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ROLL No.

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TEST BOOKLET No.

345

TEST FOR POST GRADUATE PROGRAMMES

ELECTRONIC SCIENCE

Time: 2 Hours

Maximum Marks: 450

INSTRUCTIONS TO CANDIDATES

1. You are provided with a Test Booklet and an Optical Mark Reader (OMR) Answer Sheet to mark your responses. Do not soil the Answer Sheet. Read carefully all the instructions given on the Answer Sheet.
 2. Write your Roll Number in the space provided on the top of this page.
 3. Also write your Roll Number, Test Code, and Test Subject in the columns provided for the same on the Answer Sheet. Darken the appropriate bubbles with a **Ball Point Pen**.
 4. The paper consists of 150 objective type questions. All questions carry equal marks.
 5. Each question has four alternative responses marked **A, B, C** and **D** and you have to **darken** the bubble fully by a **Ball Point Pen** corresponding to the correct response as indicated in the example shown on the Answer Sheet.
 6. Each correct answer carries **3** marks and each wrong answer carries **1** minus mark.
 7. Please do your rough work only on the space provided for it at the end of this Test Booklet.
 8. You should return the Answer Sheet to the Invigilator before you leave the examination hall. However, you can retain the Test Booklet.
 9. Every precaution has been taken to avoid errors in the Test Booklet. In the event of such unforeseen happenings the same may be brought to the notice of the Observer/Chief Superintendent in writing. Suitable remedial measures will be taken at the time of evaluation, if necessary.
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SEAL



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ELECTRONIC SCIENCE

1. In an atom, in a transition from one stationary state corresponding to an energy w_2 to another stationary state, with an associated energy w_1 ($w_1 < w_2$) the frequency of the radiant energy is (with h =Planck's constant)

(A) $f = \frac{w_1 + w_2}{h}$

(B) $f = \frac{w_1 - w_2}{h}$

(C) $\frac{w_1 w_2}{h}$

(D) $w_1 / w_2 h$

2. A piece of copper and another of germanium are cooled from room temperature to 100°K . The resistance of

(A) each of them increases

(B) each of them decreases

(C) copper decreases and germanium increases

(D) copper increases and germanium decreases

3. What is the energy gap between bottom of conduction band and discrete impurity levels in the case of n type Ge?

(A) 0.001 eV

(B) 0.005 eV

(C) 0.075 eV

(D) 0.01 eV

4. In tunnel diode impurity concentration is of the order of

(A) 1 part in 10^3

(B) 1 part in 10^5

(C) 1 part in 10^6

(D) 1 part in 10^8

5. In a bipolar junction transistor emitter efficiency (η_e) is defined as

- (A) $\frac{\text{current of injected carriers at } J_E}{\text{current of injected carriers at } J_C}$
- (B) $\frac{\text{current of injected carriers at } J_C}{\text{current gain of the transistor}}$
- (C) $\frac{\text{current of injected carriers at } J_E}{\text{total emitter current}}$
- (D) $\frac{\text{current of injected carriers at } J_C}{\text{total base current}}$

6. $S = \frac{B+1}{1+BR_C/(R_C+R_B)}$ is the expression for stability factor, with respect to I_{co} , of

- (A) fixed bias circuit
- (B) collector - to - base bias circuit
- (C) emitter bias circuit
- (D) darlington emitter follower circuit

7. In a JFET the transfer characteristics (relationships between I_{DS} and V_{GS}) is given by

- (A) $I_{DS} = I_{DSS} \left(I - \frac{V_{GS}}{V_p} \right)^2$
- (B) $I_{DS} = \frac{I_{DSS}}{\sqrt{2}} \left(I - \frac{V_{GS}}{V_p} \right)^{3/2}$
- (C) $I_{DS} = \sqrt{2} I_{DSS} \left(I - \frac{V_{GS}}{V_p} \right)^2$
- (D) $I_{DS} = I_{DSS} \left(I - \frac{V_{GS}}{V_p} \right)^{3/2}$



