BARC 2019
Electronics & Comm. Engg.

Free Mock Test

gradeup

1. The transfer function of a PID controller is given by G(s) = 10[1+ $\frac{1}{5s}$ +2s] as ω tends to zero

A. Magnitude of G (jω) tends to zero and phase angle of G (jω) tends to +90°.

B. Magnitude of G (jω) tends to infinity and phase angle of G (jω) tends to +90°.

C. Magnitude of G (jω) tends to zero and phase angle of G (jω) tends to -90°.

D. Magnitude of G (jω) tends to infinity and phase angle of G (jω) tends to -90°.

2. What is the status of zero flag after execution of following set of instructions ?

```
        LXI     H, 27F0H
        MVI     C, 27H
LOOP:DCX        H
        MOV     A, L
        ORA     H
        JNZ     LOOP
```

A. 1
B. 0
C. Can't specify
D. Same as initial value

3. For a certain binary communication channel, the Probability that a transmitted '0' is received as a '0' is 0.95 and the Probability that a transmitted '1' is received as '1' is 0.90. If the Probability that a '0' is transmitted is 0.4. Then the Probability that '1' was transmitted given that a '1' was received

A. $\frac{27}{28}$ B. $\frac{11}{28}$

C. $\frac{4}{200}$ D. $\frac{50}{100}$

4. A silica fiber cable has a refractive index of 1.48. It is surrounded by a cladding material with a refractive index of 1.465. The critical angle for TIR and the numerical aperture of fiber are__

A. 80.83° , 0.25
B. 78.32°, 0.32
C. 81.83°, 0.21
D. 78.32°,0.25

5. With ρ_s=6μC/m^2, an uniform surface charge is located at z= 10m plane. Now, determine the value of flux density at the point P(1,1,1) in μC/m^2$\left(\bar{a}_z\right)$

A. -2 μC/m^2$\left(\bar{a}_z\right)$

B. -3 μC/m^2$\left(\bar{a}_z\right)$

C. -4 μC/m^2$\left(\bar{a}_z\right)$

D. -5 μC/m^2$\left(\bar{a}_z\right)$

6. The input impedance of a dipole antenna is 90Ω, and it should be matched to a transmission line by means of short circuit stub. Now, determine the location of the stub in meters.

[Given Frequency = 90MHz, and characteristic impedance of transmission line = 590Ω]

A. 2.593m B. 1.593m
C. 4.593 D. 0.197m

7. An uniform plane wave that is propagating in a medium with ϵ_r = 18, and peak electric field of 8V/m. Now, determine the peak magnetic field intensity.

A. 0.090 A/m B. 1 A/m
C. 0.832 A/m D. 4A/m

8. The declared constant of 5A, 220V DC watt hour meter is 3275 Rev/. In a test run at half load, the meter takes 59.5 sec to complete 30 revolutions. The error of meter is_____

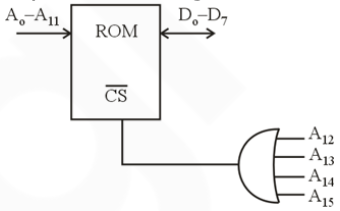
A. 0.84% slow
B. 0.84% fast
C. 0.76% slow
D. 0.76% fast

9. In a circuit of single phase induction energy meter, the pressure coil current lags the voltage by 88 , the errors while measuring power in two circuits having power factors unity and 0.5 lagging respectively
A. -0. 061%, +6.1%
B. +0. 061%, -6.1%
C. -0. 061%, -6.1%
D. -6.1%, -6.1%

10. For the below mentioned 8051 assembly code
Time elapse : MOV R0, #100
Part 1 : MOV R1, #50
Part 2 : MOV R2, #248
Part 3 : DJNZ R2,
Part3 : DJNZ R1,
Part2 : DJNZ R0,
- Part1 Assumptions:
- Microcontroller is running at 12 MHz frequency and 1 machine cycle is having 12 clock cycles
- MOV instruction takes 1 Machine cycle
- DJNZ instruction takes 2 Machine cycle

Calculate time required for execution of Part 1
A. 2495600 µS
B. 2496300 µS
C. 2495300 µS
D. 2496600 µS

11. There is an interfacing between 8085 microprocessor and ROM given in below figure. The ROM occupies the range



A. 0000 – 0FFF H
B. 0000 – 3FFF H
C. 1FFF – FFFF H
D. 8000 – 9FFF H

12. The true statements regarding T1 signalling system for multiplexing 24 channels among the following are
(i) 1 framing bit used per frame
(ii) 1 bit in every channel is reserved for signalling bit
(iii) 1 bit in every channel is used for signalling in every 6^{th} frame
(iv) 1 bit in every channel is reserved for frame synchronization.
A. (i), (ii) B. (i), (iii)
C. (ii), (iv) D. (iii), (iv)

