Debre Berhan University

College of Engineering

Department of Electrical and Computer Engineering

Communication Stream Model Exit Eaxm-2

1. A given conductor carrying a current of 3A produces an amount of heat equal to 200 J. if the current through the conductor is doubled, the amount of heat produced will be
   A. 400 J
   B. 600 J
   C. 800 J
   D. 1200 J
   ANSWER: C

2. If an electrical system is compared to a fluid system, the electrical current corresponds to the:
   A. Pressure
   B. Pump
   C. Water wheel
   D. Water flow
   ANSWER: D
3. The equivalent current-source representation for a voltage-source with open circuit voltage 12V and internal resistance 3 ohms is
   A. a current-source of strength 4A in shunt with a resistance of 6Ω .
   B. a current –source of strength 4A in series with a resistance of 3Ω .
   C. a current-source of strength 4A in shunt with a resistance of 3 ohms.
   D. a current-source of strength 4A in shunt with a resistance of 36 ohms.
   ANSWER: B
4. In any network containing more than one sources of e.m.f. the current in any branch is the algebraic sum of a number of individual fictitious currents, each of which is due to separate action of each source of e.m.f. taken in order, when the remaining sources of e.m.f. are replaced by conductors, the resistances of which are equal to the internal resistances of the respective sources". The above statement is associated with
   A. Thevenin's theorem
   B. Norton's theorem
   C. Superposition theorem
   D. Reciprocity theorem
   ANSWER: C
5. The series and parallel resonance on L-C circuit differs in that

A. Series resistance needs a low-resistance source for sharp rise in current
B. Series resonance needs a high-resistance source for sharp increase in current
C. Parallel resonance needs a low-resistance source for a sharp increase in impedance
D. Parallel resonance needs a low-resistance source for a sharp rise in line current
ANSWER: A

6. The transient currents are associated with the
   A. Changes in the stored energy in the inductors and capacitors
   B. Impedance of the circuit
   C. Applied voltage to the circuit
   D. Resistance of the circuit
   E. ANSWER: A

7. Consider the circuit shown in Fig.2. Assuming that the switch has been in position 1 for a long time and at time t=0, the switch is moved to position 2. The value of current i(t) for t > 0 is

   (A) $i(t) = \frac{4}{3} e^{-5t} A$

   (B) $i(t) = \frac{1}{3} e^{-5t} A$

   (C) $i(t) = \frac{4}{5} e^{-3t} A$

   (D) $i(t) = \frac{3}{4} e^{-5t} A$

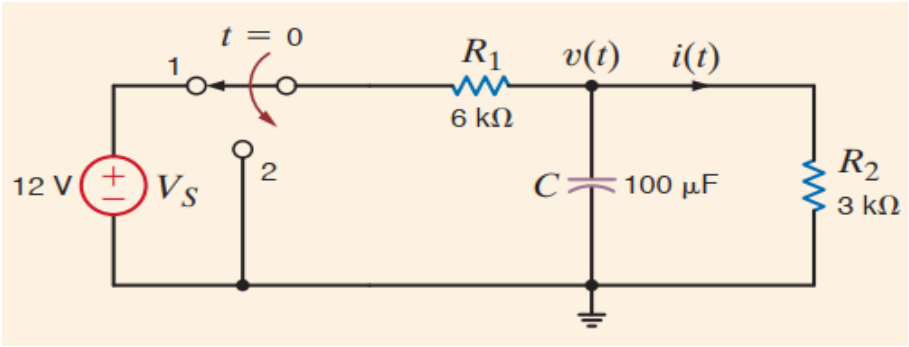


Fig.2: RC circuit

ANSWER: A

8. In DC circuit theory, which term describes how elements are connected?
   A. Path
   B. Node
   C. Branch
   D. Loop
   ANSWER: C

9. Which of the following circuit components are all active elements?
   A. a resistor and an inductor.
   B. a diode, a BJT and an FET.
   C. a capacitor, and an inductor.
   D. an Opamp, a BJT and thermionic triode.

