1. The name of pure semiconductor material that has an equal number of electrons and holes
   A. n-type
   B. pure type
   C. intrinsic
   D. p-type
   ANSWER: C

2. Elements that has four valence electrons are classified as
   A. conductor
   B. insulator
   C. elemental semiconductor
   D. compound semiconductor
   ANSWER: C

3. An example of an elemental semiconductor.
   A. Germanium (Ge)
   B. Gallium Arsenide (GaAs)
   C. Gallium Phosphide (GaP)
   D. Aluminum Arsenide (AlAs)
   ANSWER A

4. Which of the following is an example of a compound semiconductor?
   A. Gallium Arsenide (GaAs)
   B. Gallium Phosphide (GaP)
   C. Aluminum Arsenide (AlAs)
   D. All of the above
   ANSWER: D

5. Germanium has an atomic number of 32 and an atomic weight of approximately 72 amu. How many electrons, protons and neutrons are there?
   A. 32, 32, 40
   B. 32, 32, 104
   C. 40, 32, 32
   D. 40, 32, 104
   ANSWER: A

6. The chemical bond that is present in a crystal lattice of silicon atoms.
   A. covalent bond
   B. electrovalent bond
   C. ionic bond
   D. metallic bond
   ANSWER: A

7. The atomic weight of a silicon atom is approximately 28 amu. How many electrons, protons and neutrons does the atom consist?
   A. 14, 42, 14
   B. 14, 14, 42
   C. 42, 14, 14
   D. 14, 14, 14
   ANSWER: D

8. What is the total charge at the nucleus of silicon atom?
   A. -12e C
   B. 12e C
   C. -14e C
   D. 14e C
   ANSWER: D

9. In materials, what do you call the area that separates the valence band and the conduction band?
   A. energy gap
   B. forbidden band
   C. insulation band
   D. A and B are correct
   ANSWER: B

10. At absolute zero temperature, semiconductor acts as
   A. an insulator
   B. a conductor
   C. a semi-insulator
   D. usual
   ANSWER: A

11. The electron flow in a semiconductor material is
   A. opposite in direction of hole flow
   B. the same direction with hole flow
   C. the drift current
   D. known as the conventional current
   ANSWER: A

12. Typical range of the resistivity of a semiconductor
   A. $10^{-15} – 10^{-18}$ Ω-cm
   B. $10^{-5} – 10^{-8}$ Ω-cm
   C. $10 – 10^{4}$ Ω-cm
   D. $10^{8} – 10^{15}$ Ω-cm
   ANSWER: C

13. Chemical bond that is significant in metals
   A. ionic bonding
   B. electrovalent bonding
   C. covalent bonding
   D. metallic bonding
   ANSWER: D

14. A semiconductor that is free from impurities
   A. intrinsic semiconductor
   B. extrinsic semiconductor
   C. compensated semiconductor
   D. elemental semiconductor
   ANSWER: A

15. The process of adding impurities in a semiconductor material.
    A. growing
    B. diffusion
    C. doping
    D. depleting
    ANSWER: C

16. Impurities with five valence electrons.
    A. acceptor
    B. donor
    C. trivalent
    D. pentavalent
    ANSWER: D

17. Example of acceptor impurities.
    A. pentavalent impurities
    B. trivalent impurities
    C. tetravalent impurities
    D. hexavalent impurities
    ANSWER: B

18. If the substance used in doping has less than four valence electrons, it is known as
    A. acceptor
    B. donor
    C. trivalent
    D. pentavalent
    ANSWER: A

19. Commonly used as donor impurities.
    A. Antimony (Sb)
    B. Arsenic (As)
    C. Phosphorus (P)
    D. all of the above
    ANSWER: D

20. Example of trivalent impurities.
    A. Boron (B)
    B. Gallium (Ga)
    C. Indium (In)
    D. all of the above
    ANSWER: D

21. Donor-doped semiconductor becomes a
    A. N-type semiconductor
    B. good conductor
    C. p-n semiconductor
    D. P-type semiconductor
    ANSWER: A

22. What do you call a semiconductor that is doped with both donor and acceptor impurities?

A. double doped semiconductor
B. compensated semiconductor
C. compound semiconductor
D. diffused semiconductor

ANSWER: B

23. The resistance of a semiconductor is known as
A. bulk resistance
B. intrinsic resistance
C. extrinsic resistance
D. dynamic resistance

ANSWER: A

24. The most extensively used semiconductor.
A. silicon
B. germanium
C. gallium phosphide
D. gallium arsenide

ANSWER: A

25. Semiconductor whose electron and hole concentrations are equal.
A. extrinsic semiconductor
B. intrinsic semiconductor
C. compensated semiconductor
D. doped semiconductor

ANSWER: B

26. Silicon is widely used over germanium due to its several advantages, what do you think is its most significant advantage?
A. abundant
B. cheap
C. temperature stable
D. low leakage current

ANSWER: D

27. Current flow in a semiconductor that is due to the applied electric field.
A. diffusion current
B. conventional current
C. drift velocity
D. drift current

ANSWER: D

28. The movement of charge carriers in a semiconductor even without the application of electric potential.
A. diffusion current
B. conventional current
C. drift current
D. saturation current

ANSWER: A

29. Typically, how much energy is required for a valence electron to move to the conduction band for a doped semiconductor?
    A. 0 eV
    B. 0.05 eV
    C. 1.0 eV
    D. 5.0 eV
    ANSWER: B

30. Conduction of electrons in a doped semiconductor happens at
    A. conduction band
    B. forbidden band
    C. valence band
    D. nuclei band
    ANSWER: A

31. Theoretically, where does the conduction of holes occur in a doped semiconductor?
    A. conduction band
    B. forbidden band
    C. valence band
    D. empty band
    ANSWER: C

32. In energy band diagram of a doped semiconductor, the donor level
    A. is near the valence band
    B. is near the conduction band
    C. is exactly in between the valence and conduction band
    D. depends on the amount of doping
    ANSWER: B

33. The acceptor level in a doped semiconductor
    A. is near the valence band level
    B. is near the conduction level
    C. is exactly in between the conduction and valence band
    D. will depend on the concentration of doping
    ANSWER: A

34. In a semiconductor material, what will happen to the number of free electrons when the temperature rises?
    A. increases
    B. decreases exponentially
    C. decreases
    D. remains the same
    ANSWER: A

35. The electrical resistance of a semiconductor material will _____ as the temperature increases.
    A. increase
    B. increase exponentially
    C. decrease
    D. not change
    ANSWER: C

36. The potential required to removed a valence electron
    A. valence potential
    B. threshold potential
    C. critical potential
    D. ionization potential
    ANSWER: D

37. Among the given elements, which is considered as nonmetal?
    A. silicon (Si)
    B. germanium (Ge)
    C. tin (Sn)
    D. lead (Pb)
    ANSWER: A

38. A semiconductor that is classified as a metalloid or semimetal
    A. silicon (Si)
    B. germanium (Ge)
    C. tin (Sn)
    D. carbon (C)
    ANSWER: B

39. Semiconductor that is very rare, it only occurs in minute quantities in many metal sulfides
    A. silicon (Si)
    B. germanium (Ge)
    C. tin (Sn)
    D. lead (Pb)
    ANSWER: B