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8. Which of the following are true for JFET'S advantages?
1. high input impedance
 2. high offset voltage
 3. low noise
- (A) 1 and 2 only are correct
(B) 2 and 3 only are correct
(C) 1 and 3 only are correct
(D) 1,2 and 3 are correct
9. Noise figure is equal to
- (A) $\frac{\text{output signal - to - noise power ratio}}{\text{input signal - to - noise power ratio}}$
- (B) $\frac{\text{input signal - to - noise power ratio}}{\text{output signal - to - noise power ratio}}$
- (C) $\frac{\text{output noise power}}{\text{input noise power}}$
- (D) $\frac{\text{output noise power}}{\text{output signal power}}$
10. For an ideal Tran conductance amplifier the input resistance (r_i) and output resistance (r_o) will be respectively
- (A) 0 and 0
(B) ∞ and 0
(C) 0 and ∞
(D) ∞ and ∞
11. With current shunt feedback, input resistance (r_i) and output resistance (r_o)
- (A) both increase
(B) both decrease
(C) r_i decreases, r_o increases
(D) r_i increases, r_o decreases



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12. A blocking oscillator
- (A) produces very sharp and narrow pulses
 - (B) generates sinusoidal waves
 - (C) is an amplifier with negative feedback
 - (D) is a triggered oscillator
13. The upper limit of the theoretical efficiencies for a transformer coupled power amplifier is
- (A) 25%
 - (B) 50%
 - (C) 66.7%
 - (D) 75%
14. Maximum energy of electrons, liberated photo electrically, depends on
- (A) incident light intensity
 - (B) roughness of the surface
 - (C) frequency of the incident light
 - (D) current flowing in the circuit
15. The maximum wavelength of incident light beyond which photo electric emission cannot take place is called
- (A) short-wavelength limit
 - (B) ultimate wavelength
 - (C) critical wavelength
 - (D) threshold wavelength
16. Across an open-circuited S_i $p-n$ junction the value of photo voltaic emf is (in volts)
- (A) 0.1
 - (B) 0.3
 - (C) 0.4
 - (D) 0.5



17. For a rectifier % regulation is defined as

(A) $\frac{V \text{ no load} - V \text{ full load}}{V \text{ full load}} \times 100\%$

(B) $\frac{V \text{ no load} - V \text{ full load}}{V \text{ no load}} \times 100\%$

(C) $\frac{V \text{ full load}}{V \text{ no load}} \times 100\%$

(D) $\frac{V \text{ no load} - V \text{ full load}}{V \text{ no load} + V \text{ full load}} \times 100\%$

18. The 2s complement numbers 1111(equal to decimal-1) and 1110 (equal to decimal-2) when added give the 2s complement number

(A) 11101

(B) 01110

(C) 1101

(D) 1110

19.

Input		Output
A	B	
0	0	1
0	1	0
1	0	0
1	1	1

The truth table shown is for

(A) XOR gate

(B) NAND gate

(C) NOR gate

(D) XNOR gate

20. The simplified form of Boolean expression $\bar{A} + A\bar{B}$ is

(A) $A + B$

(B) $\bar{A} + \bar{B}$

(C) $\bar{B} + A$

(D) $A + \bar{B}$

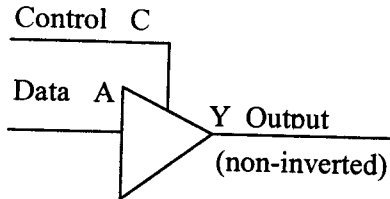


21. LED generates light. What does LCD do?
- (A) Generates light
 - (B) Controls available light
 - (C) Absorbs light
 - (D) Converts thermal energy into light
22. IC chip 7475 is a
- (A) synchronous counter
 - (B) quad NAND gate
 - (C) 4 bit transparent latch
 - (D) TTL Schmitt trigger
23. Which one of the following IC chips is a shift register IC?
- (A) 74194
 - (B) 74HC85
 - (C) 74192
 - (D) 74HC4543
24. The main sub-sections of an elementary digital voltmeter are A/D converter, display and
- (A) encoder
 - (B) counter
 - (C) decoder
 - (D) comparator
25. The advantage of successive approximation type A/D converter over ramp type A/D converter is that
- (A) it consumes less power
 - (B) it has much lower conversion time
 - (C) it has better accuracy
 - (D) it has higher resolution



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26.



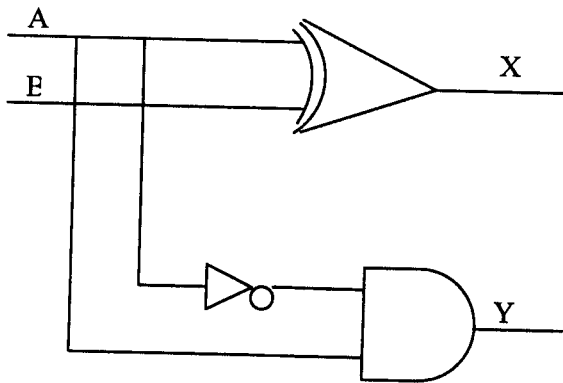
This is the logic symbol for

- (A) inverter
- (B) multiplexer
- (C) 3 state buffer
- (D) attenuator

27. NVSRM is

- (A) Negative Voltage Static RAM
- (B) Non Volatile Static RAM
- (C) Non Volatile Synchronous RAM
- (D) Negative Voltage Switched RAM

28.