ANSWER: B

10. Which one of the following is not true about digital system compared to analog system?
    A. Digital data is stored in the form of bits.
    B. In digital system hardware can be easily modulated.
    C. Digital system uses continues signals with varying magnitude.
    D. Accuracy and precision easier to maintain throughout the digital system.
    ANSWER: C
11. Which one of the following is correct about the application of logic gates?
    A. Logic gates can be used to build more complex devices like binary counters, registers.
    B. Logic gates can be applied in calculators and computers.
    C. Logic gates can be used in musical instruments and digital measuring devices.
    D. All
    ANSWER: D

12. The NAND or NOR gates are referred to as "universal gates" because they:
    A. can be found in almost all digital circuits
    B. can be used to build all the other types of gates
    C. are used in all countries of the world
    D. were the first gates to be integrated
    ANSWER: B
13. Which coding scheme is used in computer to represent data internally
    A. Decimal B. Octal C. Binary D. Hexadecimal
    ANSWER: C
14. For the given logical circuit diagram shown in figure 1 below, the Correct Boolean expression for the output Q is

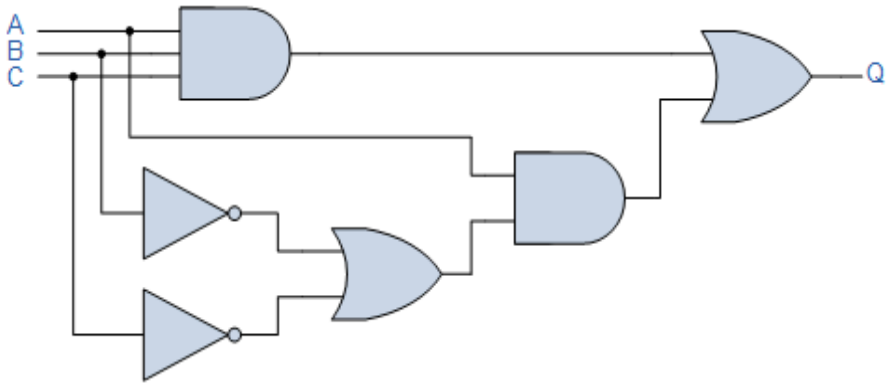


Figure 1: logical circuit diagram

    A. A (BC + B + C')
    B. ABC + A (B' + C')
    C. A (BC + C') + AB
    D. ABC + AB'C'
    ANSWER: B
15. One of the following is not true about sequential circuits compared to combinational circuit.

A. The output of sequential circuits depends on both present inputs and previous outputs.
B. There is feedback path in sequential circuits for purpose of memory element.
C. Encoder, decoder, multiplexer and DeMultiplexer are sequential logic circuits.
D. Sequential circuits contain combinational circuits and memory storage elements
A. None
ANSWER: C

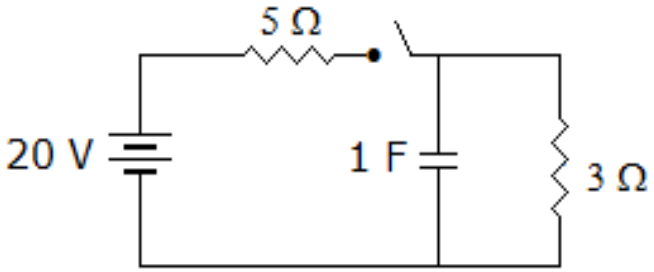
16. The binary number 1000110101000110111 1 can be written in hexadecimal as
A $AD467_{16}$ B. $8C46F_{16}$ C. $8D46F_{16}$ $D.\ AE46F_{16}$
ANSWER: C

17. An Asynchronous counter differs from synchronous counter in
A. The number of states in its sequence
B. The method of clocking
C. The type of flip-flops used
D. The number of flip-flops used
ANSWER: B