40. Compound semiconductors are also known as
    A. compensated semiconductors
    B. amorphous semiconductors
    C. organic semiconductors
    D. inner-mettalic semiconductors
    ANSWER: D

41. What semiconductor that is mostly used in devices requiring the emission or absorption of lights?
    A. amorphous semiconductor
    B. organic semiconductor
    C. compound semiconductor
    D. elemental semiconductor
    ANSWER: C

42. For high-speed integrated circuit, which semiconductor material given below is best to be used?
    A. silicon
    B. germanium
    C. carbon
    D. gallium arsenide

ANSWER: D

43. How much impurity concentration is needed for a sample of silicon to change its electrical property from a poor conductor to a good conductor?
    A. one part per hundred
    B. one part per thousand
    C. one part per million
    D. one part per billion
    ANSWER: C

44. The restriction of certain discrete energy levels in a semiconductor material can be predicted generally by using what model?
    A. Bohr model
    B. string model
    C. wave model
    D. particle model
    ANSWER: A

45. Is defined as the energy acquired by an electron moving through a potential of one volt.
    A. electron Joules (eJ)
    B. electron-potential
    C. oxidation potential
    D. electron Volt (eV)
    ANSWER: D

46. At room temperature, in a perfect silicon crystal, the equilibrium concentration of thermally generated electrons in the conduction band is about
    A. 1.5×10^5 per cubic cm.
    B. 1.5×10^{10} per cubic cm.
    C. 1.5×10^{15} per cubic cm.
    D. 1.5×10^{20} per cubic cm.
    ANSWER: B

47. What is the basis in operation of semiconductor photoconductors?
    A. EHP generation
    B. EHP degeneration
    C. EHP optical degeneration
    D. EHP optical generation
    ANSWER: D

48. The semiconductor that is used in xerography
    A. selenium (Se)
    B. gallium phosphide (GaP)
    C. cadmium compound
    D. organic semiconductor
    ANSWER: A

49. A silicon material has an intrinsic concentration $n_i=10^{10}$ per cubic centimeter at room temperature. If it is doped with 10^{15} antimony atoms per cubic centimeter, what is now the approximate electron concentration at the conduction band?
    A. 10^5 electrons

B. 10^{10} electrons
C. 10^{15} electrons
D. 10^{20} electrons

ANSWER: C

50. When an electron at the conduction band falls back to the valence band it will recombine with the hole. This is known as
    A. regeneration
    B. reunion
    C. combination
    D. recombination

    ANSWER: D

51. Which semiconductor is mostly used to detect near infrared?
    A. silicon
    B. germanium
    C. carbon
    D. silicon carbide

    ANSWER: D

52. What semiconductor that is good for high-temperature applications?
    A. indium antimonide (InSb)
    B. gallium anitmonide(GaSb)
    C. silicon carbide (SiC)
    D. diamond (C)

    ANSWER: A

53. Among the given semiconductors below, which has the highest mobility?
    A. silicon
    B. germanium
    C. gallium arsenide
    D. indium antimonide

    ANSWER: D

54. A semiconducting glass is known as
    A. isomorphous semiconductor
    B. amorphous semiconductor
    C. organic semiconductor
    D. compound semiconductor

    ANSWER: B

55. For an electroluminescent of green and red lights, which semiconductor is best?
    A. silicon carbide
    B. gallium arsenide
    C. indium antimonide
    D. gallium phosphide

    ANSWER: D

56. Typical range of power dissipation for a semiconductor to be considered as “low power” or “small signal”
    A. less than 1 watt

B. 5 < P < 10 watts
C. 10 < P < 20 watts
D. 20 watts above

ANSWER: A

57. In the design of high power semiconductor devices, it involves what factors?
A. making the size of the semiconductor bigger
B. packing the device into a bigger case
C. excellent contact between the semiconductor and the case
D. all of the above

ANSWER: D

58. How to have a better high-frequency response in designing semiconductor devices?
A. make the chip as small as possible
B. the leads should be made shorter and smaller
C. smaller packaging
D. all of the above

ANSWER: D

59. Before an electron can participate in the conduction of electricity, it must leave from the valence band and transfer to the conduction band. Transferring to the conduction band involves energy acquisition by an electron from external sources and this energy must be greater than the energy gap of the material. Which semiconductor material has the highest energy gap?
A. Zinc Sulfide (ZnS)
B. silicon (Si)
C. germanium (Ge)
D. Indium Antimonide (InSb)

ANSWER: A

60. Which of the following semiconductors has the smallest energy gap?
A. ZnS
B. Si
C. Ge
D. InSb

ANSWER: D

61. The ease with which a charge carrier (electron or hole) moves in a semiconductor material is known as mobility. It is also defined as the average drift velocity of electrons and holes per unit electrostatic field. Which of the semiconductor materials has the highest value of electron-mobility?
A. InSb
B. Ge
C. Si
D. AlP

ANSWER: A

62. In semiconductor materials, electrons have a higher value of mobility than holes, but which semiconductor material has the slowest electron-mobility?
A. InSb
B. GaP

C. GaAs
D. AlP
ANSWER: D

63. Solar cell is a semiconductor electric-junction device, which absorbs the radiant energy of sunlight and converts it directly and efficiently into electrical energy. This device, uses what type of semiconductor materials?
A. single-crystal silicon
B. amorphous or polycrystalline silicon
C. GaAs, CdS, CdTe, CuS
D. all of the above
ANSWER: D

64. What is formed when n-type and p-type semiconductors are brought together?
A. pn junction
B. semiconductor junction
C. energy band gap
D. semiconductor diode
ANSWER: A

65. PN junction acts as a one way valve for electrons because _____.
A. the circuit in which the diode is used, only attempts to pump electrons in one diode
B. electrons tend to follow the direction of the hole
C. there is a little mechanical switch inside a diode
D. when electrons are pump from P to N, free electrons and holes are force apart leaving no way for electrons to cross the junction
ANSWER: D

66. The device that is formed when an n-type and p-type semiconductors are brought together
A. pn junction
B. semiconductor junction
C. depletion region
D. junction diode
ANSWER: D

67. An external voltage applied to a junction reduces its barrier and aid current to flow through the junction
A. reverse bias
B. external bias
C. junction bias
D. forward bias
ANSWER: D

68. A device containing an anode and a cathode or a pn junction of a semiconductor as the principal elements and provides unidirectional conduction.
A. diode
B. diac
C. triode
D. triac

ANSWER: A

69. Unidirectional conduction in two-electrodes in any device other than a diode, such that rectification between the grid and cathode of a triode, or asymmetrical conduction between the collector and base of a transistor is called
    A. rectification
    B. diode action
    C. clipping
    D. clamping

ANSWER: B

70. The p-type material in a semiconductor junction diode is technically termed as
    A. positive terminal
    B. negative terminal
    C. cathode
    D. anode

ANSWER: D

71. Cathode in a semiconductor junction diode is referred to the
    A. positive terminal
    B. junction
    C. p-type terminal
    D. n-type terminal

ANSWER: D

72. The area in the semiconductor diode where there are no charge carriers
    A. depletion layer
    B. depletion region
    C. depletion mode
    D. depletion area

ANSWER: B

73. Depletion region is an area in a semiconductor device where there are no charge carriers exist. This will be always near the junction of n-type and p-type materials. What causes this junction to be depleted by charge carriers?
    A. Due to the recombination of holes and electrons at the junction
    B. Due to the cancellation of positively charge protons and negatively charge electrons
    C. Due to the annihilation of charge carriers
    D. Due to the combination of positively charge holes and negatively charge electrons

ANSWER: D

74. A junction diode is said to be forward-biased if
    A. Anode is supplied more positive than the cathode.
    B. Anode is supplied more negative than the cathode.
    C. A voltage greater than threshold is applied, with cathode less positive than anode.
    D. A voltage greater than threshold is applied, with cathode less negative than anode.