13. A Binary Symmetric Channel (BSC) has a crossover probability of 0.4. Determine its capacity.
A. 0.029 bits/symbol
B. 0.29 bits/symbol
C. 1 bit/symbol
D. 2 bits/symbol

14. Frequency modulation is done in a carrier signal, in which, the sinusoidal signal is having 2kHz frequency, and 5kHz maximum deviation in frequency. Now, if the sinusoidal signal is made to increase in amplitude by a factor of 3, then it is observed that the corresponding frequency is lowered to 1kHz. Then, determine the bandwidth of this newly modulated signal and also find out the maximum deviation of frequency respectively.
A. 29kHz, 10kHz
B. 30kHz, 15kHz
C. 31kHz, 20kHz
D. 32kHz, 15kHz

15. For the 8-bit DAC with reference voltage V_R=5V. If the digital input is 1000 0100 then find the analog output in volt.
A. 2.58V B. 5.12V
C. 3.19V D. 1.56V

16. The Nyquist stability criterion and the Routh criterion both are powerful analysis tools for determining the stability of feedback controllers. Identify which of the following statements is FALSE.

A. Both the criteria provide information relative to the stable gain range of the system.
B. The general shape of the Nyquist plot is readily obtained from the Bode magnitude plot for all minimum-phase systems.
C. The Routh criterion is not applicable in the condition of transport lag, which can be readily handled by the Nyquist criterion.
D. The closed-loop frequency response for a unity feedback system cannot be obtained from the Nyquist plot.

17. The Transfer function of two cascaded systems $H_1(z)$ & $H_2(z)$ is known to be

$$H(z)=\frac{z^2+0.25}{z^2-0.25}$$

It's also known that the unit step response of first system is $[2-(0.5)^n]u(n)$.
Then find the value of $H_1(z)$ & $H_2(z)$?

A. $H_1(z)=\frac{1}{1-0.5z^{-1}}$ & $H_2(z)=\frac{1+0.25z^{-2}}{1+0.5z^{-1}}$

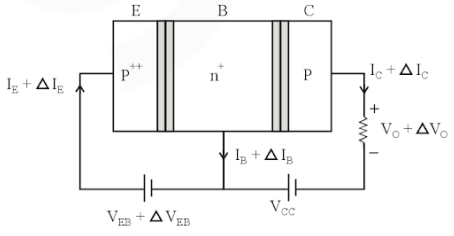
B. $H_1(z)=\frac{1}{1+0.5z^{-1}}$ & $H_2(z)=\frac{1+0.25z^{-2}}{1-0.5z^{-1}}$

C. $H_1(z)=\frac{1}{1+0.5z^{-1}}$ & $H_2(z)=\frac{1+0.25z^{-2}}{1+0.5z^{-1}}$

D. $H_1(z)=\frac{1}{1-0.5z^{-1}}$ & $H_2(z)=\frac{1-0.25z^{-2}}{1-0.5z^{-1}}$

18. At room temperature, a silicon photodetector can't be used to detect which of the following wavelength
A. 1.3 μm B. 0.633 μm
C. 0.85 μm D. 1 μm

19. For the below BJT which of the following is true, for amplification process where BV_{CB} = Breakdown voltage in CB configuration



A. $|V_O + \Delta V_O| \le V_{CC} < BV_{CB}$
B. $|V_O + \Delta V_O| > V_{CC} < BV_{CB}$
C. Both A and B
D. None

20. Find the conductivity of germanium for both
(A) with donor impurity of 1 part in 10^6
(B) with acceptor impurity of 1 part in 10^7
Given that n_i for Ge at 300K is 2.5×10^{13} cm^{-3}, μ_n and μ_p for Ge are 3800 and 1800 cm^2/Vs respectively and the no. of Ge atoms = 4.4×10^{22}
A. 26.57 S/cm and 1.267 S/cm
B. 1.67 S/cm and 16.575 S/cm
C. 13.59 S/cm and 2.236 S/cm
D. 14.231 S/cm and 2.22 S/cm

21. The average drift velocity of free electrons is 60 m/s when an electric field intensity of 10 V/cm is applied across a semiconductor at a certain temperature. Then what is the electron mobility?

