a

Explanation: Speed control of an ac motor can be achieved by varying the input frequency. Usually AC motors run on a constant speed; this because of the constant voltage and constant frequency. Speed of an ac motor can be varied by changing the input voltage or frequency.

137. Which finger denotes the direction of current in Fleming's left hand rule?

- a) Middle finger
- b) First finger
- c) Thumb
- d) Little finger

Answer: a

Explanation: Middle finger denotes the direction of current in Fleming's left hand rule. Fleming's left hand rule states that, when a current carrying conductor is placed in a magnetic field then it experiences a force. The direction of force can be determined by Fleming's left hand rule. Where First finger denotes the direction of magnetic field and thumb denotes the direction of force.

138. Which type of motor is not an encoder motor?

- a) Stepper motor
- b) Servo motor
- c) BO motor
- d) BLDC Drone motor

Answer: c

Explanation: BO motor is not an encoder motor. It does not require special types of encoders or motor drivers for running it. It can be simply used by connecting the positive and negative terminal of the battery.

139. Who invented Induction motor?

- a) Nicola Tesla
- b) Vitaly Conrad
- c) Philip Vaughan
- d) Mark Henry

Answer: a

Explanation: Nicola Tesla invented Induction motor. He was a Serbian-American inventor born on 10 July 1856. He is very famous for his contribution towards modern alternating current supply systems. He is also well known for his contribution towards wireless power supply.

140. Which finger denotes the direction of magnetic field in Fleming's left hand rule?

- a) Middle finger
- b) First finger
- c) Thumb
- d) Little finger

Answer: b

Explanation: First finger denotes the direction of magnetic field in Fleming's left hand rule. Fleming's left hand rule states that, when a current carrying conductor is placed in a magnetic field then it experiences a force. The direction of force can be determined by Fleming's left hand rule. Where middle finger denotes the direction of current and thumb denotes the direction of force.

141. Which is an example of motor driver?

- a) KSD9700
- b) XMPA06B2131
- c) L298N
- d) 792XDXM4L-24A

Answer: c

Explanation: L298N is an example of motor driver. It is a dual H-Bridge type motor driver. 792XDXM4L-24A is an example of relay. XMPA06B2131 is an example of pressure switch. KSD9700 is an example of temperature switch.

142. Which is an example of single H-bridge type motor driver?

- a) DRV8829

- b) XMPA06B2131
- c) L298N
- d) 792XDXM4L-24A

Answer: a

Explanation: DRV8829 is an example of single H-bridge type motor driver. It is manufactured by "TEXAS INSTRUMENTS". L298N is an example of dual H-Bridge type motor driver. 792XDXM4L-24A is an example of relay. XMPA06B2131 is an example of pressure switch.

143. AC motors do not have brushes.

- a) True
- b) False

Answer: a

Explanation: AC motors do not have brushes. Due to the absence of brush mechanism AC motors have longer life expectancy. DC motors comes in two forms, Brushed and Brushless motors. DC motors without brushes are termed as BLDC (Brushless DC) motors.

144. How many windings does a 2 phase bipolar stepper motor have?

- a) 2
- b) 3
- c) 4
- d) 5

Answer: a

Explanation: A 2 phase bipolar stepper motor has 2 windings. One winding is present for each phase. So, in total two windings are present for 2 phases. Each coil or winding has 2 leads. Therefore total 2 windings (coils) will have 4 leads.

145. Which finger denotes the direction of force in Fleming's left hand rule?

- a) Middle finger
- b) First finger
- c) Thumb
- d) Little finger

Answer: c

Explanation: Thumb denotes the direction of force in Fleming's left hand rule.

Fleming's left hand rule states that, when a current carrying conductor is placed in a magnetic field then it experiences a force. The direction of force can be determined by Fleming's left hand rule..

146. Who invented electrical relay?

- a) Grueblerowen
- b) Joseph Henry
- c) Philip Vaughan
- d) Robert Abalakov

Answer: b

Explanation: Joseph Henry invented electrical relay. He was an American scientist and an electromagnetism pioneer who invented the electrical relay in the year 1835. This relay was made in order to improve the capabilities of electric telegraph.