ANSWER: C

75. What do you call the very small amount of current that will flow in the diode when it is reverse biased?
    A. saturation current
    B. reverse saturation current
    C. cut-off current
    D. holding current
    ANSWER: B

76. When the diode is supplied with forward direction potentials but with a magnitude less than the threshold voltage of the diode, still it will not “turn-on” and will only allow a very small amount of current to pass. This very small current is known
    A. as leakage current
    B. as forward saturation current
    C. as holding current
    D. as cut-off current
    ANSWER: D

77. The minimum voltage required before a diode can totally conduct in a forward direction.
    A. triggering voltage
    B. breakdown voltage
    C. saturation voltage
    D. threshold voltage
    ANSWER: D

78. What will happen to the threshold voltage of the diode when it operates at higher temperatures.
    A. increases
    B. increases exponentially
    C. decreases
    D. decreases exponentially
    ANSWER: C

79. The forward current in a conducting diode will _____ as the operating temperature increases.
    A. not be affected
    B. decrease
    C. decrease exponentially
    D. increase
    ANSWER: D

80. As the operating temperature of a reverse-biased diode is increased, its leakage or reverse saturation current will
    A. Increase
    B. increase exponentially
    C. decrease
    D. decrease exponentially
    ANSWER: B

81. The small value of direct current that flows when a semiconductor device has reverse bias

A. surge current
B. bias current
C. reverse current
D. current limit

ANSWER: C

82. Normally, diodes will not conduct when reverse-biased, but if the reverse voltage is increased further, a point will be reached where the diode gives up and allowing the current to surge. This voltage is one of the limiting parameter of diodes and is known as
A. breakdown voltage (V_{BR})
B. peak inverse voltage (PIV)
C. peak reverse voltage (PRV)
D. all are correct

ANSWER: D

83. For a silicon diode, calculate the current at room temperature if the forward voltage V_F = 0.3 V and the reverse saturation current I_S = 100 nA.
A. 32.8 μA
B. 10.8 μA
C. 32.8 mA
D. 10.8 mA

ANSWER: A

84. The breakdown voltage of a junction diode will _____
A. Increase as operating temperature rises.
B. Increase exponentially as operating temperature rises.
C. Decrease as operating temperature rises.
D. Not change as operating temperature rises.

ANSWER: C

85. Calculate the new threshold voltage of a germanium diode when it operates at 100 ^{0}C.
A. 0.113 V
B. 0.188 V
C. 0.215 V
D. 0.513 V

ANSWER: A

86. A silicon diode has a reverse saturation current of 50 nA at room temperature. If the operating temperature is raised by 50°C, what is now the reverse saturation current?
A. 105.56 nA
B. 287.73 nA
C. 827.89 nA
D. 1.66 μA

ANSWER: D

87. In every increase of 10°C in the operating temperature of a diode will cause its reverse saturation current to
A. decrease
B. double
C. triple
D. quadruple

ANSWER: B

88. What do you call the resistance of the diode when operating at a steady state voltage?
    A. dc resistance
    B. dynamic resistance
    C. ac resistance
    D. average resistance
    ANSWER: A

89. The resistance of the diode that is significant when operating with a small ac signal
    A. dc resistance
    B. static resistance
    C. dynamic resistance
    D. average resistance
    ANSWER: C

90. When a diode is used in large ac voltages, the resistance that is to be considered is
    A. dc resistance
    B. static resistance
    C. dynamic resistance
    D. average resistance
    ANSWER: D

91. At forward bias condition, what will happen to the diode resistance when the applied voltage is increased?
    A. will also increase
    B. will increase exponentially
    C. will decrease
    D. will not change
    ANSWER: C

92. The primary use of Zener diode in electronic circuits.
    A. resistance regulator
    B. rectifier
    C. voltage regulator
    D. current regulator
    ANSWER: C

93. What phenomenon in electronics does an avalanche breakdown primarily dependent?
    A. Doping
    B. Recombination
    C. Ionization
    D. Collision
    ANSWER: C

94. When a diode is reverse biased the depletion region widens, since it is in between positively charge holes and negatively charge electrons, it will have an effect of a capacitor, this capacitance is called what?
    A. diffusion capacitance
    B. storage capacitance
    C. stray capacitance

D. transition capacitance
ANSWER: D

95. In a semiconductor diode, the total capacitance, that is the capacitance between terminals and electrodes, and the internal voltage variable capacitance of the junction is called
A. diffusion capacitance
B. transition capacitance
C. depletion-region capacitance
D. diode capacitance
ANSWER: D

96. What capacitance is significant when the diode is forward biased?
A. diffusion capacitance or storage capacitance
B. transition capacitance
C. depletion-region capacitance
D. stray capacitance
ANSWER: A

97. A diode that is especially designed to operate as a voltage-variable capacitor. It utilizes the junction capacitance of a semiconductor diode.
A. varactor
B. varicap
C. varistor
D. A and B are correct
ANSWER: D

98. The capacitance of a varactor will _____ when the forward bias voltage is increased.
A. increase
B. decrease
C. exponentially decrease
D. not change
ANSWER: A

99. The time taken by the diode to operate in the reverse condition from forward conduction
A. reverse recovery time
B. forward recovery time
C. reverse holding time
D. reverse time constant
ANSWER: A

100. In operating a diode at high-speed switching circuits, one of the most important parameters to be considered is
A. ac resistance
B. diode capacitance
C. noise figure
D. reverse recovery time (t_{rr})
ANSWER: D

101. The time required for forward voltage or current to reach a specified value after switching the diode from its reverse-to-forward-biased state.