A. $200\frac{cm^2}{Nsec}$ B. $400\frac{cm^2}{Nsec}$
C. $600\frac{cm^2}{Nsec}$ D. $800\frac{cm^2}{Nsec}$

22. A signal x(t) is having Nyquist rate = $2\omega_0$. Then the Nyquist rate of $x(t)\cos^2 \omega_0 t$ is
A. $2\omega_0$ B. $4\omega_0$
C. $6\omega_0$ D. $8\omega_0$

23. If the transfer function of a system is given by $H(s)=\frac{1}{(s+2)^2}$, then find the output of the system for step input.

A. $\frac{1}{4}-\frac{1}{2}e^{-2t}-\frac{1}{2}t\cdot e^{-2t}$

B. $\frac{1}{4}-\frac{1}{4}e^{-2t}+\frac{1}{2}t\cdot e^{-2t}$

C. $\frac{1}{4}-\frac{1}{4}e^{-2t}-\frac{1}{2}t\cdot e^{-2t}$

D. $\frac{1}{4}+\frac{1}{4}e^{-2t}-\frac{1}{2}t\cdot e^{-2t}$

24. Energy of the signal A · δ[n] is given by:
A. $\frac{A^2}{2}$ B. 0
C. $\frac{A^2}{4}$ D. A^2

25. If φ(t) is the state transition matrix of a system then, φ(kt) implies which of the following [where 'k' is a scalar constant]
A. φ(t) added 'k' times
B. φ(t) multiplied 'k' times
C. Both of the above
D. None of the above

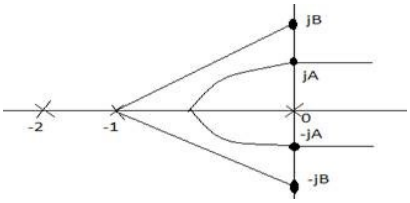
26. A typical optical fiber has
A. high refractive index core & low refractive index cladding
B. Low refractive index core &high refractive index cladding
C. Uniform refractive index core surrounded by variable refractive index cladding
D. None of the above

27. Why is one-time password safe?
A. It is easy to generate
B. It cannot be shared
C. It is different for every access
D. It can be easily decrypted

28. Which of the following correctly describe the "telnet"?
A. It provides remote access to servers and networking devices
B. It transfers webpages from webservers to clients
C. It transfers email messages and attachments
D. None of these

29. Consider the following function.
int fun (int n)
{if(n/10 ==0) return (n% 10);
else return fun(n&10 + fun(n/10)}
What is the return value of fun(9874)?
A. 1 B. 2
C. 3 D. 4

30. The open loop transfer function of the system is G(s) H(s) = $\frac{k}{s(s+1)(s+2)}$. The root locus will intersect j^{ω} axis at A, the asymptotic line intersect j^{ω} at point B



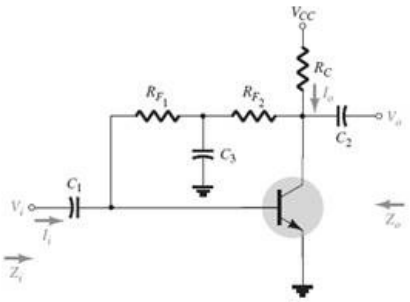
The values are
A. A = √2 , B = 2
B. A = √2 , B = √6
C. A = √2 , B = √3
D. A = √3 , B = √2

31. What will be output if you will compile and execute the following c code ?
char c=125; c=c+10;
printf("%d",c);
A. 135 B. 115
C. – 121 D. – 8

32. Bluetooth is an example of :
A. personal area network
B. virtual private network
C. local area network
D. none of the above

33. Find the value of R_1, R_2 to design second order butter worth trigger with ω_C = 100 rad/sec, gain k = 2, $C_1 = C_2$ = 1 μF, R_A = 1 kΩ ?
A. 6.325 kΩ,12.654kΩ
B. 2.365 kΩ, 4.658 kΩ
C. 7.071kΩ, 14.142kΩ
D. None of these

34. Which of the following expression gives the input impedances of the given network?



A. $R_{F_1} \| \beta r_e$
B. $R_{F_2} \| \beta r_e$
C. $R_{F_1} \| R_{F_2} \| \beta r_e$
D. βr_e

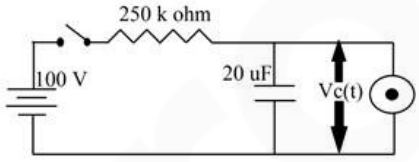
35. If the doping concentration of 'p' and 'n' side of a PN-diode are $10^{17}/cm^3$ and $0^{16}/cm^3$ respectively, find the ratio of width of depletion region in 'p' side to that of 'n' side.
A. 1 : 10 B. 10 : 1
C. 1 : 100 D. 100 : 1

