

ELECTRONICS

1. The n-type semiconductor is obtained by adding as an impurity atoms materials
 - (A) Indium
 - (B) Gallium
 - (C) Boron
 - (D) Arsenic
2. The amount of time between the creation of hole and its disappearance is called
 - (A) Doping
 - (B) Life time
 - (C) Recombination
 - (D) Valence 3
3. The atomic mass of electron is
 - (A) 1.6×10^{-19} Kg
 - (B) 2.8×10^{-20} Kg
 - (C) 9.1×10^{-31} Kg
 - (D) 1.9×10^{-5} Kg
4. The forbidden energy gap of germanium at 300 K is
 - (A) 0.3 eV
 - (B) 1.1 eV
 - (C) 0.7 eV
 - (D) 1.3 eV
5. The majority carriers in *n*-type semiconductors have an average drift velocity v in a direction perpendicular to a uniform magnetic field B . The electric field E induced due to Hall effect acts in a direction
 - (A) $v \times B$
 - (B) $B \times v$
 - (C) Along v
 - (D) Opposite to v

6. In which of the following materials, there is an overlapping of valance and conduction bands?
- (A) Wood
 - (B) Plastic
 - (C) Gold
 - (D) Germanium
7. The value of the ripple factor in an half-wave rectifier is
- (A) 1.21
 - (B) 0.42
 - (C) 0.21
 - (D) 1.42
8. FET is a
- (A) Positive resistance device
 - (B) Negative resistance device
 - (C) Current controlled device
 - (D) Voltage controlled device
9. The expression that gives the relationship between α and β of BJT is
- (A) $\beta = \frac{1}{1 - \alpha}$
 - (B) $\beta = \frac{\alpha}{1 + \alpha}$
 - (C) $\beta = \frac{\alpha}{1 - \alpha}$
 - (D) $\beta = \frac{\alpha}{\alpha - 1}$
10. How many electrons are there in the 4th orbit of Germanium atom?
- (A) 4
 - (B) 8
 - (C) 16
 - (D) 32

11. The conversion efficiency of half-wave rectifier is
- (A) 40.6 %
 - (B) 81.2 %
 - (C) 90.2 %
 - (D) 51.4%
12. The three band colour code of 12 kilo ohm resistor is
- (A) Black Orange Red
 - (B) Red Brown Orange
 - (C) Black Brown Red
 - (D) Brown Red Orange
13. The equivalent capacitance value of two capacitors of 10 micro Farad each connected in parallel is
- (A) 5 micro Farad
 - (B) 10 micro Farad
 - (C) 20 micro Farad
 - (D) 40 micro Farad
14. At high frequencies, ordinary diodes don't work properly because of
- (A) forward bias
 - (B) reverse bias
 - (C) breakdown
 - (D) charge storage
15. The capacitive reactance value of a 10 micro farad capacitor for a DC current is
- (A) 0
 - (B) 10
 - (C) 20
 - (D) Infinity
16. Which of the following processes is preferred to form the gate dielectric (SiO_2) of MOSFET?
- (A) Sputtering
 - (B) Wet oxidation
 - (C) Molecular beam epitaxy
 - (D) Dry oxidation

17. For the peak input voltage of V_m the peak inverse voltage in a center-tap full wave rectifier is
- (A) $V_m/2$
 - (B) V_m
 - (C) $2V_m$
 - (D) $4V_m$
18. The transistor parameter β independent dc biasing circuit is
- (A) Fixed biasing
 - (B) Collector feedback biasing
 - (C) Emitter Follower biasing
 - (D) Voltage-divided biasing
19. The biasing conditions for the transistor to use as an amplifier is
- (A) Emitter-base junction should be in forward biased and collector-base junction should be in reverse biased
 - (B) Emitter-base junction should be in reverse bias and collector-base junction should be forward biased
 - (C) Both emitter-base junction and collector-base junction should be forward biased
 - (D) Both emitter-base junction and collector-base junction should be reverse biased
20. The phase difference between the input and output voltages of a CE amplifier is
- (A) 0°
 - (B) 90°
 - (C) 180°
 - (D) 270°
21. The oscillator circuit that gives stable oscillations is
- (A) LC oscillators
 - (B) RC oscillators
 - (C) Crystal oscillators
 - (D) RLC oscillators

22. If A and β are the open-loop gain and feedback factor respectively, the condition for the sustained oscillations of an oscillator circuit is

- (A) $A\beta = 1$ and total phase around the loop is 0°
- (B) $A\beta \geq 1$ and total phase around the loop is 0°
- (C) $A\beta \leq 1$ and total phase around the loop is 180°
- (D) $A\beta = 0$ and total phase around the loop is 0°

23. Cutoff frequency of first order Butterworth filter is

- (A) $\frac{1}{2\pi\sqrt{6}RC}$
- (B) $\frac{RC}{\sqrt{2\pi RC}}$
- (C) $\frac{1}{\sqrt{2\pi RC}}$
- (D) $\frac{1}{2\pi RC}$

24. In a series resonant circuit, if X_C and X_L are the capacitive and inductive reactances respectively, which of the following condition is true at resonance?