A. reverse recovery time
B. forward recovery time (t_{fr})
C. saturation time
D. conduction time

ANSWER: B

102. The maximum power the diode can handle.
A. maximum derating power
B. maximum consumption power
C. breakdown power
D. maximum dissipation power

ANSWER: D

103. What is the most important specification for semiconductor diode?
A. Forward resistance
B. Reverse resistance
C. Peak inverse voltage
D. Current capacity

ANSWER: D

104. What will happen to the power handling capability of the diode if it is to be operated at a higher temperature?
A. decreases
B. increases
C. increases exponentially
D. will not be affected

ANSWER: A

105. Diode parameter that will inform the user as to what factor does the power handling capability of the diode is reduced as the operating temperature is increased.
A. power derating factor
B. power dissipating factor
C. power reduction constant
D. all of the above

ANSWER: A

106. A certain diode has a maximum power dissipation of 500 mW at room temperature and a linear power derating factor of 5.0 mW/°C. How much power the diode can handle if operated at 50°C.
A. 625 mW
B. 505 mW
C. 495 mW
D. 375 mW

ANSWER: D

107. A semiconductor device especially fabricated to utilize the avalanche or zener breakdown region. This is normally operated in the reverse-region and its application is mostly for voltage reference or regulation.
A. varactor diode
B. zener diode
C. shockley diode

D. Schottky barrier diode
ANSWER: B

108. Refers to a special type of diode which is capable of both amplification and oscillation.
A. Junction diode
B. Tunnel diode
C. Point contact diode
D. Zener diode
ANSWER: B

109. The effect obtain when the electric field across a semiconductor is strong enough which causes the free electrons to collide with valence electrons, thereby releasing more electrons and a cumulative multiplication of charge carriers occur.
A. Gunn
B. avalanche
C. tunneling
D. diffusion
ANSWER: B

110. A negative resistance diode commonly used in microwave oscillators and detectors, it is sometimes used as amplifiers. This device is also known as Esaki diode.
A. varactor diode
B. Schottky diode
C. IMPATT diode
D. tunnel diode
ANSWER: D

111. A rectifying metal-semiconductor junction
A. Schottky barrier diode
B. surface barrier diode
C. hot-carrier or hot-electron diode
D. all of the above are correct
ANSWER: D

112. Diode whose negative resistance depends on a specific form of quantum-mechanical bond structure of the material
A. Gunn diode
B. tunnel diode
C. TRAPATT diode
D. backward diode
ANSWER: A

113. One of the electronic semiconductor devices known as diac, function as
A. Four terminal multi-directional switch
B. Two terminal bi-directional switch
C. Two terminal unidirectional switch
D. Three terminal bi-directional switch
ANSWER: C

114. Another name of a three-layer diode. This is also considered as an ac diode.
A. Shockley diode

B. thyrector
C. thyristor
D. diac

ANSWER: D

115. A diode whose negative resistance is dependent on the classical effects of phase shift introduced by the time lag between maximum field and maximum avalanche current, and by the transit time through the device.
A. Read diode
B. IMPATT diode
C. TRAPATT diode
D. all of the above

ANSWER: D

116. What semiconductor diode that have a fine wire (called a cat-whisker) whose point is in permanent contact with the surface of a wafer of semiconductor material such as silicon, germanium or gallium arsenide?
A. point-contact diode
B. diac
C. PiN diode
D. thyrector

ANSWER: A

117. When the p-n junction of a semiconductor diode is inserted with an intrinsic material, the diode becomes a
A. backward diode
B. Read diode
C. Schokley diode
D. PiN diode

ANSWER: D

118. A four layer semiconductor diode whose characteristic at the first quadrant is similar to that of a silicon-controlled rectifier (SCR).
A. Shockley diode
B. thyrector
C. Schottky diode
D. diac

ANSWER: A

119. A diode that is especially processed so that its high-current flow takes place when the junction is reverse-biased. It is a variation of a tunnel diode.
A. Esaki diode
B. Read diode
C. zener diode
D. backward diode

ANSWER: D

120. A silicon diode that exhibits a very high resistance in both directions up to certain voltage, beyond which the unit switches to a low-resistance conducting state. It can be viewed as two zener diodes connected back-to-back in series.
A. bizener diode

B. diac
C. thyristor
D. thyrector
ANSWER: D

121. A type of Read diode that uses a heavily doped n-type material as its drift region
A. IMPATT diode
B. TRAPATT diode
C. TUNNETT diode
D. MITATT
ANSWER: A

122. A device containing more than one diode. An example is the full-wave bridge-rectifier integrated circuit.
A. diode array
B. diode IC
C. diode pack
D. combined diode
ANSWER: C

123. Is the combination of the inductance of the leads and electrodes, capacitance of the junction, and the resistance of the junction of a semiconductor diode.
A. diode impedance
B. diode ac resistance
C. diode reactance
D. diode ac parameter
ANSWER: A

124. In a reverse-biased pn junction, the sudden large increase in current that occurs when a particular value of reversed voltage is reached, and which is due to ionization by the high intensity electric field in the depletion region.
A. Zener effect
B. Hall effect
C. breakdown voltage
D. ionization
ANSWER: A

125. The appearance of RF current oscillations in a dc-biased slab of n-type gallium arsenide in a 3.3 kV electric field
A. Gunn effect
B. Hall effect
C. Zener effect
D. avalanche
ANSWER: A

126. The impedance presented by a junction operating in its zener breakdown region.
A. diode impedance
B. zener impedance
C. breakdown impedance
D. critical impedance
ANSWER: B

127. A curve showing the relationship between the voltage and the current of the diode at any given temperature
    A. characteristic curve
    B. transfer curve
    C. transfer characteristic curve
    D. all are correct
ANSWER: A

128. The line that is plotted in the diode characteristic curve which represents the load
    A. linear line
    B. operating line
    C. load line
    D. transfer load line
ANSWER: C

129. Diode is said to be operating at a point where the characteristic curve and the load line intersect. This point is technically termed as
    A. Q-point
    B. operating point
    C. quiescent point
    D. all are correct
ANSWER: D

130. What will happen to the magnitude of the load-line slope when the load resistance is decreased?
    A. it will also decrease
    B. it will increase
    C. it will increase exponentially
    D. is not affected by the load
ANSWER: B

131. Quiescent or Q-point position is dependent on
    A. the supply voltage
    B. the load resistance
    C. the type of diode
    D. all of the above
ANSWER: D

132. A germanium diode is connected to a load resistance of 1.5 kΩ and is supplied with 12-V such that the diode will be forward biased. What is the voltage across the diode?
    A. approximately 12 V
    B. approximately 0.7 V
    C. approximately 0.3 V
    D. lack of data and can't be solved
ANSWER: C

133. What is the drop across the diode when it is connected in series to a resistor of 1.8 kΩ and a supply voltage of 50 V. The supply voltage causes the diode to be reverse-biased.
    A. 50 V
    B. 0.7 V

C. 0.3 V
D. can not be solve, lack of data
ANSWER: A

134. Two germanium diodes are connected in series and have a load resistance of 10 kΩ and a forward supply voltage of 5 V. Calculate the voltage across the load resistor.
A. 4.7 V
B. 4.4 V
C. 0.6 V
D. 0.3 V
ANSWER: B

135. A silicon diode is in parallel with a germanium diode and is connected to a load resistor having a value of 20 kΩ and a forward supply voltage of 10 V. What is the approximate voltage across the silicon diode?
A. 10 V
B. 1.0 V
C. 0.7 V
D. 0.3 V
ANSWER: D

136. What is the output voltage across a load resistor if it is paralleled with a forward biased silicon diode? The resistor network is supplied with 10 V.
A. 0.7 V
B. 9.3 V
C. 10 V
D. Can't be solve, lack of data.
ANSWER: A

137. Diode circuit that is used to cut a portion of the input signal
A. clipper
B. clamper
C. peak detector
D. level shifter
ANSWER: A

138. A clipper circuit wherein the diode is connected in series with the load
A. series clipper
B. parallel clipper
C. shunt clipper
D. series feed clipper
ANSWER: A

139. What do you call a clipper circuit wherein the diode is shunted with the load?
A. series clipper
B. parallel clipper
C. cascade clipper
D. cascade clipper
ANSWER: B