36. Identify the characteristic equation of X-Y flip flop whose truth table is given

X	Y	Q (n+1)
0	0	0
0	1	$\overline{Q}_n$
1	0	Q_n
1	1	1

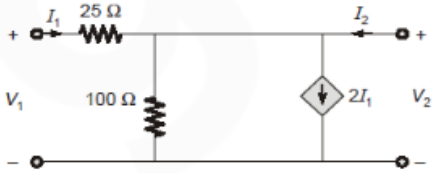
A. $XY\overline{Q}$ B. $XY+\overline{XQ}$
C. $XQ+Y\overline{Q}$ D. XY + XQ + YQ

37. The following figure shows a simple circuit for a neon glow tube. It ignites at 80V and extinguishes at 50V. Assume that the cycle starts when the voltage across the tube is 50V. Find the time (in seconds) for which the switch must be on so that the tube may ignite.



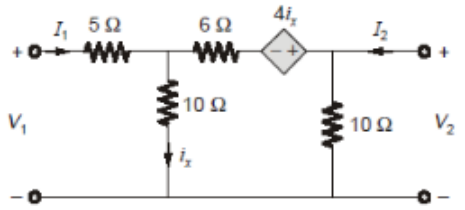
A. 2 B. 12
C. 4.58 D. 16

38. Consider the two port network given below



For the given network admittance parameter Y_{12} is _____ mʊ.
A. 120 B. 40
C. 130 D. 100

39. Consider the 2 port circuit given below

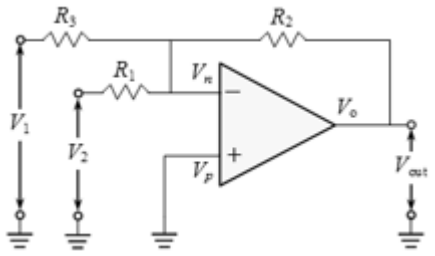


Hybrid parameter h_{12} for the circuit is _____.
A. 0.5 B. 1.24
C. 1.5 D. 2.3

40. An AM signal and a narrow band FM signal with identical carriers, modulating signal and modulation indies of 0.1 are added together. The resultant signal can be approx. be
A. Broadband FM
B. SSB with carrier
C. DSB-SC
D. SSB without carrier

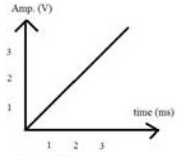
41. 12 signal each band-limited to 5 KHz are to be transmitted over a single channel by freq. division multiplexing. If AM-SSNB modulated guard band of 1 KHz is used, then the bandwidth of the multiplexed signal will be
A. 51 KHz B. 61 KHz
C. 71 KHz D. 81 KHz

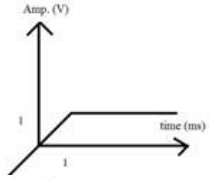
42. In filter circuit, when total resistance value of 3 resistors is 20 kΩ with voltages V_1 = 1.5 V, V_2 = 2.5 V, then V_{out} will be:

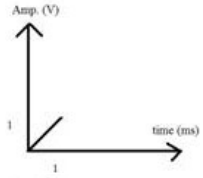


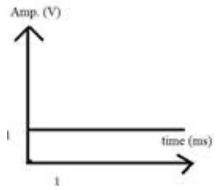
A. -4.0 V B. +4.0 V
C. −3.24 V D. 5.345 V

43. Which of the following signals represents unit ramp signal?

A. 

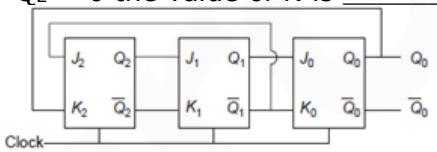
B. 

C. 

D. 

44. Which of the following is the mathematical representation of unit sinc function?
A. (sin πt)/(πt)
B. (sin t)/(t)
C. 1, for t > = 0; 0 otherwise.
D. $1 + t^2$, for t > = 0; 0 otherwise

45. The divide by N counter is shown below. If initially $Q_0 = 0$, $Q_1 = 1$, $Q_2 = 0$ the value of N is _____.



A. 4 B. 5
C. 8 D. 10

46. For $0 \le t < \infty$ the maximum value of the function $f(t) = e^{-t} - 2e^{-2t}$ occurs at
A. $t = \log_e 4$ B. $t = \log_e 2$
C. $t = 0$ D. $t = \log_e 8$