18. Which one of the following is correct about series connection of two-port network?

A. All individual z-parameters of overall connections are the sum of individual respective z-parameters
B. All individual y-parameters of overall connections are the sum of individual respective y-parameters
C. All individual h-parameters of overall connections are the sum of individual respective h-parameters
D. All individual ABCD-parameters of overall connections are the sum of individual respective ABCD-parameters
ANSWER: A

19. In the circuit of figure, the switch is closed at t = 0. At t = 0+ the current through C is



A. $4A$
B. $2.5A$
C. $3.1A$
D. 0
ANSWER: A

20. A series RLC network has a bandwidth of $300\ rad/\sec$ at a resonant frequency of $3000\ rad/\sec$ when excited by a voltage source of $100V$. The inductance of the coil is $0.1H$. The value of R and the voltage across C respectively are

A. $10\,\Omega,\ 100V$

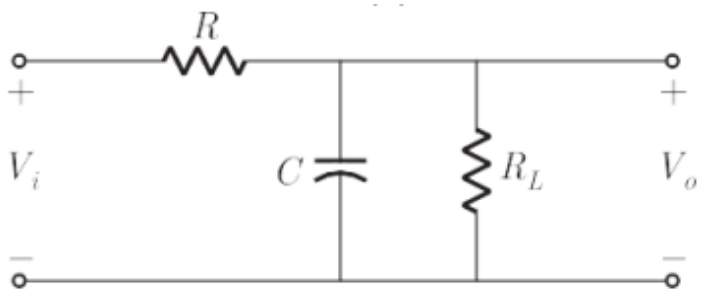
B. $30\,\Omega,\ 100V$

C. $30\,\Omega,\ 1000V$

D. $300\,\Omega,\ 1000V$

ANSWER: C

21. If the transfer function of the following network is $\frac{V_o(s)}{V_i(s)} = \frac{1}{2 + sCR}$, The value of the load resistor R_L is



A. $\frac{R}{4}$

B. $\frac{R}{2}$

C. R

D. $2R$

ANSWER: C

22. If the driving point impedance $Z(s)$ has a pole at the origin, the realization leads to

A. A resistance in series
B. An inductance in series
C. A capacitance in series
D. A resistance and capacitance in series

ANSWER: C

23. Which of the following best defines the concept of a signal in the context of signals and systems?

A. A mathematical function representing physical phenomena or data.
B. The process of converting analog signals to digital signals.
C. The study of communication systems.
D. The transformation of signals in the frequency domain

ANSWER: A

24. If x (-t) = x (t) then the signal is said to be _____

A. Even signal
B. Odd signal
C. Periodic signal
D. Non periodic signal

ANSWER: A

25. In the context of systems, what does "causal" mean?

A. The system's output depends only on past and present inputs.
B. The system's output depends only on future inputs.
C. The system's output depends on both past and future inputs.
D. The system's output is not affected by the input.

ANSWER: A

26. What is the Fourier series representation used for in signal processing?

A. To represent a periodic signal as a sum of harmonically related sinusoids
B. To represent a non-periodic signal as a sum of harmonically related sinusoids
C. To represent a signal as a sum of exponential functions
D. To represent a signal as a sum of polynomials

ANSWER: A

27. consider the system transfer function $G(s) = \frac{1}{s^2 + s - 2}$, which of the following property show the system become neither casual nor stable

A. $\text{Re}(s) > 1$
B. $\text{Re}(s) < -2$
C. $-2 < \text{Re}(s) < 1$
D. None

ANSWER: B

28. What is the inverse Laplace transform of $\frac{s}{s^2a^2+b^2}$?

a. $\frac{1}{a^2}\cos(\frac{a}{b})t$
b. $\frac{1}{a^2}\cos(\frac{b}{a})t$
c. $\frac{1}{a^2}\sin(\frac{b}{a})t$
d. $\frac{1}{a^2}\sin(\frac{a}{b})t$