140. A network with a diode and a capacitor that is used to shift the dc-level of the input signal
    A. clipper
    B. clamper
    C. shifter
    D. level inverter
ANSWER: B

141. Half-wave rectifier is a good example of
    A. a series clamper
    B. a parallel clamper
    C. a parallel clipper
    D. a series clipper
ANSWER: D

142. Which of the given circuit below must have a capacitor?
    A. rectifier
    B. clipper
    C. clamper
    D. all of the above
ANSWER: C

143. How many capacitors are used in a diode-capacitor half- wave voltage doubler?
    A. 1
    B. 2
    C. 3
    D. 4
ANSWER: B

144. An improvement of a diode-capacitor half-wave voltage doubler is the full-wave doubler, this circuit uses how many capacitors?
    A. 1
    B. 2
    C. 3
    D. 4
ANSWER: B

145. In a diode-capacitor voltage quadrupler, what is the voltage across the third stage capacitor?
    A. V_{max}
    B. $2\ V_{max}$
    C. $3\ V_{max}$
    D. $4\ V_{max}$
ANSWER: B

146. A combination of several diodes in a single housing
    A. diode array
    B. diode network
    C. diode IC
    D. diode matrix
ANSWER: A

147. A chopper, employing an alternately biased diodes as the switching element.
    A. diode chopper
    B. active chopper
    C. junction chopper
    D. all are correct
ANSWER: A

148. A light emitting diode (LED) is to be used in a circuit with a supply voltage of 5 V. What should be the value of the resistor needed by the LED to operate normally?
    A. 25 Ω
    B. 250 Ω
    C. 25 kΩ
    D. 250 kΩ
ANSWER: B

149. A simple voltage-regulator whose output is the constant voltage drop developed across a zener diode conducting in the reverse breakdown region. The regulator circuit consists of a zener diode in parallel with the load and an appropriate limiting resistor.
    A. ordinary voltage regulator
    B. zener voltage regulator
    C. series voltage regulator
    D. switching voltage regulator
ANSWER: B

150. Logic circuitry in which a diode is the logic element and a transistor acts as an inverting amplifier.
    A. RTL
    B. DTL
    C. HDTL
    D. ECL
ANSWER: B

151. What is a bridge rectifier having diodes in two arms and resistors in the other two?
    A. full-wave bridge
    B. half-wave bridge
    C. half-bridge
    D. full bridge
ANSWER: C

152. An over-voltage protection circuit employing a zener diode and an SCR whose function is to produce high overload by-pass current on a circuit.
    A. regulator
    B. current enhancer
    C. crowbar
    D. shunted zener
ANSWER: C

153. The flow of electron in a NPN transistor when used in electronic circuit is from _____.
    A. collector to base
    B. collector to base

C. emitter to collector
D. base to emitter
ANSWER: C

154. A three terminal, three layer semiconductor device that has the ability to multiply charge carriers. This device was first introduced at Bell Laboratories, by Brattain and Bardeen in 1947 and which opens a completely new direction of interest and development in the field of electronics.
A. triode
B. triac
C. SCR
D. transistor
ANSWER: D

155. An active semiconductor device, capable of amplification, oscillation, and switching action. It is an acronym for transfer resistor and had replaced the tube in most applications.
A. thyristor
B. thyrector
C. SBS
D. transistor
ANSWER: D

156. Transistor replaces the old vacuum tubes because it has several obvious advantages, what are they?
A. smaller, lightweight and rugged construction
B. no heater loss, low operating voltage and therefore efficient
C. low power consumption and low power dissipation
D. all of the above
ANSWER: D

157. Which of the three regions/areas in a transistor that is the smallest in construction?
A. emitter
B. collector
C. base
D. all are equal
ANSWER: C

158. The region or area in a transistor that is heavily doped
A. at the junction
B. emitter
C. collector
D. base
ANSWER: B

159. A transistor in which the base is diffused and the emitter is alloyed. The collector is provided by the semiconductor substrate into which alloying and diffusion are affected.
A. alloy-transistor
B. alloy-diffused transistor
C. alloy junction transistor
D. diffused junction transistor

ANSWER: B

160. A transistor whose junctions are created by alloying
    A. alloy transistor
    B. alloy-diffused transistor
    C. diffused transistor
    D. alloy junction
ANSWER: A

161. In a semiconductor device, a p-n junction formed by alloying a suitable material such as indium with the semiconductor.
    A. alloy junction
    B. diffused junction
    C. depletion junction
    D. storage junction
ANSWER: A

162. A transistor in which one or both electrodes are created by diffusion
    A. diffused transistor
    B. alloy transistor
    C. planar transistor
    D. mesa transistor
ANSWER: A

163. A two-junction transistor whose construction takes the form of a pnp or a npn. Such device uses both electron and hole conduction and is current-driven.
    A. bipolar transistor
    B. unipolar transistor
    C. bi-directional transistor
    D. double junction transistor
ANSWER: A

164. The predecessor of the junction transistor, and is characterized by a current amplification factor, alpha of greater than one.
    A. surface-charge transistor
    B. surface-barrier transistor
    C. schottky transistor
    D. point-contact transistor
ANSWER: D

165. For a transistor, the outer layers are
    A. lightly doped semiconductors
    B. heavily doped semiconductors
    C. no doping at all
    D. A and B above
ANSWER: B

166. The ratio of the total width of the outer layers to that of the center layer
    A. 100:1
    B. 150:5
    C. 150:1

D. 1:150
ANSWER: C

167. The ratio of the doping level of the outer layers to that of the sandwiched material
A. 10:3 or more
B. 10:2 or more
C. 10:3
D. 10:1 or less
ANSWER: D

168. Limiting the number of “free” carriers will
A. increase the conductivity but decreases the resistance
B. decrease the conductivity but increases the resistance
C. increase the conductivity as well as resistivity
D. decrease the conductivity as well as resistivity
ANSWER: B

169. The term _____ reflects the fact that holes and electrons participate in the injection process into the oppositely polarized material.
A. unipolar
B. bipolar
C. tetrode
D. pentode
ANSWER: B

170. What device, that employs only electron or hole?
A. unipolar
B. bipolar
C. tetrode
D. pentode
ANSWER: A

171. At forward-biased junction of pnp transistor, majority carriers flow heavily
A. from *p*- to the *n*-type material
B. from *n*- to the *p*-type material
C. from *p*- to *p*-type material
D. A and B above
ANSWER: A

172. The minority-current component of a transistor is called
A. leakage current
B. emitter current
C. cut-off current
D. all of the above
ANSWER: A

173. For general-purpose transistors, I_C is measured in ____, while I_{CO} is measured in ____.
A. micro and nanoamperes
B. milliamperes and microamperes
C. milliamperes and nanoamperes
D. b and c above

ANSWER: D

174. Is temperature sensitive, and can severely affect the stability of the system, when not carefully examined during design
   A. I_C
   B. I_{CO}
   C. I_S
   D. I_E

ANSWER: B

175. For the transistor, the arrow in the graphic symbol defines the direction of _____ through the device
   A. leakage current flow
   B. emitter electron flow
   C. majority carrier flow
   D. emitter conventional current flow