47. If the electric field of a plane wave is

$$\bar{E}(Z,t) = \hat{x}3\cos(\omega t - kz + 30^\circ) - \hat{y}4\sin(\omega t - kz + 45^\circ)(mV/m)$$

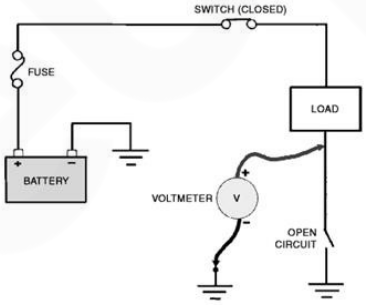
the polarization state of the plane wave is
A. left elliptical
B. left circular
C. right elliptical
D. right circular

48. What is the hexadecimal representation of $(657)_8$?
A. 1 AF B. D 78
C. D 71 D. 32 F

49. How fast can be output of an OP Amp change by 10 V, if its slew rate is 1v/μs?
A. 5μs B. 10μs
C. 15μs D. 20μs

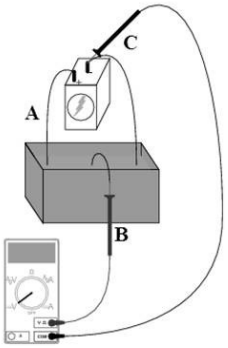
50. To have best quality waveform, oscilloscope will trigger:
A. internally B. externally
C. automatic D. runoff

51. What will be the voltmeter reading in the circuit?



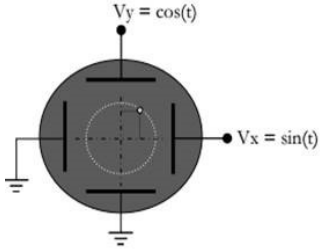
A. 12.0 volts
B. 0.0 volts
C. source voltage
D. 6.0 volts

52. In a liquid potentiometer, as shown which lead will affect the change in voltmeter reading?



A. lead A
B. lead B
C. lead C
D. Both lead A and C

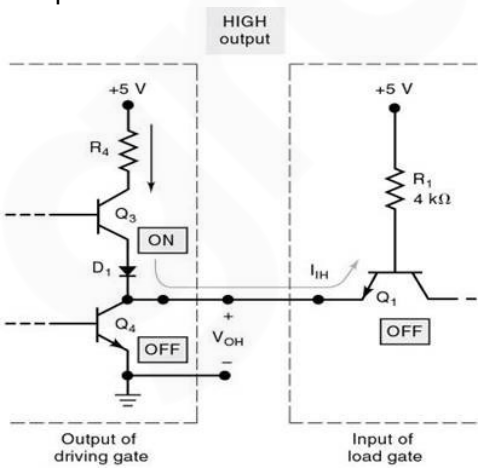
53. In CRO, due to horizontal and vertical signal, bright spot is seen on circular path as shown. This bright spot will be located on extreme _____of the screen.



A. centre of the screen
B. top
C. left
D. right

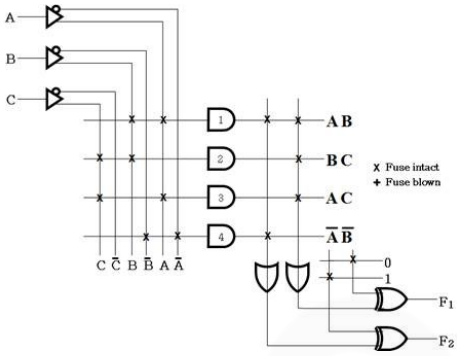
54. It is seen that the power dissipation of a JFET can be calculated by considering $P = V_{DS}I_D + V_{GS}I_G$, for all practical purposes and can be further simplified to $P = V_{DS}I_D$: Identify why the second term of the equation $V_{GS}I_G$ may be ignored for a junction field-effect transistor.
A. $I_G = 1$
B. I_G = infinite
C. I_G = neutral
D. $I_G = 0$

55. In the TTL circuit show, which among the following will act as pull up transistor?



A. Q1 B. Q2
C. Q3 D. None of these

56. In the PLA shown, what will be the equation for F2?



A. F2 = A'B + AB'
B. F2 = AB' + AB'
C. F2 = A'B + A'B
D. F2 = A'B' + AB'

57. Which of the following is an invalid state in an 8-4-2-1. Binary Coded Decimal counter
A. 1 0 0 0 B. 1 0 0 1
C. 0 0 1 1 D. 1 1 0 0

58. If 'y' is thrice the sum of Eigen values of the matrix, $A = \begin{matrix} 1 & 2 & -2 \\ 1 & 0 & 3 \\ -2 & -1 & -3 \end{matrix}$, what is the value of y?
A. 6 B. 3
C. -3 D. -6