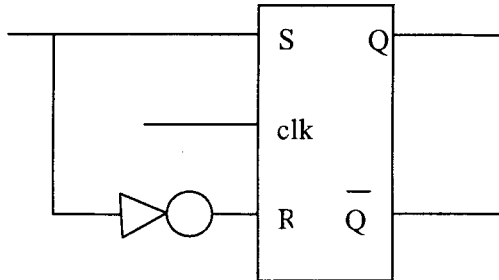


What circuit is this?

- (A) Half adder/ Half subtractor
- (B) Full adder
- (C) Comparator
- (D) Multiplier



29.



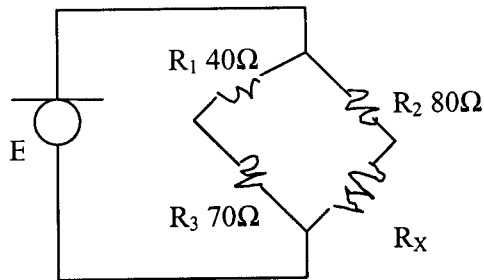
The circuit shown converts an RS flip-flop into a

- (A) T flip-flop
 - (B) D flip-flop
 - (C) JK flip-flop
 - (D) JK master-slave flip-flop
30. Sensitivity S of a voltmeter in ohms/volt is equal to
- (A) $\frac{1}{I_{FSD}}$
 - (B) $\frac{1}{I_{AVG}}$
 - (C) $\frac{V_{FSD}}{V_{MIN}} I_{FSD}$
 - (D) $\frac{\text{Full scale internal resistance}}{V_{AVG}}$
- where FSD = Full scale deflection
31. Which one of the following AC Bridges is used for frequency measurement?
- (A) Hayes bridge
 - (B) Maxwell's bridge
 - (C) Schering bridge
 - (D) Wien bridge
32. What does a vector voltmeter measure?
- (A) Amplitude of a signal at two points in a circuit and simultaneously measure the phase differences between the two nodes and a reference point.
 - (B) Measures phase of signal at each node in the circuit.
 - (C) Measures RMS amplitude at the source node.
 - (D) Measures peak amplitude at the source node



33. In a cathode ray tube with a phosphor of type P₄ the phosphorescence colour is
- (A) yellow-green (B) white
(C) purple-blue (D) yellow
34. Duty cycle of a pulse waveform is defined to be
- (A) $\frac{\text{pulse amplitude}}{\text{period}}$ (B) $\frac{\text{pulse width}}{\text{frequency}}$
(C) $\frac{\text{pulse width}}{\text{period}}$ (D) $\frac{\text{pulse amplitude}}{\text{frequency}}$
35. Instrument to measure relative amplitudes of single frequency components in a complex or distorted waveform is
- (A) frequency meter (B) wave analyser
(C) harmonic distortion analyzer (D) heterodyne converter
36. For an optical fibre (with n_1 = refractive index of core
 n_2 = refractive index of cladding)
critical angle, θ_c , the total internal reflection is equal to
- (A) $\text{Sin}^{-1} \frac{n_2}{n_1}$ (B) $\text{Tan}^{-1} \frac{n_2}{n_1}$
(C) $\text{Cos}^{-1} \frac{n_2}{n_1}$ (D) $\text{Cot}^{-1} \frac{n_2}{n_1}$
37. For a strain gauge, the change in resistance per unit change in length is called
- (A) resistance ratio (B) threshold factor
(C) gauge factor (D) strain factor
38. Rectifier type instruments use
- (A) PMMC movement with a rectifier
(B) Electrodynamometer movement with a rectifier
(C) PMMC movement with a converter
(D) Electrodynamometer movement with a converter

39.