ANSWER: D

176. In the dc mode, the levels of I_C and I_E due to the majority carriers are related by the quantity
   A. alpha (α)
   B. beta (β)
   C. gamma (γ)
   D. A and B above

ANSWER: A

177. In the ac mode, alpha α is formally called
   A. common-base, short-circuit, amplification factor
   B. common-emitter, amplification factor
   C. common-collector, amplification factor
   D. all of the above are correct

ANSWER: A

178. Phrases “not pointing in” and “pointing in” simply mean
   A. npn and pnp
   B. pnp and npn
   C. npn only
   D. pnp only

ANSWER: A

179. In the dc mode, the levels of I_C and I_B are related by a quantity called
   A. α
   B. β
   C. γ
   D. A and B above

ANSWER: B

180. For practical transistor devices, the level of β typically ranges
   A. from about 25 to over 400
   B. less than 1
   C. mostly in midrange of 50 to 400

D. A or C above
ANSWER: C

181. The formal name of β_{ac}
A. Common-collector reverse-current amplification factor
B. Common-collector forward-current amplification factor
C. Common-emitter forward-current amplification factor
D. Common-emitter reverse-current amplification factor
ANSWER: C

182. It is a particularly important parameter that provides a direct link between current levels of the input and output circuits for a common-emitter configuration.
A. α
B. β
C. A and B above
D. none of the above
ANSWER: B

183. The _____ id defined as that area below $I_C = I_{CEO}$.
A. active region
B. cutoff region
C. saturation region
D. none of the above
ANSWER: B

184. It is referred to as the communication link between the manufacturer and user
A. specification sheet
B. characteristic manual
C. characteristic curve
D. all of the above
ANSWER: D

185. The information that can be found in most specification sheets?
A. maximum ratings
B. thermal characteristics
C. electrical characteristics
D. all of the above
ANSWER: D

186. With an ohmmeter, a large or small resistance in either junction of an npn or pnp transistor indicates
A. faulty device
B. well functioning device
C. leaky device
D. either A or C
ANSWER: A

187. At base-emitter junction, using an ohmmeter, if the positive (+) lead is connected to the base and the negative (-) lead to the emitter, a low resistance reading would indicate
A. npn transistor
B. pnp transistor

C. germanium transistor
D. silicon transistor

ANSWER: A

188. At base-emitter junction, if the positive (+) lead is connected to the base and the negative (-) lead to the emitter, a high resistance reading would indicate
A. npn transistor
B. pnp transistor
C. germanium transistor
D. silicon transistor

ANSWER: B

189. Transistors of heavy duty construction
A. high-power devices
B. low-power devices
C. medium-power devices
D. all of the above

ANSWER: A

190. On a voltage-current condition curve, the point belong to which a further increase in voltage produces no (or very little) further increase in current.
A. saturation flux
B. saturation value
C. saturation point
D. all of the above

ANSWER: C

191. It is applied to any system where levels have reached their maximum values
A. saturation
B. active
C. cutoff
D. quiescent point

ANSWER: A

192. For an “on” transistor, the voltage V_{BE} should be in the neighborhood of
A. 0.3 V
B. 0.55 V
C. 0.7 V
D. 1.7 V

ANSWER: C

193. Among the three characteristics of a transistor amplifier, which region is normally employed for linear (undistorted) amplifiers?
A. active region
B. cutoff region
C. saturation region
D. capital region

ANSWER: A

194. In the active region, the collector-base junction is _____, while the base-emitter junction is _____.

A. forward and forward-biased
B. forward and reverse-biased
C. reverse and reverse biased
D. reverse and forward-biased

ANSWER: D

195. It is necessary, in order to establish the proper region of operation for ac amplification.
A. ac biasing
B. dc biasing
C. A and B above
D. none of the above

ANSWER: B

196. At cutoff region, the collector-base and base-emitter junctions of a transistor are
A. both reverse-biased
B. forward and reverse-biased
C. both forward-biased
D. reverse and forward-biased

ANSWER: A

197. In saturation region, the collector-base and base-emitter junctions of a transistor are
A. both reverse-biased
B. forward and reverse-biased
C. both forward-biased
D. reverse and forward-biased

ANSWER: C

198. If the base-emitter junction is reverse biased and the base-collector junction is forward biased, the transistor will be at what region of operation?
A. active region
B. cut-off region
C. saturation region
D. breakdown region

ANSWER: B

199. Under what region does the transistor operate if both the base-emitter and base-collector junctions are reverse-biased?
A. active region
B. cut-off region
C. saturation region
D. breakdown region

ANSWER: B

200. What region the transistor should be operating to have minimum distortion at the output signal?
A. active region
B. cut-off region
C. saturation region
D. none of the above

ANSWER: A

201. In dc biasing, it means quiet, still, inactive
    A. passive
    B. quench
    C. static
    D. quiescent
    ANSWER: D

202. The transistor terminal that handles most current
    A. base
    B. collector
    C. emitter
    D. collector and emitter
    ANSWER: C

203. Which indicates the degree of change, in operating-point due to temperature variation in the dc biasing?
    A. temperature coefficient
    B. factor of safety
    C. merit factor
    D. stability factor
    ANSWER: D

204. What best describes the transistor current that flows between the collector and emitter terminals when the base is open?
    A. leakage current
    B. cut-off current
    C. reverse saturation current
    D. all of the above
    ANSWER: B

205. Solve for the base current if collector current is 600 mA and the current gain is 20.
    A. 30 mA
    B. 3 mA
    C. 12 mA
    D. 1.2 mA
    ANSWER: A

206. When the transistor is saturated, V_{CE} is approximately
    A. 0 V
    B. ½ VCC
    C. VCC
    D. infinite
    ANSWER: A

207. Collector-emitter resistance of ideal transistor at cut-off
    A. 0 Ω
    B. infinite
    C. a function of the load resistance
    D. a function of the collector current
    ANSWER: B

208. The leakage current that flows at the collector-base junction when the emitter is open
    A. I_{CO}
    B. I_{CBO}
    C. I_{CEO}
    D. I_{CBE}
ANSWER: B

209. A transistor with β = 100 is connected as common base, was found to have a leakage current I_{CBO} = 1μA. If the transistor is configured as common emitter, what is the approximate value of its I_{CEO}?
    A. 0.01 μA
    B. 1.0 μA
    C. 100 μA
    D. 10 mA
ANSWER: C

210. The most correct technical term of the reverse leakage current that flows between the collector and base junctions when the emitter is open circuited.
    A. leakage current
    B. saturation current
    C. reverse saturation current
    D. cut-off current
ANSWER: C

211. How is the collector cut-off or reverse saturation current I_{CBO} related to the emitter cut-off current I_{EBO}?
    A. $I_{CBO} \approx \beta I_{EBO}$ p
    B. $I_{CBO} \approx I_{EBO}/\beta$
    C. $I_{CBO} \approx I_{EBO}(1-\alpha)$
    D. $I_{CBO} \approx I_{EBO}$
ANSWER: D

212. I_{CBO} of an ideal transistor
    A. increases as temperature increases
    B. increases as temperature decreases
    C. is not affected by a temperature change
    D. is zero (0) mA
ANSWER: D

213. The maximum voltage that can be applied across the collector-emitter terminal for a given transistor is specified as
    A. V_{CEO}
    B. V_{ECO}
    C. $V_{(BR)BEO}$
    D. $V_{(BR)CEO}$
ANSWER: D