147. What is the full form of MCB?

- a) Miniature contact breaker
- b) Mini circuit breaker
- c) Miniature circuit breaker
- d) Mini contact breaker

Answer: c

Explanation: MCB stands for miniature circuit breaker. It is an automatic electro mechanical switching device which is used in most of the houses, apartments, industries etc. This device automatically breaks the circuit from the main power supply when excessive current passes through it.

148. Which electrical relay contact tip material has the highest electrical conductivity?

- a) Silver
- b) Alloy of silver and copper
- c) Alloy of silver and tungsten
- d) Alloy of silver and Nickel

Answer: a

Explanation: Silver electrical relay contact tip has the highest electrical conductivity among the all mentioned above. The electrical as well as thermal conductivity of silver is much higher than any of its alloy.

149. Which type of relay can be used to automatically switch between transmitter and receiver configuration from a same antenna setup?

- a) Mercury relay
- b) Latching relay
- c) Force-guided contacts relay
- d) Coaxial relay

Answer: d

Explanation: Coaxial relay can be used to automatically switch between transmitter and receiver configuration from a same antenna setup. These relays are often used to perform switching action from receiver to transmitter and vice versa when only one antenna is present.

150. Solid state relays face high arching problems.

- a) True

b) False

Answer: b

Explanation: Solid state relays do not face arcing problems. Since solid state relays have no moving part therefore it does not face any arching problem. The arching problem of the ordinary electro mechanical relays was resolved by solid state relays.

151. Solid state relays have only one moving part which helps in switching between "ON" and "OFF" position.

a) True

b) False

Answer: b

Explanation: Solid state relays have no moving parts. The mechanical switching system in the primitive electro mechanical relays was replaced by power transistors, thyristors or triac's. No physical movement takes place in solid state relays.

152. Which type of snubber network is required at the output terminal of the solid state relays to protect the semiconductor from transient spikes and unwanted noises?

a) RC (Resistor capacitor) type

b) RL (Resistor inductor) type

c) RLC (Resistor inductor capacitor) type

d) LC (Inductor capacitor) type

Answer: a

Explanation: RC (Resistor capacitor) type of snubber network is required at the output terminal of the solid state relays to protect the semiconductor from transient spikes and unwanted noises. Snubber circuits are those circuits which are used to suppress the voltage spikes.

153. Which type of solid state relay turns “ON” when a minimum operating control voltage is applied and the load voltage nearly reaches zero?

- a) Instant ON Relays
- b) Zero-Switching Relays
- c) Peak Switching Relays
- d) Analog Switching Relays

Answer: b

Explanation: Zero-Switching Relays turn “ON” when a minimum operating control voltage is applied and the load voltage nearly reaches zero. Zero switching relays wait for the alternating wave to reach zero for the relay to turn on.

154. Who developed the first Solid state relay?

- a) Grueblerowen
- b) Walcraft engineers
- c) Crydom engineers
- d) Robert Conrad

Answer: c

Explanation: Crydom engineers developed the first Solid state relay. These relays were developed in the year 1972. Solid state relays are switching device that can switch “ON” and “OFF” positions by a small input voltage.

155. Which is an example of relay?

- a) KSD9700
- b) XMPA06B2131
- c) SLB700A/06VA
- d) 792XDXM4L-24A

Answer: d

Explanation: 792XDXM4L-24A is an example of relay. It is manufactured by SCHNEIDER ELECTRIC /MAGNECRAFT. XMPA06B2131 is an example of pressure switch. KSD9700 is an example of temperature switch. SLB700A/06VA is an example of force sensor.

156. A good electrical relay contact tip should have higher arc resistance.

- a) True
- b) False

Answer: a

Explanation: A good electrical relay contact tip should have higher arc resistance. Too much arcing or sparking can damage the contact tip. If the arcing become severe, it can even weld the contact point which can led excess of current flow and can damage other components.

157. Relay and contactors perform different physical operation.

- a) True
- b) False

Answer: b

Explanation: Relay and contactors do not perform different physical operation. They have same physical operation. The only difference is the rated voltage on which they work. Contractors are relays that perform switching operation at high voltage. Whereas relays perform switching operation at low voltage.

158. Electro mechanical relay's (EMR) needs to be manually turned "ON" and "OFF".

- a) True
- b) False

Answer: a

Explanation: Electro mechanical relay's (EMR) needs to be manually turned "ON" and "OFF". This is one of the biggest disadvantages of Electro mechanical relay's (EMR). Also they can only switch small electric current.