ANSWER: B

29. Which of the following is the equation for forward Fourier Transform?

A. $X(\omega) = \int_{-\infty}^{\infty} x(t)e^{j\omega t}dt$
B. $X(\omega) = \int_{0}^{\infty} x(t)e^{-j\omega t}dt$

C. $X(\omega) = \int_0^{\infty} x(t)e^{j\omega t}dt$

D. $X(\omega) = \int_{-\infty}^{\infty} x(t)e^{-j\omega t}dt$

ANSWER: D

30. One is not the application of semiconductor diodes?
    A. Rectifier in power supplies
    B. Filter circuit
    C. Voltage regulator
    D. Voltage multiplier circuits
    ANSWER: B
31. Assume you wants to buy different diodes for some application that is to do BSC project so how can you test a good diode with a digital voltmeter (DMM)?
    A. high resistance when forward or reverse biased
    B. low resistance when forward or reverse biased
    C. high resistance when reverse biased and low resistance when forward biased
    D. high resistance when forward biased and low resistance when reverse biased
    ANSWER: C
32. When the input junction (EB) of a transistor is reverse biased and the output junction (CB) is reverse biased the operation region of a transistor is?
    A. Saturation region
    B. Cut-off region
    C. Inverse Active region
    D. Active region
    ANSWER: B

33. What is the purpose of adding trivalent or pentavalent materials to a pure semiconductor material?
    A. To increase the resistivity of the semiconductor material
    B. To stop conduction
    C. To alter its insulating property
    D. To increase the conductivity of the semiconductor material
    ANSWER: D
34. Which one of the following is the highest region of a transistor terminal based on doping concentration?
    A. Collector
    B. Base
    C. Gate
    D. Emitter
    ANSWER: D
35. Which of the following has the highest input impedance?
    A. BJT
    B. FET

C. Crystal diode
D. MOSFET
ANSWER: D

36. Equivalent of transistor at saturation in JFETs is_____?
A. Breakdown
B. Constant current
C. Pinch-off
D. Ohmic
ANSWER: D

37. An n-channel D-MOSFET with a positive V_{GS} is operating in_____
A. The depletion-mode
B. The enhancement-mode
C. Cut off
D. Saturation
ANSWER: B

38. What is machine code?

A. The serial number of a computer
B. A programming language that a computer understands
C. The make and model of a computer

ANSWER: B

39. A set of logically sequenced instructions that allows to find the solution to a problem is:

A. Algorithm
B. Pseudocode
C. Programming
D. Program

ANSWER: A

40. The six stages of program development in logical order are:

A. Define, Analyze, Write, Test, Document, Debug
B. Define, Analyze, Develop, Write, Test and Debug, Document
C. Define, Write, Develop, Analyze, Test, Document
D. Define, Develop, Write, Test, Document, Debug

ANSWER: B

41. What will be the output of the following C++ code?

```
#include <iostream>
   using namespace std;
   int main()
   {
      int a = 5;
      float b;
      cout << sizeof(++a + b);
      cout << a;
      return 0;
}
```

A. 2 5
B. 4 5
C. 4 6
D. 2 6

ANSWER: B

42. What will be the output of the following C++ code snippet?

```
#include <iostream>
   using namespace std;
   int operate (int a, int b)
   {
```

```
        return (a * b);
    }
    float operate (float a, float b)
    {
        return (a / b);
    }
    int main()
    {
        int x = 5, y = 2;
        float n = 5.0, m = 2.0;
        cout << operate(x, y) <<"\t";
        cout << operate (n, m);
        return 0;
}
```

A. 10.0 5
B. 10 2.5
C. 10.0 5.0
D. 5.0 2.5

ANSWER: B

43. Which of the following is not responsible for radiation of electromagnetic waves into the surrounding by an antenna?
    A. Discontinuous current carrying wire
    B. Accelerated or decelerated charge
    C. Bent current carrying wire
    D. Moving charge with uniform velocity along infinitely long straight wire

    ANSWER: D
44. The characteristics of the electromagnetic field region immediately surrounding radiating antenna is more of
    A. Resistive field
    B. Diffractive field
    C. Reactive field
    D. Reflective field