214. If the current-gain-bandwidth product of transistor is 250 MHz and is operated at 100 MHz, what is the effective current gain of the transistor?
    A. 2.5
    B. 25

C. 250
D. 350
ANSWER: A

215. The current gain of a transistor decreases as the operating frequency increases. As the operating frequency is increased continuously, a point occurs where the current gain becomes unity. This point, is best described by what transistor parameter?
A. unity gain frequency
B. 0 dB frequency
C. cut-off frequency
D. unity gain bandwidth product or unity current gain bandwidth product
ANSWER: D

216. When base is common to both the input and output sides of the configuration and is usually the terminal closes to, or at ground potential, it is called what?
A. common-emitter terminology
B. common-collector terminology
C. common-base terminology
D. all of the these
ANSWER: C

217. Which transistor configuration has the highest input resistance?
A. common base
B. common emitter
C. common collector
D. common transistor
ANSWER: C

218. One of the following amplifier characteristic refers to that of a common-base (C-B) as compared to common-emitter (C-E) and common-collector (C-C) amplifiers.
A. Has larger current gain
B. Has lower input resistance
C. Has higher input resistance
D. Has larger voltage gain
ANSWER: B

219. A transistor is said to be configured as common emitter if the emitter terminal is
A. grounded
B. connected to V+
C. floating
D. not used as an input nor output
ANSWER: D

220. Most frequently used transistor configuration for pnp and npn
A. common-base
B. common-collector
C. common-emitter
D. A and C above
ANSWER: C

221. Calculate the common-emitter amplification factor β of a transistor with a common-base amplification factor α=0.99.
    A. 10
    B. 50
    C. 100
    D. 200
    ANSWER: C

222. Which transistor configuration hybrid parameters, that is usually specified by the manufacturers?
    A. for common-base
    B. for common-collector
    C. for common-emitter
    D. a combination of the three configurations
    ANSWER: C

223. For a common-emitter transistor configuration, the hybrid parameter h_{fe} stands for forward transfer current ratio. This parameter is approximately equal to
    A. H_{FE}
    B. β_{ac}
    C. β
    D. all of the above
    ANSWER: D

224. Hybrid parameter that is usually neglected in circuit analysis
    A. h_i and h_o
    B. h_r and h_f
    C. h_i and h_f
    D. h_r and h_o
    ANSWER: D

225. The input impedance of a common-base configuration is hib, and its magnitude is approximately equal to
    A. h_{ie}/h_{fe}
    B. $h_{ie}/(1+\beta)$
    C. r_e for dynamic model
    D. all of these
    ANSWER: D

226. In most transistor input equivalent circuit it comprises of a resistor and a
    A. voltage source
    B. stiff voltage source
    C. current source
    D. stiff current source
    ANSWER: A

227. Which transistor configuration has the highest input resistance?
    A. common-base
    B. common-collector
    C. common-emitter
    D. emitter follower

ANSWER: B

228. Common-base configuration has a high voltage gain and a current gain of
   A. low
   B. moderate
   C. high
   D. approximately equal to one (1)

ANSWER: D

229. Common-collector has the lowest power gain and a voltage gain of approximately one. In contrast to this, what configuration has the highest power gain?
   A. common-base
   B. common-collector
   C. common-emitter
   D. emitter follower

ANSWER: C

230. Which of the following transistor characteristic curves that is most useful?
   A. input characteristic curve
   B. output characteristic curve
   C. transfer characteristic curve
   D. all of the above

ANSWER: B

231. The graph of the product of collector-emitter voltage V_{CE} and collector current I_C in the transistor output characteristic curve.
   A. maximum power curve
   B. minimum power curve
   C. saturation power curve
   D. breakdown curve

ANSWER: A

232. The base of a transistor serves a purpose to what element of the FET?
   A. source
   B. ground
   C. substrate
   D. gate

ANSWER: D

233. What is the primary difference between the BJT and the FET?
   A. current-controlled device and voltage-controlled device, respectively
   B. voltage-controlled device and current-controlled device, respectively
   C. impedance transformed device and conductance transformed device, respectively
   D. A and C above are correct

ANSWER: A

234. Another difference between a BJT and a FET with regards to its normal biasing.
   A. The input circuit is forward-biased for BJT while reverse for FET.
   B. The input circuit is reverse-biased for BJT while forward for FET.
   C. The output circuit is forward-biased for BJT while reverse for FET.

D. The output circuit is reverse-biased for BJT while forward for FET.

ANSWER: A

235. Field-effect transistors (FETs) offer high input impedance than BJT. What makes FETs have high input impedance?
   A. The way FETs are constructed.
   B. Because of the materials used.
   C. Due to the level of doping
   D. Due to the reverse-biased input circuit of FETs

ANSWER: D

236. The operation of BJT involves both the flow of electrons and holes and is therefore, considered as a bipolar device. Unlike BJT, FET's operation involves only either electrons or holes and is considered as a _____ device.
   A. single polar
   B. unipolar
   C. unpolar
   D. polarized

ANSWER: B

237. Considered as the basic FET or the simplest form of FET
   A. JFET
   B. MOS-FET
   C. IGFET
   D. VMOS-FET

ANSWER: A

238. Junction field effect transistor or JFET has three terminals, which corresponds to the E-B-C of the BJT?
   A. D-S-G
   B. D-G-S
   C. S-G-D
   D. S-D-G

ANSWER: C

239. One obvious advantage of a JFET over BJT is its
   A. high voltage gain
   B. high current gain
   C. high input resistance
   D. high output resistance

ANSWER: C

240. A BJT is a current-controlled current-source device while JFET is a _____ device.
   A. current-controlled voltage-source
   B. voltage-controlled voltage-source
   C. voltage-controlled current-source
   D. voltage-controlled transconductance-source

ANSWER: C

241. What do you call the area in a JFET where current passes as it flows from source (S) to drain (D).

A. channel
B. substrate
C. depletion
D. drift

ANSWER: A

242. What will happen to the channel of a JFET as current flows to it?
A. widens
B. narrows
C. skews
D. nothing

ANSWER: C

243. For a normal operation of an n-channel JFET, how do you bias the gate-source junction?
A. positive-negative respectively
B. negative-positive respectively
C. forward-biased
D. any of the above

ANSWER: B

244. The voltage across the gate-source terminal of a FET that causes drain current I_D equal to zero.
A. saturation voltage
B. threshold voltage
C. cut-off voltage
D. pinch-off voltage

ANSWER: D

245. The current that flows into the channel of a JFET when the gate-source voltage is zero.
A. drain-source saturation current
B. drain-source cut-off current
C. drain-source leakage current
D. drain-source pinch-off current

ANSWER: A

246. The graph of the drain current I_D versus drain-source voltage V_{DS} with V_{GS} as the parameter.
A. transfer characteristic curve
B. output characteristic curve
C. input characteristic curve
D. current-voltage characteristic curve

ANSWER: D

247. In FET, the conduction path of the output is controlled by the electric field as its name implies. How does an electric field in FET established?
A. By the charges present at the gate due to the reverse-biased junction.
B. By the application of reverse-biased between the gate and drain.
C. By the charges produced due to the applied potential between drain and source V_{DS}.
D. By the charges present at each terminal due to the applied potential.

