

**GENERAL APTITUDE TEST
COMBINED CBRT FOR THE POST OF DEPUTY CENTRAL INTELLIGENCE
OFFICER(TECHNICAL) AND JOINT ASSISTANT DIRECTOR
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1.

Suppose a specimen (metal or semiconductor) carrying a current \mathbf{I} is placed in a transverse magnetic field \mathbf{B} , an electric field $\mathbf{\epsilon}$ is induced in the direction perpendicular to both \mathbf{I} and \mathbf{B} . Then this phenomenon is known as

- (a) Mobility
- (b) Super conductivity
- (c) Hall effect
- (d) Diffusion

2.

The rate of change of collector current with respect to the reverse saturation current, keeping β and V_{BE} constant, is called

- (a) Stability factor
- (b) Fixed bias
- (c) Load line
- (d) Bias compensation

3.

Which one of the following has negative temperature coefficient?

- (a) Sensistor
- (b) Thermistor
- (c) Metal
- (d) Heavily doped semiconductor

4.

If a conductor of length \mathbf{L} , carrying a current of \mathbf{I} , is placed in a magnetic field of intensity \mathbf{B} , then the force f_m acting on this conductor is (assuming that the directions of \mathbf{I} and \mathbf{B} are perpendicular to each other)

- (a) $f_m = BIL$
- (b) $f_m = BI/L$
- (c) $f_m = LI/B$
- (d) $f_m = 2BI/L$

5.

In a P-N junction diode, if a forward-bias potential (V_d) is zero, then

- (a) The forward-bias current (I_d) will be equal to the reverse saturation current (I_s)
- (b) The forward-bias current (I_d) will be equal to the negative of reverse saturation current (I_s)
- (c) I_d will be zero
- (d) $I_d = 2I_s$

6.

What is the cutoff frequency of the op-amp, if unity gain frequency is 10 MHz and voltage differential gain is 50,000?

- (a) 200 Hz
- (b) 100 Hz
- (c) 1000 Hz
- (d) 2000 Hz

7.

Which of the following elements are most frequently used for formation of p-type material by doping a pure germanium or silicon crystal with impurity atoms having three valence electrons?

- (a) Antimony, Arsenic, Boron
- (b) Boron, Gallium, Arsenic
- (c) Phosphorus, Boron, Gallium
- (d) Boron, Gallium, Indium

8.

Consider the following statements for sampling:

1. Flat-top sampling is preferred because of its noise immunity.
2. In natural sampling, the top of each rectangular pulse remains constant and is equal to the instantaneous value of the signal $x(t)$ at the start of sampling.
3. One important reason for intentionally lengthening the duration of each pulse in flat-top sampling is to reduce the bandwidth.

Which of the above statements are correct?

- (a) 1 and 2 only
- (b) 1 and 3 only
- (c) 2 and 3 only
- (d) 1, 2 and 3

9.

The initial value of the signal corresponding to the $X(z) = \frac{(1-3z^{-1})}{(1-0.1z^{-1})(1+0.6z^{-1})}$ is

- (a) 0
- (b) 1
- (c) 0.5
- (d) -1

10.

Consider an LTI system with frequency response $H(e^{j\omega})$, input $x_N(n)$, and output $y_N(n)$. If $x(n)$ and $y(n)$ are power signals and their power spectral densities are $G_x(e^{j\omega})$, $G_y(e^{j\omega})$ respectively, then what is the relation between input and output power spectral densities?

- (a) $G_y(e^{j\omega}) = |H(e^{j\omega})| \cdot G_x(e^{j\omega})$
- (b) $G_y(e^{j\omega}) = |H(e^{j\omega})|^2 \cdot |G_x(e^{j\omega})|^2$
- (c) $G_y(e^{j\omega}) = |H(e^{j\omega})| \cdot |G_x(e^{j\omega})|^2$
- (d) $G_y(e^{j\omega}) = |H(e^{j\omega})|^2 \cdot G_x(e^{j\omega})$

11.

Which one of the following can NOT be a correct statement for properties of Region of Convergence (ROC) in Z-Transforms?

- (a) The ROC of $X(z)$ consists of a ring in the z -plane centred about the origin.
- (b) If $X(z)$ is rational, then the ROC must not contain any pole.
- (c) If $x(n)$ is of finite duration and is absolutely summable, then the ROC is the entire z -plane, except possibly $z = 0$ and/or $z = \infty$.
- (d) If $x(n)$ is right-side and of infinite duration, then the ROC is the region in the z -plane inside the innermost pole.

12.

The linear convolution of two sequences $x(n) = \{3, 2, -1\}$ and $y(n) = \{3, 2, 2, 1\}$ is

(a) $\{-1, 0, 5, 7, 12, 9\}$

(b) $\{9, 12, 7, 5, 0, -1\}$

(c) $\{9, 12, 7, 5, 0, -1\}$

(d) $\{-1, 0, 5, 7, 12, 9\}$

13.

If a system is defined by $y(n) = x(n^2)$, then it is

- (a) Non-causal and stable
- (b) Causal and stable
- (c) Non-causal and unstable
- (d) Causal and unstable

14.

The value of $\sum_{m=-\infty}^{\infty} x(m) \cdot \delta(m - k)$ is equal to

- (a) $x(m)$
- (b) 1
- (c) $\delta(k)$
- (d) $x(k)$

15.