159. Which type of relay contains a glass tube which contains an inert gas which is used to protect the contacts from corrosion?

- a) Polarised relay
- b) Solid-state relay
- c) Contactor
- d) Reed relay

Answer: d

Explanation: Reed relays contain a glass tube which contains an inert gas which is used to protect the contacts from corrosion. These contacts move on the principle of magnetic effect of electric current. These contacts act as electromagnets which helps them to perform switching operation.

160. Which electrical relay contact tip material has the highest thermal conductivity?

- a) Silver
- b) Alloy of silver and copper
- c) Alloy of silver and tungsten
- d) Alloy of silver and Nickel

Answer: a

Explanation: Silver electrical relay contact tip has the highest thermal conductivity among the all mentioned above. The thermal as well as electrical conductivity of silver is much higher than any of its alloy.

161. How many terminals does a GTO (Gate turn off thyristor) switch has?

- a) 2
- b) 3

- c) 4
- d) 5

Answer: b

Explanation: A GTO (Gate turn off thyristor) switch has total 3 terminals. One terminal is a gate terminal and other two terminals are anode and cathode terminal respectively. It is a bipolar semiconductor switching device.

162. What is the full form of DPDT with respect to switches?

- a) Double pull double throw
- b) Double pole double throw
- c) Double pull dual throw
- d) Dual pole dual throw

Answer: b

Explanation: The full form of DPDT is “Double pole double throw” with respect to switches. This type of switches has two inputs and four outputs. These switches are widely used in the robotic sector due to its versatile nature.

163. What is the full form of DIAC with respect to switches?

- a) Diode alternating current
- b) Dipole alternating current
- c) Dual alternating current
- d) Direct alternating current

Answer: a

Explanation: The full form of DIAC is “Diode alternating current” with respect to switches. It is a two terminal, bidirectional switching device. Since it is bi-directional, therefore it does not have a fixed anode and cathode terminal.

164. Which is a type of solid state switch?

- a) NPN Diode
- b) Bipolar junction transistor
- c) DPDT(Double pole double throw) Switch
- d) Push button Switch

Answer: b

Explanation: Bipolar junction transistor is a type of solid state switch. These switches have no moving parts and no physical contacts which is why they are called so. They are also called as electronic switch.

165. DIAC (Diode alternating current) switch has three terminals.

- a) True
- b) False

Answer: b

Explanation: DIAC (Diode alternating current) switch does not have three terminals. It is a two terminal, bidirectional switching device. Since it is bi-directional, therefore it does not have a fixed anode and cathode terminal.

166. TRIAC (Triode alternating current) is a bi-directional switching device.

- a) True
- b) False

Answer: a

Explanation: TRIAC (Triode alternating current) is a bi-directional switching device. They are often used as motor driver or motor controller to control the revolution speed of the motor shaft. They are even capable of controlling AC power.

167. Which is an example of pressure switch?

- a) KSD9700
- b) XMPA06B2131
- c) SLB700A/06VA
- d) BMP180

Answer: b

Explanation: XMPA06B2131 is an example of pressure switch. It is manufactured by "SCHNEIDER ELECTRIC". KSD9700 is an example of temperature switch. BMP180 is an example of pressure sensor. SLB700A/06VA is an example of force sensor.

168. Which is an example of temperature switch?

- a) KSD9700
- b) CMCP793V-500
- c) SLB700A/06VA
- d) BMP180

Answer: a

Explanation: KSD9700 is an example of temperature switch. It has 250 volt 5 ampere input rating. It has an operating temperature of up to 150°C. BMP180 is an example of pressure sensor. SLB700A/06VA is an example of force sensor. CMCP793V-500 is a velocity sensor.

169. Which type of switch can be used as automatic switch to detect the level of water in a water tank and perform suitable switching action?

- a) Flow Switch
- b) Float switch
- c) DPDT (Double pole double throw) Switch
- d) Push button Switch

Answer: b

Explanation: Float switch can be used as automatic switch to detect the level of water in a water tank and perform suitable switching action. These switches are mainly used to control the AC and DC water pumps. When the water exceeds a certain limit the floating element of the switch moves along with it and triggers the switch to act accordingly.