- (A) $X_C > X_L$
- (B) $X_C < X_L$
- (C) $X_C = X_L$
- (D) $X_C < 10X_L$

25. If L and f indicate inductance value and frequency, the expression for the inductive reactance X_L is

- (A) πfL
- (B) $\frac{1}{\pi fL}$
- (C) $2\pi fL$
- (D) $\frac{1}{2\pi fL}$

26. Consider the following statements in the context of the conditions needed to operate a Bipolar Junction Transistor (BJT) inactive region in a linear circuit
- (i) The emitter diode must be forward biased
 - (ii) The collector diode must be reverse biased
 - (iii) The voltage across the collector diode must be greater than the breakdown voltage
 - (iv) The voltage across the collector diode must be less than the breakdown voltage
- (A) (i), (ii) and (iii) only
(B) (i), (iii) and (iv) only
(C) (i), (ii) and (iv) only
(D) (i), (ii), (iii) and (iv)
27. In a network with the voltage source and resistances, the maximum power is transformed to a load if
- (A) The load resistance is equal to zero
(B) The load resistance is equal to infinity
(C) The load resistance is equal to source resistance
(D) The load resistance is equal to half of the source resistance
28. Output impedance and CMRR of an ideal op-amp are and respectively.
- (A) ∞ and 0
(B) ∞ and ∞
(C) 0 and 0
(D) 0 and ∞
29. The CMMR of an operational amplifier is defined as
- (A) The ratio of differential voltage gain to common-mode voltage gain
(B) The ratio of common mode voltage gain to differential voltage gain
(C) Ratio of the offset voltage to offset current
(D) Sum of the common-mode voltage gain to differential voltage gain
30. The feedback element in an op-amp integrator is
- (A) Resistor
(B) Capacitor
(C) Inductor
(D) Transistor

31. In an op-amp Wein-bridge oscillator, if resistor R and the capacitor C are used in the feedback circuit, then the frequency of oscillations given by
- (A) $f = \frac{1}{2\pi RC}$
 - (B) $f = 2\pi RC$
 - (C) $f = \frac{1}{\pi RC}$
 - (D) $f = \pi RC$
32. The output waveform of a differentiator with the square waveform input is
- (A) Sinusoid
 - (B) Square
 - (C) Triangular
 - (D) Spike
33. A 555 timer is configured to generate the square waveform. Then the duty cycle of the output waveform is
- (A) 25%
 - (B) 50%
 - (C) 75%
 - (D) 100%
34. An oscillator is an amplifier with feedback.
- (A) Positive
 - (B) Negative
 - (C) Both Positive and Negative
 - (D) No
35. Closed loop voltage gain of a non-inverting operational amplifier with a feedback resistor 10 kilo ohms and a series resistor of 10 kilo ohms is equal to
- (A) 1
 - (B) 2
 - (C) 10
 - (D) 20

36. Bubbled NOR gate is logically equivalent to
- (A) AND gate
 - (B) OR gate
 - (C) NAND gate
 - (D) NOT gate
37. In a digital logic family, the full form for TTL is
- (A) Tristate Transistor Logic
 - (B) Total Transistor Logic
 - (C) Transfer Transistor Logic
 - (D) Transistor Transistor Logic
38. The desirable feature of an instrumentation amplifier is
- (A) Low output impedance
 - (B) High output impedance
 - (C) Low input impedance
 - (D) Zero input impedance
39. In CRO saw tooth voltage is applied at the
- (A) Cathode
 - (B) Accelerating anode
 - (C) Vertical deflection plates
 - (D) Horizontal deflection plates
40. Semiconductor strain gauges employ property to measure strain.
- (A) Piezoresistive
 - (B) Thermo-electric
 - (C) Diffusion
 - (D) Drift
41. Anemometers are used to measure parameter.
- (A) velocity
 - (B) volume
 - (C) density
 - (D) temperature

42. The transducer used to measure pressure is
- (A) LVDT
 - (B) RVDT
 - (C) Thermistor
 - (D) Diaphragms
43. The Hall sensor senses
- (A) temperature
 - (B) humidity
 - (C) magnetic field
 - (D) pressure
44. The resistance of LDR when exposed to radiant energy.
- (A) increases
 - (B) decreases
 - (C) reaches maximum
 - (D) remains unaltered
45. In an amplifier circuit, the coupling capacitor is used to
- (A) block dc current
 - (B) block ac current
 - (C) dc biasing the amplifier
 - (D) increase the bandwidth of an amplifier
46. Efficiency of Class A Power amplifier is
- (A) 25%
 - (B) 50%
 - (C) 75%
 - (D) 90%
47. Half power bandwidth is also known as
- (A) - 3 dB bandwidth
 - (B) +3 dB bandwidth
 - (C) +2 dB bandwidth
 - (D) - 2 dB bandwidth