    ANSWER: C
45. One of the following antenna characterizations describes how well the antenna converts input power into radio waves headed in a specified direction.
    A. Beamwidth
    B. Bandwidth
    C. Antenna gain

D. Polarization

ANSWER: C

46. Which of the following antenna type has omnidirectional radiation?

A. Wire antennas

B. Lens antenna

C. Aperture antenna

D. Reflector antennas

ANSWER: A

47. Which of the following radio wave propagation mode is convenient for low frequency ranges?

A. Line-of-sight propagation

B. Ground wave propagation

C. Ionospheric propagation

D. Tropospheric propagation

ANSWER: B

48. If the distance between the antenna and the observation point is smaller than the physical size of the antenna, the field region is classified as

A. Induced

B. Reflected

C. Radiated

D. Far-field

ANSWER: A

49. What is the reason that a binomial non-uniform array with a large number of elements is not usually used for practical design?

A. Large half-power beamwidth

B. Low sidelobe level

C. Large amplitude tapering between the center element(s) and those at the edges

D. None of the above

ANSWER: C

50. A communication engineer designs a symmetrically located 6 - elements Binomial antenna array. If the antenna array elements are equally spaced along z-axis, which of the following can be the excitation amplitude of the array elements?

A. a_1=10; a_2 = 5; a_3 = 1

B. *c*) a_1=6; a_2 = 4; a_3 = 1

C. a_1=15; a_2 = 6; a_3 = 1

D. . *d*) a_1=4; a_2 = 3; a_3 = 1

ANSWER: A

51. For a normal mode EM wave propagating in a hollow rectangular wave guide

A. the phase velocity is greater than the group velocity

B. the phase velocity is equal to velocity of light in free space

C. the phase velocity is less than the velocity of light in free space

D. the phase velocity may be either greater than or less than the group velocity.
ANSWER: A

52. Standard air filled rectangular waveguides of dimensions a = 2.29cm and b = 1.02cm are designed for radar applications. It is desired that these waveguides operate only in the dominant TE_{10} mode with the operating frequency at least 25% above the cut-off frequency of the TE_{10} mode but not higher than 95% of the next higher cutoff frequency. The range of the allowable operating frequency f is
    A. $8.19GHZ \leq f \leq 13.1$ GHZ
    B. 8.19 GHZ $\leq f \leq 12.45$ GHZ
    C. 6.55 GHZ $\leq f \leq 13.1$ GHZ
    D. 1.64 GHZ $\leq f \leq 10.24$ GHZ

    ANSWER: B
53. The main function of helix structure in a Travelling Wave Tube (TWT) is:
    A. To reduce axial velocity of RF field
    B. To reduce noise figure of TWT
    C. To properly focus Electron beam
    D. To reduce axial velocity of electron

    ANSWER: A
54. When a load is matched to a transmission line, the condition that is satisfied when matched is:
    a. $Z_L=Z_0$
    b. $Z_L=2Z0_0$
    c. $Z_L=Z_{in}$
    d. $Z_L=2Z_{in}$

    ANSWER: A
55. Any passively realizable reflection coefficient can be plotted as a unique point on the smith chart. This statement implies that:
    A. Reflection co-efficient less than or equal to 1 can be plotted
    B. Reflection co-efficient greater than or equal to 1 can be plotted
    C. Transmission co-efficient has to be less than or equal to one for the point to be located
    D. $T=\Gamma+1$

    ANSWER: A
56. The fringe effect can be neglected in a parallel plate waveguide is because of:
    A. The dielectric material used
    B. Width of the plates is greater than the distance between the plates
    C. Material of the parallel plate waveguide used
    D. Material of the parallel plate transmission used

    ANSWER: B
57. A cylindrical cavity resonator can be constructed using a circular waveguide by:

A. shorted at both the ends
B. open at both the ends
C. matched at both the ends
D. Shorted the input and open output ends