170. Which type of switch can be used as automatic switch to detect the presence of object by its weight?

- a) SPST (Single pole Single throw) Switch
- b) Limit switch
- c) DPDT (Double pole double throw) Switch
- d) Push button Switch

Answer: b

Explanation: Limit switch is used as automatic switch to detect the presence of object. These switches are usually used to detect the presence or absence of the object. They have a flexible arm which is responsible for the switching action.

171. A GTO (Gate turn off thyristor) switch is a unipolar device.

- a) True
- b) False

Answer: b

Explanation: A GTO (Gate turn off thyristor) switch is not a unipolar device. It is a bipolar, three terminal semiconductor switching device. It uses both electrons and holes for the conduction of current through it.

172. DIAC (Diode alternating current) is a bi-directional switching device.

- a) True
- b) False

Answer: a

Explanation: DIAC (Diode alternating current) is a bi-directional switching device. . It is a two terminal switching device that does not have a fixed anode and cathode terminal. It can be used regardless of the identification of anode and cathode terminal.

173. Bipolar transistor can be used as a switch.

- a) True
- b) False

Answer: a

Explanation: Bipolar transistor can be used as a switch. This configuration of transistor is widely used in the electronic industry. A small base current can control comparatively large emitter to collector current.

174. Which switch can be used to rotate a DC motor in both clockwise and anti-clock wise direction?

- a) SPST (Single pole Single throw) Switch
- b) DPST (Double pole single throw) Switch
- c) DPDT (Double pole double throw) Switch
- d) Push button Switch

Answer: c

Explanation: DPDT (Double pole double throw) Switch can be used to rotate a DC motor in both clockwise and anti-clock wise direction. These switches are mostly preferred while making a remote controlled car projects.

175. What is the full form of SPDT with respect to switches?

- a) Single pull double throw
- b) Single pole double throw
- c) Single pull dual throw

d) Singular pole dual throw

Answer: b

Explanation: The full form of SPDT is “Single pole double throw” with respect to switches. This type of switches has one input and two outputs. These switches are versatile in nature as it facilitates with two output terminal form a single input.

176.What is the main purpose of an electrical switch?

- a) To convert AC to DC
- b) To control the flow of electricity
- c) To convert DC to AC
- d) To measure the current flow

Answer: b) To control the flow of electricity

Explanation: Electrical switches are used to interrupt the flow of electricity in a circuit, allowing us to control the power.

177.Which type of switch controls one or more lights from a single location?

- a) Single-pole switch
- b) Double-pole switch
- c) Three-way switch
- d) Four-way switch

Answer: a) Single-pole switch

Explanation: A single-pole switch controls a light or a set of lights from one location.

178.What type of switch allows you to control a light from two different locations?

- a) Single-pole switch
- b) Double-pole switch
- c) Three-way switch
- d) Four-way switch

Answer: c) Three-way switch

Explanation: A three-way switch allows you to control a light or a set of lights from two different locations.

179. Which type of switch has three terminals?

- a) Single-pole switch
- b) Double-pole switch
- c) Three-way switch
- d) Four-way switch

Answer: c) Three-way switch

Explanation: A three-way switch has three terminals – two “traveler” terminals and one “common” terminal.

180. A toggle switch operates through which mechanism?

- a) Sliding
- b) Pivoting
- c) Rotating
- d) Pushing

Answer: b) Pivoting

Explanation: A toggle switch operates through a pivoting mechanism where the lever is moved up or down to open or close the circuit.

181. Which type of switch is used to control heavy electrical loads?

- a) Single-pole switch
- b) Double-pole switch
- c) Push-button switch
- d) Toggle switch

Answer: b) Double-pole switch

Explanation: A double-pole switch can control higher voltage and is often used for heavy electrical loads.

182. A dimmer switch is used for what purpose?

- a) To control the brightness of lights
- b) To convert AC to DC
- c) To convert DC to AC
- d) To measure the current flow

Answer: a) To control the brightness of lights

Explanation: A dimmer switch is used to adjust the brightness of lights by altering the voltage waveform applied to the lamp.

183.What type of switch is a push-button switch?

- a) Momentary
- b) Latching
- c) Either a or b
- d) Neither a nor b

Answer: c) Either a or b

Explanation: A push-button switch can be either momentary (press and hold to activate, release to deactivate) or latching (press to change the state).