Under balance condition the value of R_x would be

- (A) 35Ω (B) 70Ω
 (C) 105Ω (D) 140Ω
40. For a standard cell, output voltage change with temperature is of the order
- (A) $-1 \mu\text{V}/^\circ\text{C}$ (B) $-15 \mu\text{V}/^\circ\text{C}$
 (C) $-40 \mu\text{V}/^\circ\text{C}$ (D) $-60 \mu\text{V}/^\circ\text{C}$
41. For a uniform transmission line the phase constant β is equal to
- (A) $\frac{1}{\omega\sqrt{LC}}$ (B) $\frac{1}{2\pi\omega}\sqrt{\frac{L}{C}}$
 (C) $\omega\sqrt{LC}$ (D) $2\pi\omega\sqrt{\frac{L}{C}}$
42. Attenuation loss (in dB) in a transmission line is defined as

- (A) $10 \log \frac{\text{input energy}}{\text{transmitter energy to the load}}$
 (B) $10 \log \frac{\text{input energy} - \text{reflected energy at input}}{\text{transmitter energy to the load}}$
 (C) $10 \log \frac{\text{transmitted energy to the load}}{\text{input energy}}$
 (D) $10 \log \frac{\text{reflected energy to the load}}{\text{transmitted energy to the load}}$



43. Which one of the following boundary condition is incorrect for a wave propagation?
- (A) Normal components of magnetic flux density are continuous across the boundary.
 - (B) Tangential components of electric field intensity are continuous across the boundary.
 - (C) Normal components of electric flux density are continuous across the boundary.
 - (D) Tangential components of magnetic flux density are discontinuous at the boundary by the surface charge density, J .
44. Specific resistance of ferrites is of the order of
- (A) $10^7 - 10^8 \Omega m$
 - (B) $10^9 - 10^{10} \Omega m$
 - (C) $10^{11} - 10^{12} \Omega m$
 - (D) $10^{12} - 10^{13} \Omega m$
45. Why is a coaxial line a broadband device?
- (A) Its losses are negligible
 - (B) It propagates in TEM mode which has no cut-off frequency
 - (C) It uses a hybrid dielectric
 - (D) It has low resistivity
46. $\frac{1}{\sqrt{2}} \begin{bmatrix} 0011 \\ 00-11 \\ 1-100 \\ 1100 \end{bmatrix}$
- This is the s matrix of
- (A) directional coupler
 - (B) 4 port circulator
 - (C) magic tee
 - (D) 4 port hybrid junction
47. The three parameters which describe the performance of a microwave resonator are resonant frequency, input impedance and
- (A) quality factor
 - (B) power rating
 - (C) attenuation
 - (D) return loss



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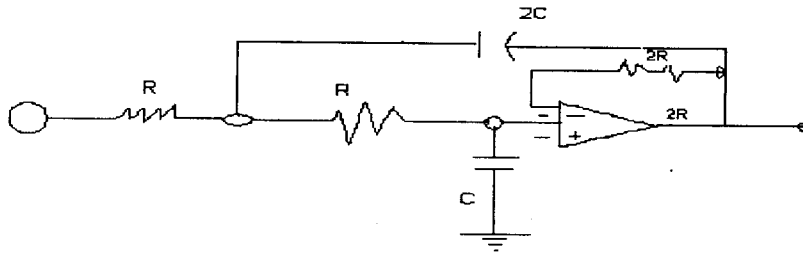
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48. In reflex klystron frequency modulation is by
- (A) square wave (B) sinusoidal wave
(C) saw tooth wave (D) rectangular pulses
49. Helix slow wave structure is used in
- (A) magnetron (B) klystron
(C) reflex klystron (D) traveling wave tube
50. In Magnetron, mode separation is achieved by
- (A) strapping (B) reducing cavity aperture
(C) using stronger magnetic field (D) increasing the anode voltage
51. Avalanche transit time diode is a p-n junction diode with
- (A) lightly doped p and n regions
(B) heavily doped p and n regions
(C) very narrow p region and very wide n region
(D) very wide p region and very narrow n region
52. Sensitivity of a receiver is its ability to receive
- (A) weak signals
(B) signals over a wide frequencies band
(C) signal of high power
(D) modulated signals
53. Single conversion superhetrodyne receivers are used
- (A) below 1 MHz only (B) between 1 MHz and 5 MHz only
(C) below 20 MHz (D) above 20 MHz
54. The output of a balanced modulator is a
- (A) single side band signal with carrier
(B) single side band suppressed carrier signal
(C) double side band signal with carrier
(D) double side band suppressed carrier signal



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55. To obtain frequency modulation using a phase modulator, the phase modulator must be
- (A) followed by a differentiator (B) followed by an integer
(C) preceded by an integrator (D) preceded by a differentiator
56. The circuit used to eliminate AM and AM noise from received FM signal before detection, is
- (A) frequency detector (B) discriminator
(C) comparator (D) amplitude limiter
- 57.