59. The invariant points of the bilinear transformation $w = \frac{2z+6}{z+7}$ are:
A. -1,5 B. -6,1
C. -3/2, -7 D. 3,14

60. A computer has 16×4 memory subsystem with the higher order inter-leaving using 8×2 chips for computer system with an 8-bit address bus. The number of RAM chips needed are_____.
A. 2 B. 3
C. 4 D. 5

61. Consider the following statements for continuous-time linear time invariant (LTI) systems.

I. There is no bounded input bounded output (BIBO) stable system with a pole in the right half of the complex plane.
II. There is non causal and BIBO stable system with a pole in the right half of the complex plane.
Which one among the following is correct?
A. Both I and II are true
B. Both I and II are false
C. Only I is true
D. Only II is true

62. For a feedback control system of type-2, the steady state error for a ramp input is:
A. Infinite B. constant
C. Zero D. Intermediate

63. For a signal flow path with only one forward path and no loops, the gain is:
A. Product of all gain along the path
B. Sum of gain along the path
C. Logarithmic addition of gain along the path
D. Algebraic sum of gain along the path

64. What is the phase shift provided in the feedback network of Wein Bridge Oscillator?
A. 0° B. 90°
C. 180° D. 270°

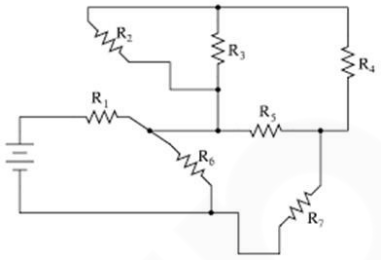
65. The theoretical efficiency of a class D amplifier is _____.
A. 50% B. 75%
C. 87.5% D. 100%

66. Certain current distribution gives rise to the vector magnetic potential $\vec{A} = x^2 y\hat{a}_x + y^2 x\hat{a}_y - xyz\hat{a}_z$ Wb/m. The flux through the surface defined by $z = 2, 0 \le x \le 1, -1 \le y \le 4$ is _____ Wb.
A. 20 B. 60
C. 10 D. none of these

67. If $A^2 - A + I = 0$, then the inverse of A is
A. A B. A + I
C. I – A D. A – I

68. Calculate the form factor of a sinusoidal wave.
A. 1.11 B. 2
C. 3 D. 2.12

69. In the following network, what is the phase difference between current I and voltage V?



A. 62.97^0 B. 135.94^0
C. 0^0 D. 90^0

70. Maximum power transfer occurs at _____ efficiency.
A. 100% B. 50%
C. 75% D. 25%

71. What is the output printed by the following code?
```
#include<stdio.h>
int main()
{
char Arr[6]="print";
int k,l;
for(k=0,l=5;k<l;Arr[k++]=Arr[l
]);
printf("%d",printf("%s",Arr));
}
```
A. tnirp B. null string
C. 0 D. 5

72. Consider the following code fragment for (k=2; k<16; k+=2); printf ("%d", ++k); returns in
A. Syntax error
B. Execution error
C. Printing of 14
D. Printing of 17

73. A standard air filled rectangular wave guide has a dimension for which a=2b, the cutoff frequency for TE_{02} mode is 12GHz, the cutoff frequency for TE_{01} mode is _____ GHz.
A. 2 B. 4
C. 6 D. 8

74. In a real time system, the simplest scheme that allows the operating system to allocate memory to two processes simultaneously is _____
A. Over lays
B. Pipeline
C. Swapping
D. None of the above

75. In a microprocessor, the resister which holds the address of the next instruction to be fetched is
A. Accumulator
B. Program counter
C. Stack pointer
D. Instructor register

76. The Complement Accumulator (CMA) instruction of 8085 processor on execution affects
A. Zero Flag
B. Sign Flag
C. Carry Flag
D. None of the flags

77. What is the simplified form of the Boolean expression
$T = (x+y)(x+\bar{y})(\bar{x}+y)$
A. $\bar{X}\bar{Y}$ B. $\bar{X}Y$
C. XY D. $X\bar{Y}$

78. The Boolean expression:
$F = \overline{A+\bar{B}+C} + \overline{\bar{A}+\bar{B}+C} + \overline{A+\bar{B}+\bar{C}} + ABC$
reduced to
A. A B. B
C. C D. A+B+C