184.In electrical terminology, what does SPST stand for?

- a) Single Pole Single Throw
- b) Single Pole Short Throw
- c) Short Pole Single Throw
- d) Short Pole Short Throw

Answer: a) Single Pole Single Throw

Explanation: SPST stands for Single Pole Single Throw, which is a type of switch that controls one circuit with one on and off position.

185.Which type of switch is commonly used for bell circuits in homes?

- a) Single-pole switch
- b) Double-pole switch

- c) Push-button switch
- d) Dimmer switch

Answer: c) Push-button switch

Explanation: Push-button switches are commonly used for bell circuits in homes due to their momentary operation.

186.What is the difference between a single-pole and a double-pole switch?

- a) Number of circuits they control
- b) Number of locations they control
- c) Number of terminals
- d) All of the above

Answer: d) All of the above

Explanation: A single-pole switch controls one circuit from one location and has two terminals, while a double-pole switch controls two circuits, can be used from multiple locations, and has four terminals.

187.How many terminals does a double-pole switch have?

- a) Two
- b) Three
- c) Four
- d) Five

Answer: c) Four

Explanation: A double-pole switch has four terminals – two for input and two for output.

188.Which type of switch can allow or prevent the flow of current in multiple devices simultaneously?

- a) Single-pole switch
- b) Double-pole switch

- c) Three-way switch
- d) Four-way switch

Answer: b) Double-pole switch

Explanation: A double-pole switch can control two separate circuits, allowing or preventing the flow of current in multiple devices at the same time.

189. How many switch positions does an SPST switch have?

- a) One
- b) Two
- c) Three
- d) Four

Answer: b) Two

Explanation: An SPST (Single Pole Single Throw) switch has two positions – on and off.

190. A light is being controlled from three different locations using two three-way switches and one four-way switch. If the light is currently off, which switch should be toggled to turn it on?

- a) Any of them
- b) The three-way switches only
- c) The four-way switch only
- d) It cannot be determined

Answer: a) Any of them

Explanation: In a multi-way switching setup with three-way and four-way switches, any switch can be toggled to change the state of the light.

191. Which type of switch uses air as the dielectric medium?

- a) Air break switch
- b) Oil switch
- c) Vacuum switch
- d) SF6 switch

Answer: a) Air break switch

Explanation: An air break switch uses air as the dielectric medium to interrupt the flow of current.

192.The rocker switch design is commonly used in which application?

- a) Industrial machinery
- b) Home appliances
- c) Aircraft controls
- d) All of the above

Answer: d) All of the above

Explanation: Rocker switches, named for their rocking operation, are versatile and used in various applications, including industrial machinery, home appliances, and aircraft controls.

193.In electrical terminology, what does DPDT stand for?

- a) Double Pole Double Throw
- b) Double Pole Direct Throw
- c) Direct Pole Double Throw
- d) Direct Pole Direct Throw

Answer: a) Double Pole Double Throw

Explanation: DPDT stands for Double Pole Double Throw, a type of switch that controls two circuits and has two on positions.

194.Which type of switch operates by physically moving a conductor to open or close a circuit?

- a) Solid-state switch
- b) Mechanical switch
- c) Semiconductor switch
- d) Transistor switch

Answer: b) Mechanical switch

Explanation: A mechanical switch operates by physically moving a conductor to open or close a circuit.

195. What type of switch is commonly used in test equipment because it can connect one input to multiple outputs?

- a) Single-pole switch
- b) Double-pole switch
- c) Rotary switch
- d) Dimmer switch

Answer: c) Rotary switch

Explanation: A rotary switch can connect one input to multiple outputs, making it ideal for use in test equipment.

196. What kind of switch is used to control the speed of a fan?

- a) Single-pole switch
- b) Double-pole switch
- c) Rotary switch
- d) Speed control switch

Answer: d) Speed control switch

Explanation: A speed control switch is used to control the speed of a fan by varying the voltage supplied to it.

197. Which type of switch is activated by a change in light level?

- a) Photonic switch
- b) Photocell switch
- c) Photoelectric switch
- d) All of the above

Answer: d) All of the above

Explanation: All these switches are types of light-sensitive switches that operate based on changes in light levels.