48. If C is the velocity of light, then the relation between the frequency f and the wavelength λ of the electromagnetic wave is given by
- (A) $\lambda = f/c$
 - (B) $\lambda = c/f$
 - (C) $\lambda = f^2/c$
 - (D) $\lambda = c^2/f$
49. A current of 2.0 A passes through a cell of e.m.f 1.5 V having internal resistance of $0.15\ \Omega$. The potential difference across the terminals of the cell is
- (A) 1.35 V
 - (B) 1.00 V
 - (C) 1.50 V
 - (D) 1.20 V
50. In an AM wave, useful power is carried by
- (A) Carrier
 - (B) Sidebands
 - (C) both sidebands and carrier
 - (D) neither carrier nor sidebands
51. A network contains linear resistors and ideal voltage sources. If values of all the resistors are doubled, then the voltage across each resistor is
- (A) halved
 - (B) doubled
 - (C) increased by four times
 - (D) not change
52. The condition $AD - BC = 1$ for a two port network implies that the network is a
- (A) Reciprocal network
 - (B) Lumped element network
 - (C) Lossless network
 - (D) Unilateral element network

53. Envelop detectors are used in
- (A) FM demodulation
 - (B) PM demodulation
 - (C) AM demodulation
 - (D) FSK demodulation
54. The total average power in a sinusoidal AM wave with a carrier power of 10 watt and the modulation index of 0.5 is equal to
- (A) 10.25 watts
 - (B) 11.25 watts
 - (C) 102.5 watts
 - (D) 112.5 watts
55. The modulation index of an FM wave for a maximum frequency deviation of 50 kilo Hertz and the modulating frequency of 5 kilo Hertz is
- (A) 5
 - (B) 10
 - (C) 15
 - (D) 250
56. Which statement is true with the Frequency Modulation?
- (A) Noise immunity is better than AM
 - (B) It covers wider area than AM
 - (C) The FM modulator circuit is simpler than AM modulator circuit
 - (D) The bandwidth requirement of FM is less than AM
57. In an AM, the carrier signal used in the modulation process is
- (A) pulse
 - (B) sinusoidal
 - (C) square
 - (D) triangular

58. For a 2-port network to be reciprocal

- (i) $z_{11} = z_{22}$
- (ii) $y_{21} = y_{12}$
- (iii) $h_{21} = -h_{12}$
- (iv) $AD - BC = 0$

- (A) (i) and (ii)
- (B) (ii) and (iii)
- (C) (iii) and (iv)
- (D) (iv) and (i)

59. Norton's theorem states that a complex network connected to a load can be replaced with an equivalent impedance

- (A) In series with a current source
- (B) In parallel with a voltage source
- (C) In series with a voltage source
- (D) In parallel with a current source

60. The distance of a geostationary satellite from the surface of the earth is nearly

- (A) 360 Km
- (B) 3600 Km
- (C) 36000 Km
- (D) 360000 Km

61. The unit of flux density is

- (A) MMF
- (B) Weber
- (C) Maxwell
- (D) Tesla

62. In an n channel JFET, the gate is

- (A) n type
- (B) p type
- (C) Metal
- (D) Insulator

63. The effects of feedback on stability and sensitivity are
- (A) Negative feedback improves stability and system response is less sensitive to external inputs and parameter variations
 - (B) Feedback does not affect stability and system response is sensitive to disturbances and parameter variations
 - (C) Negative feedback affects stability and system response is more sensitive disturbances and parameter variations
 - (D) None of the above
64. The Gray code for the binary digit 10110 is
- (A) 11101
 - (B) 10101
 - (C) 11001
 - (D) 10011
65. The output of an AND gate with three inputs A, B and C is HIGH for
- (A) $A = 0, B = 0, C = 0$
 - (B) $A = 1, B = 1, C = 1$
 - (C) $A = 1, B = 0, C = 1$
 - (D) $A = 0, B = 1, C = 1$
66. The number of select lines used in 1:16 de-multiplexer is
- (A) 2
 - (B) 4
 - (C) 8
 - (D) 16
67. A decade counter is a
- (A) Mod-2 counter
 - (B) Mod-3 counter
 - (C) Mod-5 count
 - (D) Mod-10 counter

