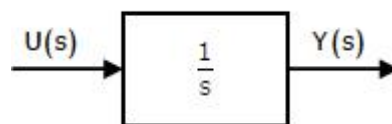


- C On the right half D Random

 11. A silicon $p-n$ junction at $T = 300$ K has $N_D = 10^{14} \text{ cm}^{-3}$ and $N_A = 10^{17} \text{ cm}^{-3}$. The built-in voltage is
 A 0.63 V B 0.93 V
 C 0.026 V D 0.038 V
 12. In unbiased $p-n$ junction, the junction current at equilibrium is
 A due to diffusion of majority carriers B due to diffusion of minority carriers
 C zero due to equal and opposite currents crossing the junction D zero because no charges cross the junction
 13. I_{dc} value for the half wave rectifier circuit can be given by
 A $\frac{I_m}{2}$ B $\frac{I_m}{\sqrt{2}}$
 C $\frac{I_m}{\pi}$ D $\frac{2I_m}{\pi}$
 14. A Tunnel diode is $p-n$ diode with
 A very high doping in p -region B very high doping in n -region
 C very high doping in both p -region and n -region D low doping in both p -region and n -region
 15. In a Varactor diode using the alloy junction, the transition capacitance is proportional to (where V_j is the magnitude of reverse junction voltage)
 A V_j^2 B $\frac{1}{V_j}$
 C $\frac{1}{\sqrt{V_j}}$ D $\frac{1}{V_j^2}$
 16. Main drawback of a JFET is
 A high input impedance B low input impedance
 C higher noise D lower gain
 17. A transition region in an open circuited $p-n$ junction contains
 A Electrons only B Immobile ions
 C Holes only D Electrons and holes both
 18. In a second order system, if the damping ratio is greater than equal to '1', then what would be the nature of roots?
 A Imaginary B Real and equal
 C Real but not equal D Complex conjugate
 19. The $V-I$ characteristics of an enhancement mode MOSFET has
 A only an ohmic region B only a saturation region
 C an ohmic region at low voltages and saturation region at higher voltages D an ohmic region at higher voltages and saturation region at lower voltages
 20. The Threshold Voltage (V_T) of a n -MOSFET can be increased by
 A increasing the channel dopant concentration B decreasing the channel dopant concentration
 C reducing the gate oxide thickness D reducing the channel length
 21. Which point on root locus specifies the meeting or collision of two poles?
 A Centroid B Break away point
 C Stability point D Anti-break point

22. Which one of the following statements is NOT TRUE for a continuous time causal and stable LTI system?
- A All the poles of the system must lie on the left side of the $j\omega$ axis B Zeros of the system can lie anywhere in the s-plane
- C All the poles must lie within $|s| = 1$ D All the roots of the characteristic equation must be located on the left side of the $j\omega$ axis
23. Which of the following amplifier produces least distortion
- A Class-A B Class-B
- C Class-C D Class-AB
24. When multistage amplifier the coupling method which is capable of providing highest gain is
- A RC coupling B Direct coupling
- C Transformer coupling D Impedance coupling
25. In a feedback amplifier, de-sensitivity D equals
- A $A\beta$ B $1 + A\beta$
- C $1 - A\beta$ D $\frac{1}{1 + A\beta}$
26. Following compensation method in amplifier leads to reduction in bandwidth
- A Lead compensation B Pole-zero compensation
- C Miller effect compensation D Dominant pole compensation
27. Comparator circuits are used in
- A summing B integrating
- C differentiating D converting sine to square wave
28. The T_{on} time for the 555 based astable multivibrator is
- A $0.69 (R_A + 2R_B).C$ B $0.69 (R_A + R_B).C$
- C $0.69 R_B.C$ D $1.44R_B.C$
29. Common collector amplifier has (where R_i is input resistance and R_o is output resistance)
- A high R_i and high R_o B low R_i and low R_o
- C high R_i and low R_o D low R_i and high R_o
30. Assuming zero initial condition, the response $y(t)$ of the system given below to a unit step input $u(t)$ is



- A $u(t)$ B $tu(t)$
- C $(t^2/2)u(t)$ D $e^{-t}u(t)$
31. In 1-to-4 demultiplexer, how many select lines are required?
- A 1 B 2
- C 3 D 4
32. In which of the following base systems, 123 is not a valid number?
- A Base 10 B Base 7
- C Base 4 D Base 3

