56. If all the three resistances of a given DELTA network are 15 Ω each, then three resistances of the equivalent star will be
1. 45 Ω each
2. 30 Ω each
3. 15 Ω each
4. 5 Ω each

57. The phenomenon known as "Early effect" in bipolar transistor refers to a reduction of the effective base-width caused by
1. Electron-hole recombination at the base
2. The reverse biasing of the base-collector junction
3. The forward biasing of emitter-base junction
4. The early removal of the stored base charge during saturation-to-cutoff switching

58. In a JFET, drain current is maximum when V_{GS} is
1. Zero
2. Negative
3. Positive
4. Equal to VP

59. What is the minimum number of two-input NAND gates used to perform the function of two input OR gate
1. One
2. Two
3. Three
4. Four

60. A-bit R/2R digital-to-analog (DAC) converter has a reference of 3 volts. For a digital input code of "0110" what would be the equivalent analog output in volts?
1. 0.1125 V
2. 1.125 V
3. 0.2250 V
4. –1.125 V

61. The concentration of the minority charge carriers in an extrinsic semiconductor under equilibrium is
1. Directly proportional to the doping concentration
2. Inversely proportional to the doping concentration
3. Directly proportional to the intrinsic concentration
4. Inversely proportional to the intrinsic concentration

62. Consider the following statements S1 and S2
S1 : At the resonant frequency the impedance of a series *RLC* circuit is zero.
S2 : In a parallel *GLC* circuit, increasing the conductance G results in increase in its *Q* factor.
Which one of the following is correct?
1. S1 is FALSE and S2 is TRUE
2. Both S1 and S2 are TRUE
3. S1 is TRUE and S2 is FALSE
4. Both S1 and S2 are FALSE

63. A source of angular frequency 1 rad/sec has a source impedance consisting of 1Ω resistance in series with 1 H inductance. The load that will obtain the maximum power transfer is
1. 1Ω resistance
2. 1Ω resistance in parallel with 1 H inductance
3. 1Ω resistance in series with 1F capacitor
4. 1Ω resistance in parallel with 1F capacitor

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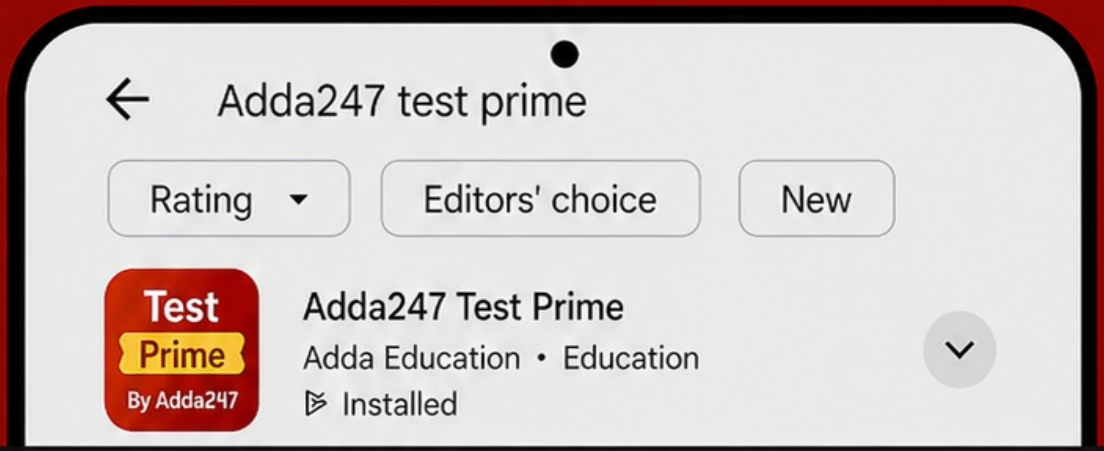

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64. For a Phase Lock Loop (PLL) with a Gilbert cell mixer based phase detector, to maintain lock, the phase error between incoming reference signal and VCO output must be maintained between
1. 0 & π
2. 0 & $\pi/2$
3. 0 & 2π
4. π & 2π

65. In a prototype filter the series arm and shunt arm impedance should be
1. Zero
2. Resistive
3. Reactive and same type
4. Reactive and opposite type

66. If the maximum electron density for E layer in ionosphere is 9×10^6 electrons/cm^3, then its critical frequency is
1. 81 MHz
2. 9 MHz
3. 27 MHz
4. 54 MHz