The circuit shown is that of a

- (A) low pass filter (B) high pass filter
(C) band pass filter (D) all pass filter
58. Delta modulation is a special case of
- (A) PAM (B) DPCM
(C) PPM (D) PWM
59. Aspect ratio for HDTV is
- (A) 4:3 (B) 8:6
(C) 12:9 (D) 16:9

60. Height of geo-stationary orbit above the Earth is
- (A) 28,786 km (B) 32,786 km
(C) 35,786 km (D) 38,786 km
61. For an optical fibre the factor $\sqrt{\frac{n_1^2 - n_2^2}{n_0}}$ is
- (A) figure of merit (B) numeric aperture
(C) reflection factor (D) loss tangent
62. The statement "The total displacement or electric flux through any closed surface surrounding charges is equal to the amount of charge enclosed" is that of
- (A) Coulomb's law (B) Gauss's law
(C) divergence theorem (D) Biot-savart law
63. Time varying form of equation of continuity is
- (A) $\Delta \cdot j = -\frac{\partial \rho}{\partial t}$ (B) $\Delta \cdot E = -\frac{\partial \sigma}{\partial t}$
(C) $\Delta \cdot X \cdot j = -\frac{\partial \rho}{\partial t}$ (D) $\Delta \cdot XE = -\frac{\partial \sigma}{\partial t}$
64. In a region in which there is no charge density $\nabla \cdot E$ is equal to
- (A) ∞ (B) 0
(C) finite, but large (D) non zero, but small
65. Under free space conditions the electromagnetic wave equations are
- (A) $\nabla^2 E = \frac{1}{\mu \epsilon} \vec{E}$ $\nabla^2 H = \frac{1}{\mu \epsilon} \vec{E}$
(B) $\nabla^2 E = \sqrt{\frac{\mu}{\epsilon}} \vec{E}$ $\nabla^2 H = \sqrt{\frac{M}{\epsilon}} \vec{E}$
(C) $\nabla^2 E = \mu \epsilon \vec{E}$ $\nabla^2 H = \mu \epsilon \vec{E}$
(D) $\nabla^2 E = \mu \epsilon \vec{E}$ $\nabla^2 H = \mu \epsilon$



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66. The time varying behaviour of electric field strength vector with some fixed point in space is called
- (A) polarisation (B) magnetisation
(C) Rayleigh distribution (D) scattering
67. During day time the bulk of the ionisation in the ionosphere, is between
- (A) 0 km to 100 km (B) 100 km to 150 km
(C) 150 km to 1000km (D) beyond 1000km
68. The highest frequency that can be reflected back for a given distance of transmission is called
- (A) threshold frequency (B) critical frequency
(C) transmission frequency (D) maximum usable frequency
69. Which type of antenna array has only main lobes and no side lobes?
- (A) Log periodic directive array (B) VHF array
(C) Binomial array (D) 4 element broad side array
70. Lorentz gauge condition is
- (A) $\nabla \cdot A = -\mu \epsilon \dot{V}$ (B) $\nabla \cdot E = 0$
(C) $\nabla \cdot H = -\frac{\rho}{\epsilon}$ (D) $\nabla \cdot A = \frac{1}{\mu \epsilon} \dot{V}$
71. Radix of a number system is
- (A) the total number of numerals used in the system
(B) the largest number in the system
(C) the average value of the numbers in the system
(D) the indicator of most significant numeral in a number
72. The Hexadecimal equivalent of binary 11110111101100 is
- (A) 2ED9 (B) 3EDA
(C) 3DEC (D) 2DEC



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73. Gray code for the number '4' is
- (A) 0100 (B) 0110
(C) 0011 (D) 1010
74. The A registers in 8086 microprocessor are
- (A) AH and AL only (B) AX and AH only
(C) AX and AL only (D) AX, AH and AL only
75. When PUSH instruction is executed (in 8086 microprocessor) the SP register is
- (A) decremented by a count of 1 (B) decremented by a count of 2
(C) incremented by a count of 1 (D) incremented by a count of 2
76. 8284 IC chip used with 8086 microprocessor is
- (A) clock generator
(B) programmable peripheral interface
(C) universal asynchronous receiver/transmitter
(D) 8K EPROM
77. In 8086, the register holding the base address of the final physical memory address is called
- (A) index register (B) flag register
(C) segment register (D) pointing register
78. For a signal the operation $\int_{-\infty}^{\infty} f(\tau)\delta(t-T)d\tau = f(T)$ is
- (A) time scaling (B) time shifting
(C) time inversion (D) convolution



79. The idealised characteristic of a continuous delta function are given as

1. signal must be infinitesimally narrow
2. signal must occur at time zero
3. signal must have zero energy
4. signal pulse must have a unit area

Which of the above are correct?