68. In Boolean algebra, the expression $A(B + C) = AB + BC$ is called
- (A) commutative law
 - (B) associative law
 - (C) identity law
 - (D) distributive law
69. The 4-variable Karnaugh map has number of cells.
- (A) 4
 - (B) 8
 - (C) 16
 - (D) 32
70. Number of flip-flops required for the divide by 8 ripple counter is
- (A) 2
 - (B) 3
 - (C) 4
 - (D) 8
71. Among the digital logic families, the highest power dissipating one is
- (A) TTL
 - (B) PMOS
 - (C) NMOS
 - (D) ECL
72. The storage element in a static RAM is
- (A) Diode
 - (B) Resistor
 - (C) Capacitor
 - (D) Flip-flop
73. In random access memory
- (A) Data can be written only once
 - (B) Data can be read only once
 - (C) Data can be written only once but data can be read many times
 - (D) Data can be written and read many number of times

74. EPROM stands for

- (A) Electrical Programmable Read Only Memory
- (B) Electronic Programmable Read Only Memory
- (C) Electromagnetic Programmable Read Only Memory
- (D) Erasable Programmable Read Only Memory

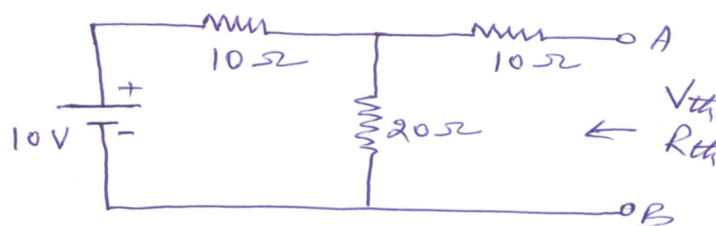
75. The binary 2's complement equivalent of -5 is

- (A) 0101
- (B) 1011
- (C) 1010
- (D) 0111

76. The Laplace transform of $e^{-2t} \sin 2\omega t$ is

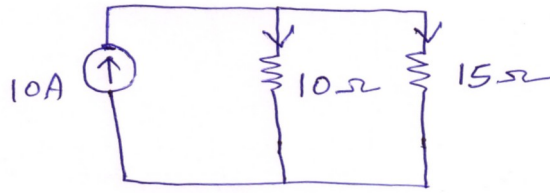
- (A) $\frac{2s}{(s+2)^2 + 2\omega^2}$
- (B) $\frac{2\omega}{(s-2)^2 + 4\omega^2}$
- (C) $\frac{2s}{(s+2)^2 + 4\omega^2}$
- (D) $\frac{2s}{(s-2)^2 + 2\omega^2}$

77. In a circuit shown below, the value of Thevenin's voltage and resistance across the terminals A and B are



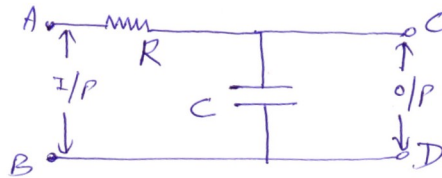
- (A) 10 V and 20 ohm
- (B) 10 V and 16.6 ohm
- (C) 6.6 V and 16.6 ohm
- (D) 6.6 V and 10 ohm

78. In the circuit shown below, the voltage across the 15 ohm resistor is



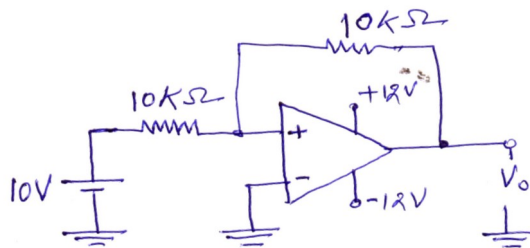
- (A) 10 V
- (B) 60 V
- (C) 100 V
- (D) 150 V

79. The RC circuit shown below behaves like a



- (A) All-pass filter
- (B) High-pass filter
- (C) Band-pass filter
- (D) Low-pass filter

80. The value of output voltage in the circuit shown below is



- (A) 5 V
- (B) 10 V
- (C) 15 V
- (D) 20 V

81. A band limited signal with a maximum frequency of 5 KHz is to be sampled. According to the sample theorem, the sampling frequency which is not valid is
- (A) 5 KHz
 - (B) 12 KHz
 - (C) 15 KHz
 - (D) 20 KHz
82. The Fourier transform of a voltage signal $x(t)$ is $X(f)$. The unit of $|X(f)|$ is
- (A) volt
 - (B) volt-sec
 - (C) volt/sec
 - (D) volt^2
83. If a signal $f(t)$ has energy E , the energy of the signal $f(2t)$ is equal to
- (A) E
 - (B) $E/2$
 - (C) $2E$
 - (D) $4E$
84. The autocorrelation function of an energy signal has
- (A) No symmetry
 - (B) Odd symmetry
 - (C) Conjugate symmetry
 - (D) Even symmetry
85. The amplitude spectrum of a Gaussian pulse is
- (A) uniform
 - (B) A sine function
 - (C) Gaussian
 - (D) An impulse function