33. Binary equivalent of decimal 21.125 is
 A 10101.001 B 11010.101
 C 10001.101 D 01011.001
34. A debouncing circuit is
 A an astable multivibrator B a bistable multivibrator
 C a latch D a monostable multivibrator
35. Excess-3 code is known as
 A weighted code B cyclic redundancy code
 C self-complementing code D algebraic code
36. Which components play a significant role in the formation of a dynamic RAM?
 A Two MOSFETs B Two capacitors
 C One capacitor & two MOSFETs D One capacitor & one MOSFET
37. Which among the following is not a mode of Flip Flop representation?
 A Characteristic equations B Excitation Tables
 C Finite State Machines (FSM) D Variable Entered Mapping (VEM)
38. If the output of two-bit asynchronous binary up counter using T flip flops is '00' at reset condition, then what output will be generated after the fourth negative clock edge?
 A 00 B 01
 C 10 D 11
39. For a ring counter, the number of output states are always equal to
 A Number of input states B Number of clock pulses
 C Number of registers D Number of flip flops
40. For high speed applications, the preferable bipolar logic family is
 A Diode Transistor Logic (DTL) B Transistor Transistor Logic (TTL)
 C Emitter Coupled Logic (ECL) D Integrated Injection Logic (I²L)
41. If the quarter line is short-circuited, then it acts as
 A Conductor B Insulator
 C Capacitor D Inductor
42. After what wavelength does the nature of graph get reversed for the input impedance of open-circuited line?
 A $\lambda/2$ B $\lambda/4$
 C λ D $\lambda/8$
43. To find a projection of one vector on to the other which of the following methods used
 A Summation B Cross product
 C Dot product D All of the above
44. The ratio of magnitudes of electric field intensity to the magnetic field intensity is regarded as
 A Intrinsic Impedance B Characteristic Impedance
 C Both A and B D None of the above
45. The constant x-circles of Smith chart becomes smaller due to increase in the value of 'x' from
 A 0 to π B 0 to 2π
 C 0 to $\pi/2$ D 0 to ∞
46. Which form of Gauss's law is regarded as Maxwell's first equation?
 A Line form B Point form
 C Angular form D Volume form
47. The correct relationship between electric field intensity (E) of two charges and their

B E inversely varies with r

D None of the above

48. Which conversion mechanism is performed by parabolic reflector antenna?
A Plane to spherical wave
B Spherical to plane wave
C Both A and B
D None of the above
49. Which type of wire antennas are also known as dipoles?
A Linear
B Loop
C Helical
D All of the above
50. Which mode of propagation is adopted in HF antennas?
A Ionospheric
B Ground wave
C Tropospheric
D All of the above
51. The sampling technique having the minimum noise interference is
A Instantaneous sampling
B Natural sampling
C Flat top sampling
D All of the above
52. Calculate the Nyquist rate for sampling when a continuous time signal is given by $x(t) = 5 \cos 100\pi t + 10 \cos 200\pi t - 15 \cos 300\pi t$
A 300 Hz
B 600 Hz
C 200 Hz
D 100 Hz
53. Noise Factor(F) and Noise Figure(NF) are related as
A $NF = 10 \log_{10}(F)$
B $F = 10 \log_{10}(NF)$
C $NF = 10 (F)$
D $F = 10 (NF)$
54. Determine the Bandwidth of a FM wave when the maximum deviation allowed is 75KHz and the modulating signal has a frequency of 10KHz.
A 170 kHz
B 200 kHz
C 210 kHz
D 180 kHz
55. For a FM signal $v(t) = 25 \cos (15 * 10^8 t + 10 \sin 1550t)$, calculate Modulation index and Maximum frequency deviation
A 10, 3000.1 Hz
B 20, 1550.9 Hz
C 10, 2465.9 Hz
D 10, 2000.0 Hz
56. Phase-locked loop (PLL) circuit can be used as
A FM demodulator
B AM demodulator
C FM receiver
D AM receiver
57. In radio receivers, varactor diodes are used for
A Tuning
B Demodulation
C Mixing
D None of the above
58. QPSK is a modulation scheme where each symbol consists of
A 1 bit
B 2 bits
C 4 bits
D 8 bits
59. The capacity of Gaussian channel is
A $C = 2B(1+S/N)$ bits/s
B $C = B^2(1+S/N)$ bits/s
C $C = B(1+S/N)$ bits/s
D $C = B(1+S/N)^2$ bits/s
60. The digital modulation technique in which the step size is varied according to the variation in the slope of the input is called
A Delta modulation
B PCM
C Adaptive Delta modulation
D PAM
61. The noise that affects PCM
A Transmission Noise
B Quantization noise
C Transit noise
D Both A and B are correct