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

80.

$$f(t) = \begin{cases} [1-|t|] & |t| \leq 1 \\ 0 & |t| > 1 \end{cases} \text{ represent}$$

- (A) unit signum function (B) unit sinc function
 (C) unit parabolic function (D) unit triangular function

81. Which one of the following system is non-causal?

- (A) $y(t) = x(t) \sin(1+t)$ (B) $y(t) = x(t^2)$
 (C) $y(t) = \frac{d}{dt} x(t)$ (D) $y(t) = x(t-1)$

82. For amplitude modulation with modulation index = m and carrier power = P_c , the total power of modulated signal is

- (A) $P_t = P_c(1 + m/2)$ (B) $P_t = P_c(1 + m^2)/2$
 (C) $P_t = P_c(1 + m^2/2)$ (D) $P_t = P_c(1 + m/\sqrt{2})$

83. A circuit which keeps the audio section of a receiver turned off in the absence of a received signal is called

- (A) switch circuit (B) squelch circuit
 (C) cut – off circuit (D) audio turn – off circuit

84. IC LM565 is a

- (A) audio amplifier IC
- (B) general purpose phase locked loop IC
- (C) video amplifier IC
- (D) timer IC

85. The entropy of a set of N message with probabilities P_1 and P_2 , is

- (A) $H = \sum_{k=1}^N p_k \log p_k$
- (B) $H = \sum_{k=1}^{N-1} \frac{1}{p_k} \log p_k$
- (C) $H = \sum_{k=1}^N p_k \log \frac{1}{p_k}$
- (D) $H = \sum_{k=1}^{N-1} \frac{1}{p_k} \log \frac{1}{p_k}$

86. The law/principle first enunciated by Heisenberg is

- (A) Law of mass action
- (B) Uncertainty principle
- (C) Maximum power transfer principle
- (D) Three halves power law

87. In an intrinsic semiconductor Fermi level is equal to

- (A) $\frac{E_c + E_v}{2}$
- (B) $\frac{E_c - E_v}{2}$
- (C) $\frac{E_c + E_v}{2} - \frac{k_T}{2} \ln \frac{N_c}{N_v}$
- (D) $\frac{E_c - E_v}{2} + \frac{k_T}{2} \ln \frac{N_c}{N_v}$

88. Recombination agent commonly used by semiconductor manufacturers is

- (A) silver
- (B) gold
- (C) magnesium
- (D) selenium



89. Volt equivalent of temperature (V_T) is equal to
- (A) $T/11600$ (B) $T/550$
(C) $T/282$ (D) $T/114$
90. In a pn junction diode the storage time is
- (A) time for the stored majority charge to reduce to zero
(B) time for reverse bias to start changing the charge
(C) time for output pulse to appear after an input pulse is applied
(D) time for minority and majority carrier charges to become equal
91. In a pn junction diode effective width of depletion layer is of the order of
- (A) 1 micron (B) 5 micron
(C) 15 micron (D) 95 micron
92. In bipolar junction transistor, the ratio $\frac{\text{injected carrier current reaching } J_C}{\text{injected carrier current reaching } J_E}$ is called
- (A) base efficiency (B) emitter attenuation
(C) emitter efficiency (D) base transport factor
93. Ebers-Moll model for bipolar junction transistors has
- (A) two diodes connected in series with a voltage source
(B) two diodes connected back to back with a controlled control source across each
(C) three diodes connected in series with a controlled voltage source across the first and third diodes
(D) three diodes in series with the centre diode connected back-to-back with the other two diodes