198.What type of switch is a reed switch?

- a) Magnetic
- b) Mechanical
- c) Solid-state
- d) Thermal

Answer: a) Magnetic

Explanation: A reed switch is a type of switch that operates through a magnetic mechanism.

199.In a circuit with multiple switches connected in parallel, how many switches need to be closed to complete the circuit?

- a) All of them
- b) Any one of them
- c) At least half of them
- d) Two-thirds of them

Answer: b) Any one of them

Explanation: In a parallel circuit, closing any one switch will complete the circuit and allow current to flow.

200.What type of switch is used in a stairway where you can control the light from either end of the stairs?

- a) Single-pole switch
- b) Double-pole switch
- c) Three-way switch
- d) Four-way switch

Answer: c) Three-way switch

Explanation: A three-way switch allows you to control a light or a set of lights from two different locations, like at either end of a stairway.

201.Which switch allows control from more than two locations?

- a) Single-pole switch
- b) Double-pole switch
- c) Three-way switch
- d) Four-way switch

Answer: d) Four-way switch

Explanation: A four-way switch, in combination with two three-way switches, allows control from more than two locations.

202.A switch that interrupts the current flow after a pre-set time is known as what?

- a) Timer switch
- b) Dimmer switch
- c) Rotary switch
- d) Push-button switch

Answer: a) Timer switch

Explanation: A timer switch automatically turns off the current after a specified amount of time.

203.Which type of switch can function without physical or mechanical contact?

- a) Solid-state switch
- b) Mechanical switch
- c) Rotary switch
- d) Toggle switch

Answer: a) Solid-state switch

Explanation: A solid-state switch operates without physical or mechanical contact. It uses semiconductors to open and close the circuit.

204.In electrical terminology, what does DPST stand for?

- a) Direct Pole Single Throw
- b) Double Pole Single Throw

- c) Direct Pole Short Throw
- d) Double Pole Short Throw

Answer: b) Double Pole Single Throw

Explanation: DPST stands for Double Pole Single Throw, a type of switch that controls two circuits from a single ON/OFF position.

205.What type of switch is commonly used for industrial control circuits?

- a) Push-button switch
- b) Toggle switch
- c) Limit switch
- d) Rotary switch

Answer: c) Limit switch

Explanation: A limit switch is commonly used in industrial control circuits. It is operated by the motion of a machine part or the presence of an object.

206.What type of switch is often used in modems and routers for factory settings reset?

- a) Push-button switch
- b) Toggle switch
- c) Reset switch
- d) Rotary switch

Answer: c) Reset switch

Explanation: A reset switch is often used in devices like modems and routers. When pressed, it resets the device to its factory settings.

207.Which type of switch is operated by a key?

- a) Keylock switch
- b) Toggle switch
- c) Rotary switch
- d) Push-button switch

Answer: a) Keylock switch

Explanation: A keylock switch is operated with a key, providing an added level of security and access control.

208.Which switch controls the operation of some ignition systems in automobiles?

- a) Keylock switch
- b) Ignition switch
- c) Push-button switch
- d) Toggle switch

Answer: b) Ignition switch

Explanation: The ignition switch controls the operation of some ignition systems in automobiles.

209.A type of switch that is sensitive to body heat is known as?

- a) Heat switch
- b) Pyroelectric switch
- c) Infrared switch
- d) Thermal switch

Answer: c) Infrared switch

Explanation: An infrared switch is sensitive to body heat. It can detect the infrared radiation emitted by a warm body and actuate the switch.

210.What is a mercury switch?

- a) A switch that uses mercury as a dielectric medium
- b) A switch that uses mercury to open or close a circuit
- c) A switch sensitive to mercury level
- d) A switch that operates under high temperatures

Answer: b) A switch that uses mercury to open or close a circuit

Explanation: A mercury switch is a type of switch that uses a small amount of mercury inside a sealed capsule to open or close a circuit.

211. What is the main advantage of solid-state switches over mechanical switches?

- a) They have a larger size
- b) They have a longer operational life
- c) They require a high voltage to operate
- d) They have a slower switching speed

Answer: b) They have a longer operational life

Explanation: Solid-state switches have a longer operational life than mechanical switches because they have no moving parts that can wear out.