ANSWER: A

58. The reason for nonexistence of magnetic monopoles is
    A. The magnetic field cannot be split
    B. Due to permeability
    C. Due to magnetization
    D. Due to magneto statics

ANSWER: A

59. Scattering matrix for a reciprocal network is:
    A. Symmetric
    B. Unitary
    C. Skew symmetric
    D. Identity matrix

ANSWER: A

60. What is Mobile communication?

A. Allows to communicate from different locations without the use of physical medium
B. Allows to communicate from different locations with the use of physical medium
C. Allows to communicate from same locations without the use of physical medium
D. Allows to communicate from same locations with the use of physical medium

ANSWER: A

61. Which type of antenna is used for edge excited cells?
    A. Omnidirectional antenna
    B. Grid antenna
    C. Sectored directional antenna
    D. Dipole antenna

ANSWER: C

62. What is the condition for intersystem interference?
    A. Mobile moves from one cell to another cell
    B. Mobile remains in the same cell
    C. Mobile moves from one cellular system to another cellular system
    D. Mobile remains in the same cluster

ANSWER: C

63. In a micro cell zone concept, when a mobile travels from one zone to another within the cell, it retains the same _____
    A. Power level
    B. Base station
    C. Channel

D. Receiver

ANSWER: C

64. What is the dimension of object as compared to wavelength of propagating wave when reflection occurs?

A. Large
B. Small
C. Same
D. Very small

ANSWER: A

65. Diffraction occurs when radio path between Tx. And Rx. Is obstructed by _____

A. Surface having sharp irregularities
B. Smooth irregularities
C. Rough surface
D. All types of surfaces

ANSWER: A

66. Which of the following is an advantage of AM systems in comparison to FM sytems?

A. Occupy less bandwidth
B. Superior performance in fading
C. Better noise immunity
D. Not susceptible to impulse noise

ANSWER: A

67. The propagation model that estimates radio coverage of a transmitter is called _____

A. Large scale propagation model
B. Small scale propagation model
C. Fading model
D. Okumura mode

ANSWER: A

68. For telegraphy the most commonly used modulation system

A. FSK
B. Two tone modulation
C. PCM
D. Single tone modulation

ANSWER: A

69. As per Shannon-Hartley theorem, noise is less Gaussian channel has

A. Zero capacity
B. Infinity capacity
C. Small capacity
D. None of the above

ANSWER: B

70. FM transmitting and receiving equipment's as compared to Am equipment's
    A. Costly
    B. Cheaper
    C. Almost equally costly
    D. None of the above

    ANSWER: A
71. Which of the following is analog?
    A. PCM
    B. PWM
    C. Delta modulation
    D. Differential modulation

    ANSWER: B
72. The modulation index of an FM is changed from 0 to 1. How does the transmitted power change?
    A. Get halved
    B. Gets doubled
    C. Get increased by 50 percent
    D. Remains unchanged

    ANSWER: C
73. VSB Preferred in TV transmission because
    A. It reduces the bandwidth requirement to half
    B. It avoids phase distortion at low frequency
    C. It results in batter reception
    D. None of the above

    ANSWER: A
74. Which occurs due to equilibrium fluctuations?
    A. Thermal noise
    B. Johnson noise
    C. Thermal and Johnson noise
    D. None

    ANSWER: C
75. The noise due to random behavior of charge carriers is
    A. Shot noise
    B. Partition noise
    C. Industrial noise
    D. Flicker noise

    ANSWER: A

76. What is the challenge if transmission in wireless communication is performed in baseband form?
    A. Mobility is difficult due extremely large antenna size.