94. The factor $\frac{1}{(1 - V_{CB} / BV_{CBO})^n}$ is
- (A) collector-base junction efficiency
 - (B) attenuation in collector-base junction
 - (C) avalanche multiplication factor
 - (D) breakdown threshold
95. Punch-through or reach-through in a bipolar junction transistor occurs due to
- (A) excessive heat in the junctions
 - (B) application of a square wave
 - (C) narrowing of transition region
 - (D) early effect
96. For bipolar junction transistor stabilization factor S is equal to
- (A) $\frac{\partial I_C}{\partial V_{BE}}$
 - (B) $\frac{\partial I_C}{\partial I_{CO}}$
 - (C) $\frac{\partial I_C}{\partial \beta}$
 - (D) $\frac{\partial I_C}{\partial V_{CE}}$
97. The condition which must be satisfied to prevent thermal runaway is (with P_c =collector power, T_j =collector junction temperature and R_T = thermal resistance R_j =junction resistance)
- (A) $\frac{\partial P_c}{\partial T_j} < \frac{1}{R_j}$
 - (B) $\frac{\partial P_c}{\partial T_j} < \frac{1}{R_T}$
 - (C) $\frac{\partial P_c}{\partial T_j} \geq \frac{1}{T_j}$
 - (D) $\frac{\partial P_c}{\partial T_j} = \frac{1}{R_j}$
98. In bipolar junction transistor base spreading resistance is of the order of
- (A) 300 – 500 Ω
 - (B) 50 – 70 Ω
 - (C) 1 – 5 Ω
 - (D) 0.01 – 0.05 Ω



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99. The overall bandwidth of two identical voltage amplifier connected in cascade will
- (A) remain the same as that of a single stage.
 - (B) be better than that of single stage
 - (C) be worse than that of single stage
 - (D) be better if first stage gain is low and worse if first stage gain is high
100. f_T is the frequency at which
- (A) CB current gain becomes 1
 - (B) CC current gain becomes 1
 - (C) CE current gain becomes 1
 - (D) CE current gain becomes equal to common base current gain
101. Galvanometer damping is provided by two mechanisms. One is mechanical. The other is
- (A) electromagnetic
 - (B) hydraulic
 - (C) viscous
 - (D) optical
102. The three methods for connecting unknown components to the test terminals of a Q meter are series connection, parallel connection and
- (A) series – parallel connection
 - (B) inverse parallel connection
 - (C) direct connection
 - (D) isolated connection
103. Lumped parameter delay line consists of a number of cascaded symmetrical
- (A) RL networks
 - (B) LC networks
 - (C) RC networks
 - (D) series parallel RLC networks
104. Integrating principle in the digital measurement is the conversion of
- (A) voltage to frequency
 - (B) voltage to time
 - (C) voltage to current
 - (D) current to voltage
105. Rosette strain gauge is used for measurement of strain
- (A) in more than one direction
 - (B) in large beams
 - (C) at low temperatures
 - (D) in underwater testing



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106. Measurement of force in terms of displacement of ferromagnetic core of a transformer is done by using
- (A) magnetometer (B) fluxmeter
(C) Hall effect probe (D) LVDT
107. Binary equivalent of decimal 33 is
- (A) 11001 (B) 10001
(C) 11000 (D) 10010
108. $A+B.C = (A+B).(A+C)$ illustrates
- (A) commutative rule (B) distributive rule
(C) associative rule (D) additive rule
109. If a signal can be represented by a set of equations it is said to be
- (A) deterministic (B) random
(C) aperiodic (D) discrete-time
110. For an energy signal the power content is
- (A) zero (B) finite and small but not zero
(C) large but not infinite (D) infinite
111. 74C00 series ICs belong to which logic family?
- (A) TTL (B) DTL
(C) CMOS (D) ECL
112. Which one of the following is not an alphanumeric code?
- (A) ASCII (B) Baudot
(C) Hollerith (D) Excess-3 code
113. LCD which uses a polarising filter on the top and bottom of the display is called
- (A) filtered LCD (B) field effect LCD
(C) envelope LCD (D) inverse LCD



114. Schmitt trigger is used for
- (A) switching (B) filtering
(C) multiplexing (D) wave shaping
115. A counter in which counting is automatically halted when a sequence is finished is called
- (A) circulating counter (B) up/down counter
(C) asynchronous counter (D) self – stopping counter
116. The counting sequence for the normal 74HC393 IC is
- (A) 000 through 111 (B) 0000 through 1111
(C) 00000 through 1001 (D) 000 through 101
117. An example of 4 bit bidirectional universal shift register IC is
- (A) 74194 (B) 74HC 164
(C) 4511 (D) 40818
118. Huffman coding is optimal in the case where all symbol probabilities are integral powers of
- (A) 0.8 (B) 0.667
(C) 0.5 (D) 0.25
119. Amount of information in a message with probability P is
- (A) $\log_{10} P$ (B) $\log_2 1/P$
(C) $\log_{10} 1/P$ (D) $\log_2 P$
120. Generally optical fibre systems operate with wavelengths in the range
- (A) 0.1 to 0.3 μm (B) 0.4 to 0.7 μm
(C) 0.8 to 1.6 μm (D) 1.7 to 2 μm
121. A step – function is an example of
- (A) singularity function (B) harmonic function
(C) imaginary function (D) distorted function