212 What type of switch is used to detect the liquid level in a tank?

- a) Float switch
- b) Level switch
- c) Both a and b
- d) None of the above

Answer: c) Both a and b

Explanation: Both float switches and level switches are used to detect the level of liquid in a tank.

213 What type of switch is used to protect an electrical circuit from damage caused by excess current?

- a) Circuit breaker
- b) Relay
- c) Fuse
- d) All of the above

Answer: d) All of the above

Explanation: Circuit breakers, relays, and fuses are all types of protective switches that can interrupt the flow of electricity when the current exceeds a certain level.

214 What type of switch is commonly used in home automation systems?

- a) Toggle switch
- b) Push-button switch
- c) Relay switch
- d) Smart switch

Answer: d) Smart switch

Explanation: A smart switch is commonly used in home automation systems. It can be controlled remotely using a smartphone or other networked device.

215 Which switch allows the current to flow in only one direction?

- a) Diode
- b) Transistor
- c) Resistor
- d) Capacitor

Answer: a) Diode

Explanation: A diode is a switch that allows current to flow in only one direction. It is used in various applications, including power conversion and signal modulation.

216 In a 2-way switch wiring system, how many wires are typically needed?

- a) Two
- b) Three
- c) Four
- d) Five

Answer: b) Three

Explanation: A 2-way switch typically requires three wires: one common wire and two traveler wires.

217 What is the purpose of a 'test' button on a Ground Fault Circuit Interrupter (GFCI) outlet?

- a) To test the power supply
- b) To test the ground connection
- c) To test the functionality of the GFCI
- d) To test the connected devices

Answer: c) To test the functionality of the GFCI

Explanation: The 'test' button on a GFCI outlet is used to ensure that the GFCI is working properly and can respond to a ground fault.

218 What type of switch is often used in emergency stop safety circuits?

- a) Push-button switch
- b) Limit switch
- c) E-stop switch
- d) Toggle switch

Answer: c) E-stop switch

Explanation: An E-stop switch (Emergency Stop) is used in safety circuits to immediately shut down the system in case of an emergency.

219 What is the main function of a relay in an electrical circuit?

- a) To amplify the electrical signal
- b) To switch a larger current using a smaller one
- c) To reduce electrical noise
- d) To convert AC to DC

Answer: b) To switch a larger current using a smaller one

Explanation: A relay is used in an electrical circuit to switch a larger current using a smaller one. It provides isolation between control and load circuits.

220 What is the name of a switch that uses a solenoid to operate?

- a) Solenoid switch
- b) Relay

- c) Magnetic switch
- d) All of the above

Answer: d) All of the above

Explanation: All these switches use a solenoid to operate. They use the principle of electromagnetic induction to open or close the circuit.

221 What type of switch is typically used in burglar alarm systems?

- a) Toggle switch
- b) Reed switch
- c) Rotary switch
- d) Dip switch

Answer: b) Reed switch

Explanation: A reed switch is typically used in burglar alarm systems. When a magnetic field is brought near, the reeds inside the switch come together to close the circuit.

222 Which of the following is a disadvantage of mechanical switches?

- a) They do not provide firm on/off states
- b) They have a limited life span due to wear and tear
- c) They require a high voltage to operate
- d) They cannot handle large currents

Answer: b) They have a limited lifespan due to wear and tear

Explanation: Mechanical switches have moving parts that can wear out over time, limiting their lifespan.

223 Which type of switch is often used in data networks for routing data packets?

- a) Network switch
- b) Ethernet switch
- c) Both a and b
- d) None of the above

Answer: c) Both a and b

Explanation: Both network switches and Ethernet switches are used in data networks for routing data packets between devices.

224 What type of switch is used to detect the presence or absence of an object?

- a) Proximity switch
- b) Limit switch
- c) Pressure switch
- d) Toggle switch

Answer: a) Proximity switch

Explanation: A proximity switch is used to detect the presence or absence of an object without physical contact.

225 Which type of switch uses the Hall effect principle to switch currents?

- a) Hall effect switch
- b) Transistor switch
- c) Diode switch
- d) Relay switch

Answer: a) Hall effect switch

Explanation: A Hall effect switch uses the Hall effect, a phenomenon in which a voltage difference is created across an electrical conductor, transverse to an electric current in the conductor and a magnetic field perpendicular to the current.

Thank You

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