62. Entropy of a signal is
 A Average information per message B Mean squared error in a message
 C Quantized information in a message D None of the above
63. In digital transmission, the modulation technique that requires minimum bandwidth is
 A Delta Modulation B PCM
 C DPCM D PAM
64. For the mixer circuits in communication which of the following device is preferable?
 A Varactor Diode B BJT
 C Tunnel diode D FET
65. Transducers can be capable of
 A Converting physical variations into electrical signal and vice versa B Converting physical variations into electrical signal
 C Converting electrical signal to physical variations D None of the above
66. Which method determines the dispersion limitation of an optical link?
 A Link power budget B Rise time budget
 C Both A and B D None of the above
67. Which among the following is a key process adopted for the laser beam formation as it undergoes the light amplification?
 A Spontaneous Emission B Stimulated Emission
 C Both A and B D None of the above
68. In an optical fiber, the concept of Numerical aperture is applicable in describing the ability of
 A Light Collection B Light Scattering
 C Light Dispersion D Light Polarization
69. Which among the following is provided by an optical receiver for the regeneration of data signal with minimum error?
 A Photo-diode B Signal Processing Circuits
 C Linear Circuitry D None of the above
70. Discrete Fourier Transform (DFT) is applied to
 A Infinite sequences B Finite discrete sequences
 C Continuous infinite signals D Continuous finite sequences
71. Superposition of signals in a linear system refers to the
 A Output that is product of all the signals B Output that is sum of all the signals
 C Output that is of highest amplitude of all the signals D Output that is of largest spectrum of all the signals
72. The condition for a system to be causal is
 A All poles of its transfer function must be left half of s-plane B All poles of its transfer function must be right half of s-plane
 C All zeros of its transfer function must be right half of s-plane D All zeros of its transfer function must be left half of s-plane
73. The circular convolution of two sequences in time domain is equivalent to
 A Multiplication of DFTs of two sequences B Summation of DFTs of two sequences
 C Difference of DFTs of two sequences D Square of multiplication of DFTs of two sequences

74. Causal systems are the systems in which
- | | |
|---|---|
| A The output of the system depends on the present and the past inputs | B The output of the system depends only on the present inputs |
| C The output of the system depends only on the past inputs | D The output of the system depends on the present input as well as the previous outputs |
75. Which flags represent the least significant bit (LSB) and most significant bit (MSB) of Program Status Word (PSW) respectively in 8051 microcontroller?
- | | |
|------------------------------|--------------------------------------|
| A Parity Flag & Carry Flag | B Parity Flag & Auxiliary Carry Flag |
| C Carry Flag & Overflow Flag | D Carry Flag & Auxiliary Carry Flag |
76. What is the default value of stack once after the system undergoes the reset condition in 8051 microcontroller?
- | | |
|--------|--------|
| A 00 H | B 07 H |
| C 08 H | D 09 H |
77. Which of the following statements for 8085 is correct?
- | | |
|---|--|
| A Program Counter (PC) specifies the address of the instruction last executed | B PC specifies the address of the instruction being executed |
| C PC specifies the address of the instruction to be executed | D PC specifies the number of instructions executed so far |
78. Processor status word of 8085 microprocessor has five flags. They are
- | | |
|-------------------|--------------------|
| A S, Z, AC, P, CY | B S, OV, AC, P, CY |
| C S, Z, OV, P, CY | D S, Z, AC, P, OV |
79. Which of the following instruction is not possible in 8085?
- | | |
|-----------|------------|
| A POP PSW | B POP B |
| C POP D | D POP 30 H |
80. Which instruction is required to rotate the content of accumulator one bit right along with carry in 8085 microprocessor?
- | | |
|-------|-------|
| A RLC | B RAL |
| C RRC | D RAR |
81. Improper integral $\int_0^1 \frac{dx}{\sqrt{x}}$ is
- | | |
|-----|-----|
| A 1 | B 2 |
| C 3 | D 0 |
82. At which point the local minima will occur?

$$f(x, y) = 2x^2 + 3xy + 4y^2 - 5x + 2y$$

A $\left(3, \frac{3}{2}\right)$

B $(3, -1)$

C $(2, -1)$

D None of these.

83. Find the derivative of the function $f(x, y) = \frac{x-y}{xy+2}$ at $P(1, -1)$ in the direction of

$$\bar{u} = 12\hat{i} + 5\hat{j}.$$

A $\frac{21}{13}$

B $\frac{11}{13}$

C 0

D None of these

84. Evaluate $\int_C (x + y + z) ds$ where C is the straight line segment from $(1, 2, 3)$ to

$$(0, -1, 1).$$

A $\sqrt{14}$

B 1

C $3\sqrt{14}$

D None of these

85. Determine the counterclockwise circulation of $\bar{F} = (y^2 - x^2)\hat{i} + (x^2 + y^2)\hat{j}$ where

C is the triangle bounded by $y = 0$, $x = 3$, $y = x$.