122. In a computer, an area of memory that holds a sequence of CPU instructions is called
- (A) Cache memory (B) code memory
(C) internal memory (D) distributed memory
123. In 8086 microprocessor SI and DI register are used as
- (A) 8 bit registers (B) 4 bit registers
(C) 16 bit registers (D) variable bit registers
124. In 8086 BIU stands for
- (A) bus interface unit (B) binary Information unit
(C) bus interrupt unit (D) binary interrupt unit
125. The 3 types of jump ranges in 8086 are
- (A) short , long , longer (B) short, near, far
(C) small, median, large (D) primary, secondary, tertiary
126. How many interrupt types are there in 8086?
- (A) 8 (B) 16
(C) 64 (D) 256
127. For 8086 AAA. AAS. AAD and AAM are
- (A) data movement instructions (B) interrupt instructions
(C) ASCII based instruction (D) rotation instructions
128. MOVS is a
- (A) string move instruction (B) secondary move instruction
(C) supplementary move instruction (D) segment move instruction
129. Full form of REP instruction, for 8086, is
- (A) Resume segment operation (B) Repeat string operation
(C) Repeat store operation (D) Resume store operation



137. Frits formula for noise factor f is

$$\begin{array}{ll}
 \text{(A)} & F = F_1 + \frac{F_2 + 1}{G_1} + \frac{F_3 - 1}{G_1 G_2} + \dots \\
 \text{(B)} & F = F_1 + \frac{F_2}{G_1} + \frac{F_3}{G_2} + \dots \\
 \text{(C)} & F = F_1 + \frac{F_1 + F_2}{G_1} + \frac{F_2 + F_3}{G_2} + \dots \\
 \text{(D)} & F = F_1 + \frac{F_2 - 1}{G_1} + \frac{F_3 - 1}{G_1 G_2} + \dots
 \end{array}$$

138. Clapp oscillator is a modified version of

- (A) Hartley oscillator (B) Wien bridge oscillator
 (C) Colpitts oscillator (D) Phase shift oscillator

139. Doubly balanced diode ring modulator rejects

- (A) the carrier only
 (B) one of the sidebands only
 (C) modulating signal only
 (D) both the carrier and the modulating signals

140. In ISB, transmission multiplexing technique used is

- (A) TDM (B) FDM
 (C) CDM (D) modified TDM

141. The ridge in a ridge waveguide

- (A) increases the capacitance between the wide walls
 (B) decreases the capacitance between the wide walls
 (C) increases the capacitance between the narrow walls
 (D) decreases the capacitance between the narrow walls

142. For a transmission line $10 \log \frac{(s+1)^2}{4s}$ is the

- (A) transmission loss (B) return loss
 (C) reflection loss (D) insertion loss



143. In a reflex klystron with beam voltage = V_0 cavity RF gap voltage = V_1 and beam coupling coefficient = β_1 the depth of modulation is
- (A) $\beta_1 \log \frac{V_1}{V_0}$ (B) $\beta_1 \frac{V_1}{V_0}$
(C) $\beta_1 \log \frac{V_0}{V_1}$ (D) $\beta_1 \log V_1 V_0$
144. Double minimum method is used for measurement of VSWR in a microwave transmission line when VSWR is
- (A) < 5 (B) between 5 and 15
(C) < 20 (D) > 20
145. Which one of the following is not a method for microwave frequencies measurement?
- (A) Slotted line method (B) Down conversion method
(C) Reflect meter method (D) Cavity perturbation method
146. Trapezoidal patterns are used for observing characteristics of AM transmitters
- (A) tuning (B) power
(C) modulation (D) radiation
147. In a receiver, noise temperature is equal to
- (A) $\frac{n}{kb}$ (B) NKB
(C) $\frac{2\pi n}{kb}$ (D) $2\pi nkb$
148. Which class of operation is normally employed in AM transmitters?
- (A) Class A (B) Class B
(C) Class C (D) Class AB



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149. With Δf = frequency deviation and f_m = modulating signal frequency modulation index for FM is equal to

(A) $\Delta f \cdot f_m$

(B) $\Delta f / f_m$

(C) $f_m / \Delta f$

(D) $(f_m - \Delta f) / f_m$

150. Which one of the following is not a FM detector circuit?

(A) Balance slope detector

(B) Foster – Seely discriminator

(C) Ratio detector

(D) Envelope detector