79. A processor that has carry, overflow and sign flag bits as part of its program status word (PSW) performs addition of the following two 2's complement numbers 01001101 and 11101001. After the execution of this addition operation, the status of the carry, overflow and sign flags, respectively will be:
A. 0,0,0 B. 1,0,0
C. 1,0,1 D. 1,1,1

80. A JFET is set up as a follower, with μ = 200, r_d = 100kΩ and source load resistor R_L = 1k Ω. The output resistance R_0 is
A. 1000 Ω B. 500 Ω
C. 333 Ω D. 666 Ω

81. Intermediate (i) layer of PIN-diode imparts which one of the following features to a p-n junction diode?
A. High reverse blocking capability
B. High forward current rating
C. Inverting capability
D. Poor turn off performance

82. In a P-N junction diode under reverse bias, the magnitude of electric field is maximum at
A. the edge of the depletion region on the P side
B. the edge of the depletion region on the N side
C. the centre of the depletion region on the N side
D. the P-N junction

83. Consider the following statements:
1). Infix, Prefix and Postfix notations for expressing sum of A and B are A+B, +AB, and AB+ respectively.
2). AVL tree is a binary tree in which the difference in heights between the left and the right sub tree is not more than one for every node.
3). Stack data structure is used to save and retrieve information in reverse order.
4). Queue data structure is known as LIFO.
Which of the statements given above are correct?
A. 1, 2 and 3 B. 2, 3 and 4
C. 1, 3 and 4 D. 1, 2 and 4

84. An array multiplier is used to find the product of a 3 bit number with a 4 bit number. How many 4 bits adders are required to perform multiplication?
A. 1 B. 2
C. 3 D. 4

85. A micro-strip line of 50 ohm is terminated in Z_L = 40 + j30Ω what is the VSWR of the load?
A. 2.0 B. 1.8
C. 1.5 D. 1.3

86. When electromagnetic waves are propagated in a waveguide
A. They travel along the walls of the waveguide
B. They travel through the dielectric without touching the walls.
C. The are reflected from the walls but do not travel along the walls
D. None of these

87. A micro-strip line consists of a single ground plane and thin strip conductor on a
A. conducting plane
B. semiconductor slab
C. low-loss dielectric substrate
D. high-loss dielectric substrate

88. In a microwave magic-*T*, *E*-plane and *H*- plane are
A. In phase
B. Out of phase
C. Isolated
D. 90^0 out of phase

89. The underlying principle of working of a cavity wave meter, used to measure frequency of microwaves in a system, is
A. selective absorption of microwave energy in solids
B. selective scattering of microwave energy by a cavity
C. selective diffraction of microwaves around a cavity
D. resonance of a cavity with incoming microwave energy

90. A ratio cab company with its antenna at a height of 15 m communicates with a cab having its antenna 1.5 m. the maximum communication distance without obstacles is roughly.
A. 10 km B. 20 km
C. 28 km D. 36 km

91. Which of the following antenna gives circular polarization?
1). Yagi-Uda
2). Parabolic
3). Helical
4). Dipole
A. 1, 2, 3 and 4
B. 1, 2 and 3 only
C. 3 only
D. 4 only

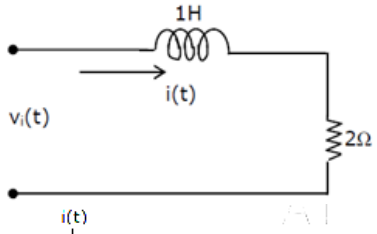
92. What is the spectral density of white noise?
A. A constant
B. δ(ω)
C. $[\delta(\omega)]^2$
D. A step function in ω

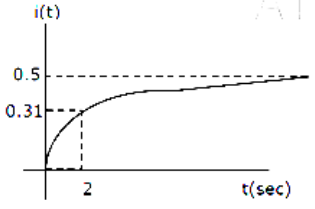
93. If variance σ_x^2 of $d(n)=X(n)-X(n-1)$ one-tenth the variance σ_x^2 of a stationary zero- mean discrete-time signal X(n), then the normalized autocorrelation function $R_{XY}(k)/\sigma_x^2$ at k = 1 is
A. 0.95 B. 0.90
C. 0.10 D. 0.05

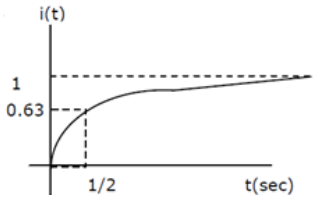
94. A piezoelectric crystal has a thickness of 2.5 mm and a voltage sensitivity of 0.05 V m/N. The piezoelectric crystal is subjected to an external pressure of 1.6 X 10^6 N/m^2, then the corresponding output voltage is
A. 200 volts
B. 3.2 X 10^9 volts/m of thickness
C. 0.07 X 10^9 $V/(m^3/New)$
D. 200 m volts