86. In a geostationary satellite communication system, a message signal is transmitted from an earth station via an uplink to a satellite, amplified in a transponder on board the satellite and then transmitted via a downlink to another earth station. The most popular frequency band for satellite communication is
- (A) 16 MHz for the uplink and 14 MHz for the downlink
 - (B) 4 GHz for the uplink and 6 GHz for the downlink
 - (C) 6 GHz for the uplink and 4 GHz for the downlink
 - (D) 10 GHz for the downlink and 8 GHz for the uplink
87. Boosting of higher frequency at the transmitter is done by using
- (A) De-emphasis
 - (B) AGC circuit
 - (C) Pre-emphasis
 - (D) Armstrong method
88. The power contained in single sideband in amplitude modulation is
- (A) $\frac{m^2 P_C}{2}$
 - (B) $2m^2 P_C$
 - (C) $\frac{m^2 P_C}{4}$
 - (D) $4m^2 P_C$
89. Statement (1): The bandwidth of AM signal depends on the bandwidth of the modulating signal.
Statement (2): The amplitude modulated signal contains f_c , $f_c \pm f_m$ frequency signals.
- (A) Both statements (1) and (2) are individually true and statement (2) is the correct explanation of statement (1)
 - (B) Both statements (1) and (2) are individually true and statement (2) is not the correct explanation of statement(1)
 - (C) Statements (1) is true and statement (2) false
 - (D) Statements (1) is false and statement (2)true

90. The frequency range for satellite communication is
- (A) 1 KHz - 100 KHz
 - (B) 100 kHz - 1 MHz
 - (C) 10 MHz - 30 MHz
 - (D) 1 GHz - 30 GHz
91. A communication channel distributed by Gaussian noise has a bandwidth of 6 KHz and S/N ratio of 15. The maximum transmission rate that such a channel can support is
- (A) 2.4 k bits/sec
 - (B) 24 k bits/sec
 - (C) 34 k bits/sec
 - (D) 48 k bits/sec
92. For an AM signal, the bandwidth is 20 kHz and highest frequency component present is 800 kHz. The carrier frequency used for this AM signal is
- (A) 710 KHz
 - (B) 705 KHz
 - (C) 700 KHz
 - (D) 790 KHz
93. The correlation function of a wide sense stationary random process representing a non-deterministic signal is
- (A) Not a deterministic function
 - (B) Deterministic, but not symmetric function
 - (C) Sometimes non-deterministic function
 - (D) Always deterministic and symmetric function
94. One of the main functions of the RF amplifiers in a super-heterodyne receiver is to
- (A) Provide improved tracking
 - (B) Permit better adjacent channel rejection
 - (C) Increase the tuning range of the receiver
 - (D) Improve the rejection of the image frequency

95. An FM signal has a carrier swing of 100 kHz when modulating signal has a frequency of 8 kHz. The modulation index is

- (A) 12.5
- (B) 7.5
- (C) 6.25
- (D) 15

96. As compared to A-law compander, the μ -law compander produces

- (A) More companding at low amplitudes
- (B) More companding at high amplitudes
- (C) Less companding at low amplitudes
- (D) Less companding at high amplitudes

97. Consider the following:

- (i) Pulse-position modulation
- (ii) Pulse-code modulation
- (iii) Pulse-width modulation
-)

Which of the above communication are not digital?

- (A) (i) and (ii) only
- (B) (ii) and (iii) only
- (C) (i) and (iii) only
- (D) (i), (ii) and (iii)

98. In a superheterodyne receiver, if the intermediate frequency is 450 kHz and the signal frequency is 1000 kHz, then the local oscillator frequency and image frequency respectively are

- (A) 1450 KHz and 100 KHz
- (B) 550 KHz and 1900 KHz
- (C) 1450 KHz and 1900kHz
- (D) 550 KHz and 1450 KHz

99. Statement (1): Space wave is used for propagation of FM broadcast system.
Statement (2): Several independent interference-free transmitters can be operated on the same frequency because of line-of-sight propagation.
- (A) Both statements (1) and (2) are individually true and statement (2) is the correct explanation of statement(1)
(B) Both statements (1) and (2) are individually true and statement (2) is not the correct explanation of statement(1)
(C) Statements (1) is true and statement (2) false
(D) Statements (1) is false and statement (2) true
100. A PLL can be used to demodulate
- (A) PAM signals
(B) PCM signals
(C) FM signals
(D) DSB-SC signals
101. Examples of active display and passive display respectively are
- (A) LCD and Gas discharge plasma
(B) LED and LCD
(C) Gas discharge plasma and LED
(D) Electrophoretic image display and LED
102. A register of microprocessor which keeps track of the execution of a program and which contains the memory address of the next instruction to be executed is called
- (A) Index registers
(B) Memory address register
(C) Program counters
(D) Instruction register
103. VLSI chip utilizes
- (A) BJT
(B) NMOS
(C) CMOS
(D) All of the Mentioned