67. In a forward biased PN junction diode, the sequence of events that best describes the mechanism of current flow is
1. injection, and subsequent diffusion and recombination of minority carriers
2. injection, and subsequent drift and generation of minority carriers
3. extraction, and subsequent diffusion and generation of minority carriers
4. extraction, and subsequent drift and recombination of minority carriers

68. Without any additional circuitry, an 8:1 MUX can be used to obtain
1. some but not all Boolean functions of 3 variables
2. all functions of 3 variables but not of 4 variables
3. all functions of 3 variables and some but not all of 4 variables
4. all functions of 4 variables

69. A master-slave flip flop has the characteristic that
1. change in the output is immediately reflected in the output
2. change in the output occurs when the state of the master is affected
3. change in the output occurs when the state of the slave is affected
4. both the master and the slave states are affected at the same time

70. A series RLC circuit has a resonance frequency of 1 kHz and a quality factor $Q = 100$. If each of R, L and C is doubled from its original value, the new Q of the circuit is
1. 25
2. 50
3. 100
4. 200

71. Two D flip-flops are connected as a synchronous counter that goes through the following $QBQA$ sequence 00 " 11 " 01 " 10 " 00 "··· The combination to the inputs DA and DB are

1. $DA = QB$; $DB = QA$
2. $DA = QA$; $DB = QB$
3. $DA = (QAQB + QAQB)$; $DB = QA$
4. $DA = (QAQB + QAQB)$; $DB = QB$

72. If the differential voltage gain and the common mode voltage gain of a differential amplifier are 48 dB and 2 dB respectively, then common mode rejection ratio is

1. 23 dB
2. 25 dB
3. 46 dB
4. 50 dB

73. Characteristic impedance of a waveguide with cross sectional dimensions 5 cm and 4 cm and cut off frequency to frequency of operation ratio equal to 0.6, assuming dielectric constant to be 9 is

1. 200 Ω
2. 400 Ω
3. 75 Ω
4. 45 Ω

74. When the incident angle of a light ray is greater than the reflected angle, the condition is called

1. Total internal reflection
2. Total internal refraction
3. Diffraction
4. Dispersion

75. The cut-off frequency of an LC low pass filter is

1. $\frac{1}{\sqrt{LC}}$
2. $\frac{1}{\pi\sqrt{LC}}$
3. $\frac{1}{2\pi\sqrt{LC}}$
4. $\frac{1}{4\pi\sqrt{LC}}$

76. HEMT used in microwave circuit is a

1. Source
2. High power amplifier
3. Low noise amplifier
4. Detector

77. Maxwell's equations of Electromagnetics are not applicable to

1. Isotropic media
2. Non homogenous media
3. Medium moving with respect to system of co-ordinates
4. Non linear media

78. In a reflex klystron, the velocity modulation

1. Occurs near the reflector
2. Occurs in the resonator gap
3. Occurs near the accelerating grid
4. Does not occur at all

79. If an antenna draws 12 A current and radiates 4 kW, then what will be its radiation resistance?

1. 22.22 ohm
2. 27.77 ohm
3. 33.33 ohm
4. 39.77 ohm

80. The electric potential field is produced by point charge 1 μC and 4 μC located at (–2, 1, 5) and (1, 3, –1), respectively. The energy stored in the field is

1. 2.57 mJ
2. 5.14 mJ
3. 10.28 mJ
4. 11 mJ

81. For a hollow waveguide, the axial current must necessarily be

1. Conduction current only
2. A combination of conduction and displacement current
3. Displacement current only
4. Time-varying conduction current and displacement current

82. Which among the following is also regarded as Twin-lead transmission line?

1. Open-wire
2. Underground cable
3. Co-axial cable
4. Wave guide

83. Asymmetrical two port networks have

1. $Z_{sc1} = Z_{oc2}$
2. $Z_{sc1} = Z_{sc2}$
3. $Z_{oc1} \neq Z_{oc2}$
4. $Z_{oc1} \neq Z_{oc2}$ and $Z_{sc1} \neq Z_{sc2}$

84. Which one of the following is a transferred electron device?

1. BARIT diode
2. IMPATT diode
3. TRAPAIT diode
4. Gunn diode

85. Name the ionization layer that exists during day time and usually vanishes at night due to highest recombination rate

1. Appleton region
2. D Region
3. Normal E region
4. Sporadic E region

86. Which type of ground wave travels over the earth surface by acquiring direct path through air from transmitting to receiving antennas?