B. Multiplexing become a little complex.
C. Interference become high due to large coverage distance.
D. The quality of the communication is degraded.
ANSWER: A

77. Assume that after graduation you will join to a company as communication engineer. Your company wants to buy FM modulator for repairing system but only PM modulator, differentiator and integrator are available in local market. What is the immediate and best solution as communication engineer?
    A. Buying differentiator and integrator and assemble them to use as FM modulator.
    B. Buying integrator and PM modulator then integrating the input of FM then feed to PM modulator.
    C. Buying differentiator and PM modulator then differentiating the input of FM then feed to PM modulator.
    D. Importing FM modulator from abroad market.
    ANSWER: B
78. Which one of the following statements is wrong stated?
    A. Modulation is a signal processing technique carried out at the transmitter.
    B. Demodulation is carried out at the receiver to extract the original message signal.
    C. Amplification may have carried out both at the transmitter and receiver to boost signal to desired level.
    D. Channel coding can be implemented for both analog and digital communication systems.
    ANSWER: D
79. The usefulness of preemphasis and deemphasis is to improve the performance of modulation system in the presence of noise by
    A. Emphasizing high frequency amplitude values of modulating signal
    B. Emphasizing low frequency amplitude values of modulating signal
    C. Emphasizing carrier frequency amplitude values
    D. Emphasizing carrier frequency itself
    ANSWER: B
80. Debre Berhan university wants to build a local FM broadcasting station to introduce and share useful information for the community in different issues. The university intended to use equipments present different laboratories of the university. If narrow band FM modulator is available in the ECE laboratory. How to use this FM modulator to the desired wideband FM broadcasting station?
    A. By integrating the output narrow band FM modulator and feed to the bandpass filter.
    B. By feeding the output of narrow band FM modulator to n^{th} order frequency multiplier and use BPF centered at nf_c .
    C. There is no way to change narrowband FM to wideband FM.
    D. No need to modification, both have equivalent performance.

ANSWER: B

81. Amplitude limiter in FM receivers are used to
    A. Remove amplitude variations due to noise.
    B. Filtering
    C. Demodulation
    D. Amplification
    ANSWER: A

82. The effect of keeping modulating frequency constant and increasing frequency deviation on the resulting FM wave is
    A. Increase in the modulation index but not bandwidth and side band components.
    B. Increase in the modulation index, bandwidth and side band components.
    C. Increase in bandwidth but not the modulation index and side band components
    D. Increase in modulation index and bandwidth, but not the side band components
    ANSWER: B

83. Advantage of using direct method for generation of FM signal is
    A. It gives high stability to FM signal frequency.
    B. Distortion free FM signal is generated.
    C. High power FM generation is possible.

    High stability

    ANSWER: C

84. Which one of the following is component of data communication?
    A. Receiver
    B. Channel
    C. Protocol
    D. Transmitter
    E. All
    ANSWER: E

85. Which one of the following organizations is not closer to internet standardization?
    A. IETF
    B. ICANN
    C. IEE
    D. ITU
    ANSWER: D

86. The _____ create a connection between computers around the world.
    A. Intranet
    B. Extranet
    C. Internet
    D. Internet
    ANSWER: C

87. Identify most commonly use network topology in Ethernet.

A. Bus
B. Tree
C. Star
D. Ring

ANSWER: C

88. Which one is deferent?

A. IP address
B. NAT
C. ICMP
D. HTTP

ANSWER: D

89. Dialogues between applications is governed by _____ of OSI model?

A. Application
B. Presentation
C. Session
D. Transport

ANSWER: C

90. Identify the best error correcting method from the following.

A. Parity checking
B. Hamming distant
C. Checksum
D. Cyclic redundancy code

ANSWER: D

91. Which media access protocol is implemented in wired and wireless Ethernet?

A. ALOHA
B. CSMA/CD
C. CSMA/CA
D. B and C

ANSWER: D

92. Based on question number 12 which one is not a valid host address for the given subnet?

A. 192.168.10.2
B. 192.168.10.27
C. 192.168.10.32
D. 192.168.10.126

ANSWER: D

93. Three-way hand shaking for data transmission is _____ layer method.

A. Network layer
B. Transport layer
C. Data link layer
D. Application layer

ANSWER: D

94. The number of the next byte the receiving party expected to receive is called _____?

A. Sequence Number
B. Byte number
C. Segment number
D. Acknowledgment number

ANSWER: D