104. An excitation is applied to a system at $t = T$ and its response is zero for $-\infty < t < T$. Such a system is a
- (A) A steady state value of the system output
 - (B) Initial value of the system output
 - (C) Transient behaviour of the system output
 - (D) None of the above
105. The minimum number of gates required to realize the function $AB + C$ (using NAND gates only) is
- (A) 2
 - (B) 3
 - (C) 4
 - (D) 6
106. What is the correct sequence when the logic families TTL, ECL, IIL and CMOS are arranged in descending order of fan-out capabilities?
- (A) CMOS, TTL, ECL, IIL
 - (B) IIL, TTL, ECL and CMOS
 - (C) IIL, ECL, TTL and CMOS
 - (D) CMOS, ECL, TTL and IIL
107. k -map method of simplification can be applied when the given functions are in
- (A) Product of sum form
 - (B) Sum of product form
 - (C) Canonical form
 - (D) Any form
108. The correct instruction execution sequence is
- (A) Execute, Decode and Fetch
 - (B) Fetch, Execute and Decode
 - (C) Execute, Fetch and Decode
 - (D) Fetch, Decode and Execute

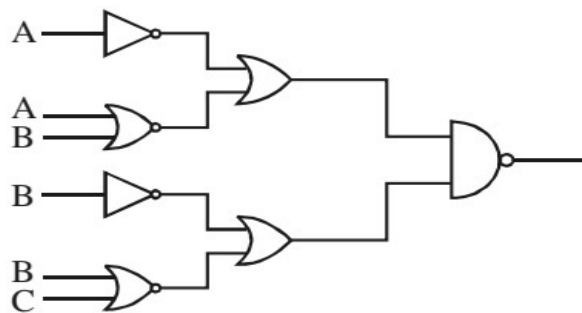
109. All half order can be constructed using

- (A) One XOR and one OR gate with their outputs connected in parallel
- (B) One XOR and one OR gate with their outputs connected in series
- (C) One XOR and one AND gate
- (D) Two XNOR gates only

110. The speed of conversion is maximum in

- (A) Successive approximation A/D converter
- (B) Parallel comparative A/D converter
- (C) Counter ramp A/D converter
- (D) Dual slope A/D converter

111. The output of the circuit is given by:



- (A) $A + C$
- (B) $B + C$
- (C) $A + B$
- (D) None of the above

112. Match the following lists:

P IC 7400
Q IC 7402
R IC 7408
S IC 7432

i Quad 2-input NOR gate
ii Quad 2-input AND gate
iii Quad 2-input OR gate
iv Quad 2-input NAND gate

- (A) P – iv, Q – ii, R – i, S – iii
- (B) P – iv, Q – i, R – ii, S – iii
- (C) P – iii, Q – ii, R – i, S – iv
- (D) P – iv, Q – iii, R – i, S – i

113. The speed mismatch between processor and memory in a computer is alleviated by using small fast memory as an intermediate buffer between memory and processor. This buffer memory is known as
- (A) Volatile ROM
 - (B) Non Volatile ROM
 - (C) Cache memory
 - (D) EPROM
114. The Logical expression $y = A + \bar{A}B$ is equivalent to
- (A) $y = AB$
 - (B) $y = \bar{A}B$
 - (C) $y = \bar{A} + B$
 - (D) $y = A + B$
115. For an n – variable Boolean function maximum number of prime implicants is
- (A) $2(n + 1)$
 - (B) $n/2$
 - (C) $2n$
 - (D) $2(n - 1)$
116. The minimized form of the logical expression $(\bar{A}\bar{B}\bar{C} + \bar{A}B\bar{C} + \bar{A}BC + AB\bar{C})$ is
- (A) $\bar{A}\bar{C} + B\bar{C} + \bar{A}B$
 - (B) $A\bar{C} + \bar{B}C + \bar{A}B$
 - (C) $\bar{A}C + \bar{B}C + \bar{A}B$
 - (D) $A\bar{C} + \bar{B}C + A\bar{B}$
117. The minimum number of NAND gate required to implement the Boolean function $A + A\bar{B} + A\bar{B}C$ is equal to
- (A) 0
 - (B) 1
 - (C) 4
 - (D) 7