1. Surface wave
2. Space wave
3. Both 1 and 2
4. Standing wave

87. What would be the Standing Wave Ratio (SWR) for a line with reflection coefficient equal to 0.49?

1. 0.01
2. 2.12
3. 2.921
4. 3.545

88. Line-of-sight propagation is done by

1. MEO Satellites
2. GEO Satellites
3. LEO Satellites
4. GEO stationary satellites

89. The standard reference antenna for the directive gain is the

1. Infinitesimal dipole
2. Isotropic antenna
3. Elementary doublet
4. Half-wave dipole

90. The transmission bandwidth of an AM signal is

1. Same as signal bandwidth
2. Twice the carrier frequency
3. Half the carrier frequency
4. Twice the signal bandwidth

91. For a discrete memory less source containing K symbols, the upper bound for the entropy is

1. 1/K
2. $\log_2 K$
3. $\log_{10} K$
4. $\log_2 (1/K)$

92. The number of levels required to represent a 6 bit quantized output is

1. 32
2. 64
3. 18
4. 128

93. The modal dispersion in a fiber is 20 ns/km. What will be the overall pulse spread in 10 km long fiber? Assume material dispersion to be zero

1. 50 ns
2. 100 ns
3. 200 ns
4. 300 ns

94. The type of access used in GSM technology is

1. FDMA
2. TDMA
3. FDMA/TDMA
4. CDMA

95. The modulation used in video transmission of commercial TV transmission

1. Single side Band modulation
2. Double side Band modulation
3. Frequency modulation
4. Vestigial side Band modulation

96. Which layer is not present in TCP/IP model?

1. Application layer
2. Presentation layer
3. Internet layer
4. Transport layer

97. What is the sampling rate of a signal when it is sampled at every 0.001 sec?

1. 1 samples/sec
2. 100 samples/sec
3. 10 samples/sec
4. 1000 samples/sec

98. The advantages of DSB over SSB full carrier AM is

1. Less available channel space
2. More stable transmitter gives better reception
3. More power to transmit same signal
4. Signal is less resistant to noise

99. All CDMA based technologies 2G and 3G have.

1. Soft handover
2. Hand handover
3. Blind handover
4. Soft and Hard handover

100. What polarization is employed in an AM broadcasting?

1. horizontal
2. parallel
3. transverse
4. vertical

101. Which optical detector is used when high sensitivity and bandwidth are required?

1. PMT
2. APD
3. PIN
4. Phototransistor

102. If there are N routers from source to destination, total end to end delay in sending packet P(L – number of bits in the packet, R – transmission rate)

1. N
2. (N*L)/R
3. (2N*L)/R
4. L/R

103. The best mode of connection between devices which need to send or receive large amounts of data over a short distance is

1. BUS
2. Serial port
3. Parallel port
4. Isochronous port

104. If the channel is band limited to 6 kHz and signal to noise ratio is 16, what would be the capacity of channel?

1. 15.15 kbps
2. 24.74 kbps
3. 30.12 kbps
4. 52.18 kbps

105. For a 10 Mbps Ethernet link, if the length of the packet is 32 bits, the transmission delay is (in milliseconds)

1. 3.2
2. 32
3. 0.32
4. 320

106. Let a signal $x(t)$ is finite and zero outside the interval T_a, T_b where, T_a and T_b are finite. The region of convergence of the signal's bilateral laplace transform is

1. A parallel strip containing $j\Omega$ axis
2. A half place containing the $j\Omega$ axis
3. The entire 's' plane
4. A parallel strip not containing $j\Omega$ axis

107. Let a signal $x(t) = 3\cos(10\pi t) + \cos(30\pi t)$ is sampled at a rate 20 samples/second and reconstructed using an ideal low pass filter with cut off frequency of 20 Hz. the frequency/frequencies present in the reconstructed signal is/are

1. 5Hz and 15Hz only
2. 5Hz, 10Hz and 15Hz only
3. 10Hz and 15Hz only
4. 5Hz only

108. Transfer functions of FIR filters will have

1. Poles and zeros
2. Only poles
3. Only zeros
4. Only constants

109. If $x[n] = (1/3)^{|n|} - (1/2)^n u]n]$ then, the region of convergence of its z-transform in the z-plane will be

1. $1/3<|z|<3$
2. $1/2<|z|<3$
3. $1/3<|z|<1/2$
4. $1/3<|z|$

110. The impulse response $h(t)$ of a continuous time, linear time invariant system is described by $h(t) = e^{at}\, u(t) + e^{bt}\, u(-t)$ where, $u(t)$ denotes the unit step function and a *and* b are real constants. This system is stable if

1. both a and b are positive
2. a is positive and b is negative
3. a is negative and b is positive
4. both a and b are negative

111. If the region of convergence of Z-transform of $x[n] + y[n]$ is $0.3 < |z| < 0.6$ then, the region of convergence of Z-transform of $x[n] - y[n]$ is