95. One single-phase energy meter operating on 230 V and 5 A for 5 hours makes 1940 revolutions. Meter constant is 400 rev/kWh. The factor of the load is
A. 1.0 B. 0.8
C. 0.7 D. 0.6

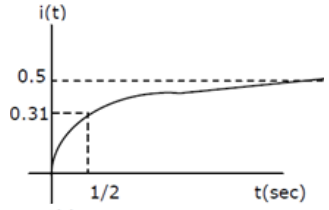
96. For the R-L circuit shown in Figure, the input voltage $v_i(t) = u(t)$. The current i(t) is



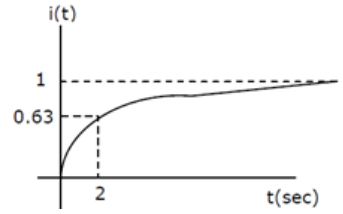
A.


B.


C.



D.



97. Two sequences $x_1[n]$ and $x_2[n]$ have the same energy. Suppose $x_1[n] = a\,0.5^n\,u[n]$, where a is a positive real number and u[n] is the unit step sequence. Assume

$$x_2[n] = \begin{cases} \sqrt{1.5} & \text{for } n = 0, 1 \\ 0 & \text{otherwise.} \end{cases}$$

Then the value of a is_____.

A. 2 B. 1.5
C. 2.5 D. 14

98. Let $f(z) = \frac{az+b}{cz+d}$. If $f(z_1) = f(z_2)$ for all $z_1 \neq z_2$, a = 2, b = 4 and c = 5, then d should be equal to

_____

A. 150 B. 10
C. 50 D. 25

99. Which of the following is true?

A. A silicon wafer heavily doped with boron is a p^+ substrate
B. A silicon wafer lightly doped with boron is a p^+ substrate
C. A silicon wafer heavily doped with arsenic is a p^+ substrate
D. A silicon wafer lightly doped with arsenic is a p^+ substrate

100. The average power delivered to impedance (4 – j3)Ω by a current 5 cos(10 πt + 100)A is

A. 44.2 W B. 50 W
C. 62.5 W D. 125 W

ANSWER KEY

1. Ans. D.	26. Ans. A.	51. Ans. C.	76. Ans. D.
2. Ans. A.	27. Ans. C.	52. Ans. B.	77. Ans. C.
3. Ans. A.	28. Ans. A.	53. Ans. D.	78. Ans. B.
4. Ans. C.	29. Ans. A.	54. Ans. D.	79. Ans. B.
5. Ans. B.	30. Ans. C.	55. Ans. C.	80. Ans. C.
6. Ans. D.	31. Ans. C.	56. Ans. A.	81. Ans. A.
7. Ans. A.	32. Ans. A.	57. Ans. D.	82. Ans. D.
8. Ans. B.	33. Ans. C.	58. Ans. D.	83. Ans. A.
9. Ans. C.	34. Ans. A.	59. Ans. B.	84. Ans. C.
10. Ans. C.	35. Ans. A.	60. Ans. C.	85. Ans. A.
11. Ans. A.	36. Ans. C.	61. Ans. A.	86. Ans. C.
12. Ans. B.	37. Ans. C.	62. Ans. C.	87. Ans. C.
13. Ans. A.	38. Ans. B.	63. Ans. A.	88. Ans. C.
14. Ans. D.	39. Ans. A.	64. Ans. A.	89. Ans. A.
15. Ans. A.	40. Ans. B.	65. Ans. D.	90. Ans. B.
16. Ans. D.	41. Ans. C.	66. Ans. A.	91. Ans. C.
17. Ans. A.	42. Ans. A.	67. Ans. C.	92. Ans. A.
18. Ans. A.	43. Ans. A.	68. Ans. A.	93. Ans. A.
19. Ans. A.	44. Ans. A.	69. Ans. C.	94. Ans. A.
20. Ans. A.	45. Ans. B.	70. Ans. B.	95. Ans. B.
21. Ans. C.	46. Ans. A.	71. Ans. C.	96. Ans. C.
22. Ans. C.	47. Ans. A.	72. Ans. D.	97. Ans. B.
23. Ans. C.	48. Ans. A.	73. Ans. C.	98. Ans. B.
24. Ans. D.	49. Ans. B.	74. Ans. B.	99. Ans. A.
25. Ans. B.	50. Ans. B.	75. Ans. B.	100. Ans. B.

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