118. Crossover distortion behaviour is characteristics of
- (A) Class A output stage
 - (B) Class B output stage
 - (C) Class AB output stage
 - (D) Common-base output stage
119. Thermal runaway in a transistor biased in the active region is due to
- (i) Heating of the transistor
 - (ii) Change in β due to increase in temperature
 - (iii) Change in reverse collector saturation current due to rise in temperature
 - (iv) Base emitter voltage V_{BE} which decreases with rise in temperature
- Which of the above statement is/are correct?
- (A) (i) and (ii)
 - (B) (ii) and (iii)
 - (C) (iii) only
 - (D) (iv) only
120. A 4 bit modulo-16 ripple counter uses JK flip flop. If the propagation delay of each FF is 50 nano seconds the maximum clock frequency that can be used is equal to
- (A) 20 MHz
 - (B) 10 MHz
 - (C) 5 MHz
 - (D) 4 MHz
121. In Gunn diodes, electrons are transferred from
- (A) High to low mobility energy bands
 - (B) Low to high mobility energy bands
 - (C) Valley to domain formation
 - (D) Domain to valley formation
122. The antenna efficiency of a $\lambda/8$ long dipole antenna is 89.159%. The radiation resistance of the antenna is
- (A) 1.5 Ω
 - (B) 15 Ω
 - (C) 12.33 Ω
 - (D) 125 Ω

123. The complex permeability of ferrite at radio frequency is given $\mu = \mu' - j\mu''$. Here μ'' represents
- (A) Relative permeability
 - (B) Relative permittivity
 - (C) Loss parameter
 - (D) Resistivity
124. The solutions to many problems involving electric fields are simplified by making use of equipotential surfaces. An equipotential surface is a surface:
- 1 On which the potential is same everywhere
 - 2 The movement of charge over such a surface would required no work
 - 3 The tangential electric field is zero
 - 4 The normal electric field is zero
- (A) 1, 2 and 3 only
 - (B) 1, 2 and 4 only
 - (C) 2, 3 and 4 only
 - (D) 1, 2, 3, 4
125. What is the force developed per meter length between two current-carrying conductors 10 cm apart and carrying 1000 A and 1500 A currents, respectively?
- (A) 30 N
 - (B) 3 N
 - (C) 20 N
 - (D) 2 N
126. Consider the following properties of electromagnetic waves:
- 1 These waves do not require any material medium to propagate
 - 2 Both electric and magnetic field vectors are parallel to each other and perpendicular to the direction of propagation of waves
 - 3 The energy in electromagnetic wave is divided equally between electric and magnetic vectors
 - 4 Both electric and magnetic field vectors attain the maxima and minima at the same place and same time
- (A) 1, 2 and 3 only
 - (B) 1, 3 and 4 only
 - (C) 2, 3 and 4 only
 - (D) 1, 2, 3 and 4

127. Electromagnetic waves are transverse in nature due to

- (A) Reflection
- (B) Diffraction
- (C) Interference
- (D) Polarization

128. The ratio $(\sigma/\omega\epsilon)$ is

- 1 Intrinsic ratio
- 2 Loss tangent
- 3 Conduction ratio
- 4 Dissipation factor

- (A) 1 and 2
- (B) 2 and 3
- (C) 1 and 4
- (D) 2 and 4

129. The length of half-wave dipole at 30 MHz will be

- (A) 5 m
- (B) 10 m
- (C) 15 m
- (D) 5.5 m

130. If n_1 and n_2 are the refractive indices of the core and cladding respectively, the maximum acceptance angle at the air-core interface should

- (A) $\tan^{-1} \frac{n_2}{n_1}$
- (B) $\sin^{-1} \sqrt{n_1^2 - n_2^2}$
- (C) $\sin^{-1} \sqrt{n_2^2 - n_1^2}$
- (D) $\tan^{-1} \frac{n_1}{n_2}$

131. Maximum frequency reflected from ionosphere is 9 MHz on a particular day.
The maximum ion density/metre³ is

- (A) 10^8
- (B) 10^6
- (C) 10^{12}
- (D) 10^9

132. A loss-less transmission line of length l is open-circuited and has characteristic impedance Z_0 . The input impedance is

- (A) $+ jZ_0 \tan \beta l$
- (B) $- jZ_0 \tan \beta l$
- (C) $- jZ_0 \cot \beta l$
- (D) $+ jZ_0 \cot \beta l$

133. Conditions for a transmission line to be of low loss are

- (A) $R \gg \omega L, G \gg \omega C$
- (B) $R \ll \omega L, G \ll \omega C$
- (C) $R \ll \omega L, G \gg \omega C$
- (D) $R \gg \omega L, G \ll \omega C$