1. $0.6 < |z| < 3$
2. $0.3 < |z| < 0.6$
3. $0.3 < |z|$
4. $|z| < 0.6$

112. How many complex additions are required to be performed in linear filtering of a sequence using FFT algorithm?

1. $(N/2)\log N$
2. $2N\log_2 N$
3. $(N/2)\log_2 N$
4. $N\log_2 N$

113. A N-point discrete time sequence is passed through a N-point DFT calculator and its output is passed through another N-point DFT calculator. The output of the second calculator is

1. the sequence same that of input
2. the time reversed version of the input sequence
3. unit time delay version of the input sequence
4. accumulated version of the input sequence

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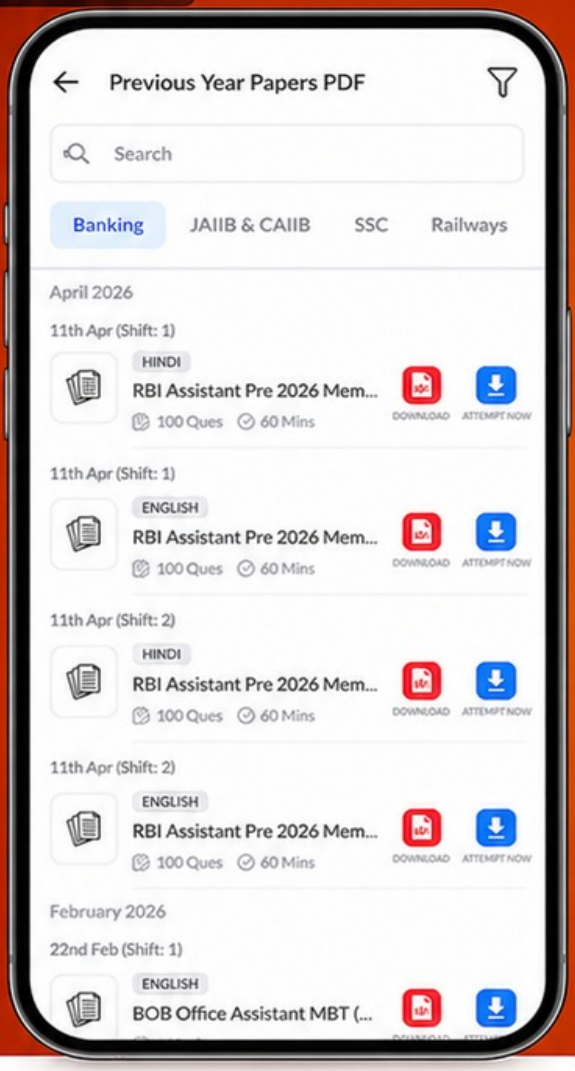

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114. A blackman window can eliminate ripple in FIR filters. The tradeoff is

1. Larger transition bandwith
2. Smaller transition bandwidth
3. Non linear phase response
4. Instability

115. A DSP convolves each discrete samples with the coefficients –0.25, –0.25, 1, –0.25 and –0.25. This must be a

1. Low pass filter
2. High pass filter
3. Band pass filter
4. Band stop filter

116. The unit step response of a system is $\left[1-e^{-t}(1+t)\right]u(t)$. The system represents

1. an unstable system
2. a stable system
3. a critically stable
4. an oscillatory system

117. The transfer function of a compensator is given by $G_c(s)=\frac{sT+1}{s\beta T+1}K_c\beta$ represents a lag compensator if

1. $T>0,\ \beta>1$
2. $T>0,\ \beta<1$
3. $T<0,\ \beta>1$
4. $T<0,\ \beta<1$

118. Consider an unity feedback system with open loop transfer function

$$G(s)=\frac{K}{(s-1)(s^2+4s+7)}.$$

A root locus exist on the real axis between

1. $S=1$ and $S=-\infty$
2. $S=1$ and $S=-2$
3. $S=-1$ and $S=-\infty$
4. $S=-2$ and $S=-\infty$

119. The gain margin and phase margin of a feedback system with

$G(s)\ H(s)=\frac{4}{(s+10)^3}$ are

1. ∞, ∞
2. 0, 0
3. ∞, 0
4. 0, ∞

120. A control system is defined by the following mathematical relationship

$$\frac{d^2x}{dt^2}+6\frac{dx}{dt}+5x(t)=10(1-e^{-5t}).$$

The response of the system as $t\to\infty$ is

1. $x=2$
2. $x=6$
3. $x=5$
4. $x=-2$