ANSWER: A

248. An early version of the field effect transistor in which limited control of current carriers near the surface of a semiconductor bar or film was obtained by an external electric field applied transversely.
   A. fieldistor
   B. JFET
   C. IGFET
   D. MOSFET
   ANSWER: A

249. A FET in which the gate electrode consists of a pn junction
   A. JFET
   B. fieldistor
   C. MOS-FET
   D. IGFET
   ANSWER: A

250. Which type of FET has the lowest input resistance?
   A. JFET
   B. MOS-FET
   C. IGFET
   D. VMOSFET
   ANSWER: A

251. In order to increase further the input resistance of a FET, its gate is insulated. An example of this type is the
   A. fieldistor
   B. JFET
   C. MOS-FET
   D. A and B above
   ANSWER: C

252. What is the insulator used in most MOS-FET?
   A. CO2
   B. SiO2
   C. mica
   D. plastic
   ANSWER: B

253. An n-channel JFET has a drain-source saturation current I_{DSS} = 10 mA and a gate-source pinch-off voltage V_p = -4 V. If the applied reverse gate-source voltage V_{GS} = 2 V, calculate the drain current I_D.
   A. 2.5 mA
   B. 5.0 mA
   C. 10.0 mA
   D. 22.5 mA
   ANSWER: A

254. Base from Shockley's equation of a JFET, what is the drain current when the applied voltage V_{GS} is exactly equal to the pinch-off voltage V_p?

A. I_{DSS}
B. maximum
C. minimum
D. zero

ANSWER: D

255. The transconductance of a JFET is defined as
A. dI_D/dV_{GS}
B. dV_{GS}/dI_D
C. dI_{DSS}/dV_{GS}
D. dI_D/dV_p

ANSWER: A

256. A field-effect transistor in which the gate electrode is not a pn junction (as in the junction field-effect transistor) but a thin metal film insulated from the semiconductor channel by a thin oxide film.
A. MOSFET (enhancement type)
B. MOSFET (depletion type)
C. IGFET
D. all of the above

ANSWER: D

257. In MOSFET, it is the foundation upon which the device will be constructed and is formed from a silicon base
A. substrate
B. slab
C. source
D. base

ANSWER: A

258. A type of MOSFET wherein originally there is no channel between the drain and the source
A. depletion type
B. enhancement type
C. break type
D. insulated type

ANSWER: B

259. What type of MOSFET whose channel is originally thick but narrows as the proper gate bias is applied?
A. enhancement
B. depletion
C. transverse
D. all of the above

ANSWER: B

260. The amount of voltage needed at the gate-source terminal for an enhancement type MOSFET so that a channel can be formed for the current to flow.
A. “ON” voltage
B. pinch-off voltage
C. threshold voltage

D. trigger voltage
ANSWER: C

261. To switch off the depletion type MOSFET, the channel should be depleted. Depletion of the channel is done by applying enough voltage across the gate-source terminal. What do you call this voltage?
A. pinch-off voltage
B. trigger voltage
C. holding voltage
D. threshold voltage
ANSWER: A

262. The substrate of a MOSFET is usually connected internally to
A. source
B. gate
C. drain
D. channel
ANSWER: A

263. In an n-channel enhancement type MOSFET, the gate voltage should be _____ with respect to the source in order to produce or enhance a channel.
A. the same
B. positive
C. negative
D. either positive or negative
ANSWER: B

264. To deplete a channel from a p-channel IGFET depletion type, the gate voltage should be _____ with respect to the source.
A. the same
B. positive
C. negative
D. either positive or negative as long as it is greater
ANSWER: B

265. The substrate used in a p-channel IGFET enhancement type
A. n -type material
B. n^+ -type material
C. p -type material
D. p^+ -type material
ANSWER: A

266. The base material of a MOSFET which extends as an additional terminal
A. source (S)
B. channel (C)
C. drain (D)
D. substrate (SS)
ANSWER: D

267. Which FET that has a substrate?
A. MOSFET enhancement type

B. IGFET
C. MOSFET depletion type
D. all of the above

ANSWER: D

268. What is the difference between a JFET and a MOSFET?
A. The gate of a MOSFET is insulated.
B. MOSFET uses a substrate in its construction.
C. MOSFET can work in both forward and reverse gate-source voltages.
D. all of the above

ANSWER: D

269. Calculate the transconductance of a p-channel MOSFET enhancement type if the gate-source voltage V_{GS} = -8 V, threshold voltage V_T = -4 and a constant k = 0.3 mA/V^2.
A. 1.2 mS
B. 2.4 mS
C. 3.6 mS
D. 7.2 mS

ANSWER: B

270. One drawback of JFET devices is the strong dependence of the devices' parameters on the channel geometry. Which parameter is an example of this?
A. drain saturation current (I_{DSS})
B. pinch-off voltage (V_P)
C. transconductance (g_m)
D. all of the above

ANSWER: D

271. JFET cutoff frequency is dependent on channel length by a factor of
A. 1/L
B. $1/L^2$
C. $1/L^3$
D. $1/L^4$

ANSWER: B

272. Which FET operates as close as BJT in terms of switching?
A. JFET
B. MOSFET depletion type
C. MOSFET enhancement type
D. IGFET

ANSWER: C

273. Generally, MOSFET has low power handling capability than BJT. To increase MOSFET power, the channel should be made
A. narrow and long
B. narrow and short
C. wide and long
D. wide and short

ANSWER: D

274. Which FET has a wide and short effective channel?

A. JFET
B. MOSFET
C. IGFET
D. V-MOSFET

ANSWER: D

275. A type of FET wherein the channel is formed in the vertical direction rather than horizontal
A. JFET
B. MOSFET
C. IGFET
D. V-MOSFET

ANSWER: D

276. Advantage or advantages of V-MOS over BJT
A. No stored charge and therefore faster in switching action.
B. A negative temperature dependence of output current which eliminates thermal runaway.
C. High input impedance and therefore high current gain.
D. all of the above

ANSWER: D

277. In general, which of the transistors is particularly more useful in integrated-circuit (IC) chips?
A. BJTs
B. FETs
C. UJTs
D. all of the above

ANSWER: B

278. A monolithic semiconductor-amplifying device in which a high-impedance GATE electrode controls the flow of current carriers through a thin bar of semiconductor called the CHANNEL. Ohmic connections made to the ends of the channel constitute SOURCE and DRAIN electrodes.
A. BJT
B. UJT
C. FET
D. UPT

ANSWER: C

279. A junction field effect transistor has a drain saturation current of 10 mA and a pinch-off voltage of -4 V. Calculate the maximum transconductance.
A. 2.5 mS
B. 5.0 mS
C. 25.0 mS
D. 50.0 mS

ANSWER: B

280. In semiconductor application, which of the following statement is not true?
A. An ohmmeter test across the base-collector terminal of a transistor should show low resistance in one polarity and high resistance in the opposite polarity.

B. A triac is a bidirectional device.
C. An ohmmeter test across a diode shows low resistance in one polarity and high resistance in the opposite polarity.
D. An ohmmeter test across the base-collector of a transistor should show low resistance for both polarities.

ANSWER: D