A 3

B 9

C 18

D None of these

86. General solution of $y'' + 8y' + 16y = 0$ is

A $y = c_1 \cos 4x + c_2 \sin 4x$

B $y = c_1 \cos x + c_2 \sin x$

C $y = c_1 \cos 3x + c_2 \sin 3x$

D None of these

87. Determine the particular integral of $\frac{1}{4}y'' + y' + y = x^2 - 2x$

A $y_p = x^2 - 4x + \frac{7}{2}$

B $y_p = x^2 - 4x - \frac{7}{2}$

C $y_p = x^2 - 4x + \frac{3}{2}$

D None of these

88. Find the solution of $\frac{dr}{d\theta} + r \sec \theta = \cos \theta$.

A $(\sec \theta + \tan \theta)r = \cos \theta + c$

B $(\sec \theta + \tan \theta)r = \theta - \cos \theta + c$

C $(\sec \theta + \tan \theta)r = \theta + c$

D None of these

89. The particular integral of $y'' + y = \sin x$

A $y_p = \frac{1}{2}x \cos x$

B $y_p = -\frac{1}{2}x \sin x$

C $y_p = -\frac{1}{2}x \cos x$

D None of these

90. The solution of $x^2 y'' + xy' + 4y = 0$ is

A $y = c_1 x \cos(2 \ln x) + c_2 \sin(2 \ln x)$

B $y = c_1 \cos(2 \ln x) + c_2 \sin(2 \ln x)$

C $y = c_1 \cos(\ln x) + c_2 \sin(\ln x)$

D None of these

91. Let $B = \begin{bmatrix} 1 & 0 \\ 26 & 27 \end{bmatrix}$. Find a matrix A such that $A^3 = B$.

A $A = \begin{bmatrix} 1 & 0 \\ 2 & 3 \end{bmatrix}$

B $A = \begin{bmatrix} -1 & 0 \\ 2 & 3 \end{bmatrix}$

C $A = \begin{bmatrix} 1 & 0 \\ 2 & 2 \end{bmatrix}$

D None of these

92. Find the eigen values of $A = \begin{bmatrix} 1 & -4 \\ 3 & -7 \end{bmatrix}$.

A $1, -5$

B $2, -3$

C $-1, 5$

D None of these

93. Solve $4x - 2y = 5$, $-6x + 3y = 1$.

A $(3, -2)$

B $(3, -2)$

C $(1, 2)$

D None of these

94. The derivative of $f(z) = z^2 \bar{z}$ exists

A at $z = 1$

B at $z = -1$

C no where

D at $z = 0$

95. Evaluate $\oint_C \frac{e^{2z}}{(z+1)^4} dz$ where C is the circle $|z| = 3$.

A $\pi i e^{-2}$

B $\frac{8}{3} \pi i e^{-2}$

C $2\pi i e^{-2}$

D None of these

96. Choose correct option for the series of $\tan z$.

A $z + \frac{z^3}{3} + \frac{2z^5}{15} + \dots$

B $\frac{1}{z} + \frac{z^3}{3} + \frac{2z^5}{15} + \dots$

C $z + \frac{z^3}{6} + \frac{2z^5}{15} + \dots$

D None of these

97. Find the probability that a single toss of a die will result in a number less than 4 if it is given that the toss resulted in an odd number.

A $\frac{2}{3}$

B $\frac{1}{3}$

C $\frac{2}{5}$

D $\frac{3}{5}$

98. Find the probability that in five tosses of a fair die, a 3 will appear twice.

A $\frac{25}{3840}$

B $\frac{125}{3840}$

C $\frac{625}{3888}$

D $\frac{325}{3840}$

99. Determine the interval where root lies for the function $f(x) = x^3 + 3x^2 - 1$.

A $(-2, -1)$

B $(1, 2)$

C $(2, 3)$

D $(0, 1)$

100. Choose appropriate formula of Simpson's One - Third rule for $\int_{x_0}^{x_2} f(x)dx$ where

$$x_0 < \xi < x_2.$$

A $\frac{h}{3}[f(x_0) + 3f(x_1) + f(x_2)] - \frac{h^5}{90}f^{(4)}(\xi)$

B $\frac{h}{3}[f(x_0) + 4f(x_1) + f(x_2)] - \frac{h^5}{90}f^{(4)}(\xi)$

C $\frac{h}{3}[f(x_0) + 2f(x_1) + f(x_2)] - \frac{h^5}{90}f^{(4)}(\xi)$

D $\frac{h}{3}[f(x_0) + f(x_1) + f(x_2)] - \frac{h^5}{90}f^{(4)}(\xi)$