134. In a waveguide, attenuation near the cut-off frequency is

- (A) Low
- (B) High
- (C) Very high
- (D) Zero

135. The unit of $\nabla \times H$ is

- (A) ampere
- (B) ampere/metre²
- (C) Ampere/metre
- (D) Ampere- metre

136. The only modes in micro strip lines are
- (A) TE modes
 - (B) TM modes
 - (C) TE and TEM modes
 - (D) Quasi-transverse electric and magnetic modes
137. Which of the following methods provides largest bandwidth?
- (A) Proximity coupling
 - (B) Aperture coupling
 - (C) Coaxial probe feed
 - (D) Microstrip line feed
138. Complex Poynting vector, P is
- (A) $P = E \times H$
 - (B) $P = \frac{1}{2} E \times H^*$
 - (C) $P = E \times H^*$
 - (D) None of the above
139. If parabolic dish diameter increases
- (A) beam width become small
 - (B) beam width become high
 - (C) beam width become high and sometimes small
 - (D) beam width remains constant
140. The directivity of isotropic radiator is
- (A) 1
 - (B) More than 1
 - (C) 0
 - (D) ∞
141. Effective length of a half-wave dipole is
- (A) $\lambda/2$
 - (B) $< \lambda/2$
 - (C) $> \lambda/2$
 - (D) 0.55λ

142. The magnitude of open-circuit and short circuit input impedances of a transmission line are $100\ \Omega$ and $25\ \Omega$ respectively. The characteristic impedance of the line is
- (A) $25\ \Omega$
 - (B) $75\ \Omega$
 - (C) $50\ \Omega$
 - (D) $100\ \Omega$
143. The modulation scheme commonly used for transmission from GSM mobile terminals is
- (A) 4-QAM
 - (B) Walsh-Hadamard orthogonal code
 - (C) 16-PSK
 - (D) GMSK
144. An electric field on a plane is described by its potential $V = 20(r^{-1} + r^{-2})$, where r is the distance from the source. The field is due to
- (A) A monopole
 - (B) A dipole
 - (C) Both a monopole and dipole
 - (D) None of the above
145. The capacitance per unit length and the characteristic impedance of a lossless transmission line are C and Z_0 respectively. The velocity of a travelling wave on the transmission line is
- (A) $Z_0 C$
 - (B) Z_0 / C
 - (C) $1 / Z_0 C$
 - (D) C / Z_0
146. Which of the following can act as an inverse transducer?
- (A) LVDT
 - (B) Strain
 - (C) Piezo electric crystal
 - (D) Bimetal strip

147. Measurement of pressure can be done by using wire, foil or semiconductor type Strain Gauges. The disadvantage of the semiconductor type of strain gauge compared to other two is in terms of
- (A) Gauge factor
 - (B) Hysteresis characteristics
 - (C) Temperature sensitivity
 - (D) Frequency response
148. When damping ratio is equal to zero, the damping frequency of a system is
- (A) Equal to natural frequency
 - (B) Zero
 - (C) More than natural frequency
 - (D) None of above
149. Wheatstone bridge is used to measure antenna impedance at frequency of
- (A) 10 GHz to 20 GHz
 - (B) Up to millimetre range
 - (C) 1 GHz to 10 GHz
 - (D) Up to 30 MHz range
150. The expected value of the voltage across a resistor is 80 V. However, the voltmeter reads 79 V. The absolute error in the measurement is
- (A) 0.875 V
 - (B) 0.125 V
 - (C) 1.00 V
 - (D) 1.125 V

ANSWER KEY**Subject Name: 606 ELECTRONICS**

SI No.	Key	SI No.	Key	SI No.	Key	SI No.	Key	SI No.	Key
1	D	31	A	61	D	91	B	121	A
2	B	32	D	62	B	92	D	122	C
3	C	33	B	63	A	93	D	123	C
4	C	34	A	64	A	94	D	124	A
5	B	35	B	65	B	95	C	125	A
6	C	36	A	66	B	96	A	126	B
7	A	37	D	67	D	97	C	127	D
8	D	38	A	68	D	98	C	128	D
9	C	39	D	69	C	99	C	129	A
10	A	40	A	70	B	100	C	130	B
11	A	41	A	71	D	101	B	131	C
12	D	42	D	72	D	102	C	132	C
13	C	43	C	73	D	103	D	133	B
14	D	44	B	74	D	104	A	134	C
15	D	45	A	75	B	105	A	135	B
16	B	46	A	76	C	106	D	136	D
17	C	47	A	77	C	107	C	137	B
18	D	48	B	78	B	108	D	138	B
19	A	49	D	79	D	109	C	139	A
20	C	50	B	80	D	110	D	140	A
21	C	51	D	81	A	111	C	141	B
22	A	52	A	82	B	112	B	142	C
23	D	53	C	83	B	113	C	143	D
24	C	54	B	84	C	114	D	144	C
25	C	55	B	85	C	115	D	145	B
26	C	56	A	86	C	116	A	146	C
27	C	57	B	87	C	117	A	147	C
28	D	58	B	88	C	118	B	148	A
29	A	59	D	89	A	119	B	149	D
30	B	60	C	90	D	120	C	150	C