Consider the following statements regarding the logic circuits:

1. In combinational logic circuits, the outputs at any instant of time are entirely dependent upon the inputs present at that time.
2. The behavior of synchronous sequential circuit depends upon the order in which its input signals change and can be affected at any instant of time.
3. Synchronous sequential circuits that use clock pulses in the inputs of memory elements are called clocked sequential circuits.

Which of the above statements are correct?

- (a) 1, 2 and 3
- (b) 1 and 2 only
- (c) 2 and 3 only
- (d) 1 and 3 only

16.

Which one of the following expressions represents characteristic equation for clocked RS flip-flop?

- (a) $S + \overline{RQ}$
- (b) $\overline{S} + RQ$
- (c) $S + \overline{RQ}$
- (d) $\overline{S} + R\overline{Q}$

17.

Which one of the following expressions represents the simplified form of the Boolean function $F(A, B, C, D) = \sum(0,1,2,4,5,6,8,9,12,13,14)$?

- (a) $\bar{C} + \bar{A}C\bar{D} + BC\bar{D}$
- (b) $\bar{A}\bar{C} + A\bar{C} + \bar{A}\bar{C}\bar{D} + BC\bar{D}$
- (c) $\bar{C} + \bar{A}\bar{D} + B\bar{D}$
- (d) $\bar{A}\bar{C} + A\bar{C} + \bar{A}\bar{D} + \bar{B}\bar{D}$

18.

Consider the following statements regarding Boolean algebra:

1. The complement of a function expressed as the sum of minterms equals the sum of minterms missing from the original function.
2. Boolean functions expressed as a sum of minterms or product of maxterms are said to be in canonical form.
3. Another way to express Boolean functions is in one of the standard forms like sum of products or product of sums.

Which of the above statements are correct?

- (a) 1 and 2 only
- (b) 1 and 3 only
- (c) 2 and 3 only
- (d) 1, 2 and 3

19.

A ROM unit is organized as 512 words of 4 bits each. The number of input lines, output lines and the total storage capacity (in bits) of the unit respectively are

- (a) 4, 9, 2048
- (b) 9, 4, 4096
- (c) 4, 9, 4096
- (d) 9, 4, 2048

20.

Which one of the following logic families has both worst noise immunity and power dissipation?

- (a) DTL
- (b) I^2L
- (c) TTL
- (d) ECL

21.

Consider the following statements regarding the ripple counters:

1. In a ripple counter, the flip-flop output transition serves as a source for triggering other flip-flops.
2. Ripple counters are sometimes called synchronous counters.
3. In a Binary ripple counter, the flip-flop holding the least significant bit receives the incoming count pulses.

Which of the above statements are correct?

- (a) 1 and 3 only
- (b) 1 and 2 only
- (c) 2 and 3 only
- (d) 1, 2 and 3

22.

Which one of the following is intended to compensate for the loss of signal power incurred in the course of transmission?

- (a) Filtering
- (b) Tuning
- (c) Amplification
- (d) Broadcasting

23.

Which of the following major components are required for phase-locked loop?

- (a) Transmitter, receiver and channel
- (b) Multiplier, adder and oscillator
- (c) Multiplier, a loop filter and a voltage controlled oscillator
- (d) Product modulator, adder and feedback resistor

24.

The power spectral density of a wide-sense stationary random process is always

- (a) Negative
- (b) Zero
- (c) Unity
- (d) Non-negative

25.

The video signal exhibits a large bandwidth and significant low-frequency content, which suggest the use of

- (a) DSB-SC modulation
- (b) SSB-SC modulation
- (c) VSB modulation
- (d) Frequency modulation

26.

What is the frequency range of FM radio receivers?

- (a) 0.535 MHz – 1.605 MHz
- (b) 88 MHz – 108 MHz
- (c) 0.455 MHz – 10.8 MHz
- (d) 8.8 MHz – 10.8 MHz

27.

Which one of the following modulation schemes enables two DSB-SC modulated waves to occupy the same channel bandwidth, and yet it allows for the separation of the two message signals at the receiver output?

- (a) Vestigial sideband modulation
- (b) Quadrature – amplitude modulation
- (c) Frequency modulation
- (d) Single sideband modulation

28.

What is the bandwidth (Δ) required for FM signal in which the modulating frequency is f_m , the maximum deviation is δ and the modulation index is m_f ?

- (a) $\Delta = f_m \times \text{highest needed sideband} \times 2$
- (b) $\Delta = f_m \times \delta \times 2$
- (c) $\Delta = f_m \times m_f \times 2$
- (d) $\Delta = m_f \times \text{highest needed sideband} \times 2$

29.

Which one of the following is correct as per amplitude modulation technique?

- (a) With the increased depth of modulation, the sideband power increases
- (b) With the decreased depth of modulation, the sideband power increases
- (c) The total transmitted power always remains constant
- (d) With the increased depth of modulation, the required bandwidth increases

30.

Which one of the following is NOT correct as per Frequency Modulation technique?

- (a) Frequency Modulation is a linear modulation process.
- (b) Frequency Modulation provides a practical method for the trade-off of channel bandwidth for improved noise performance.
- (c) Spectral analysis of Frequency Modulation is more difficult than for Amplitude Modulation.
- (d) The instantaneous frequency of a sinusoidal carrier is varied in proportion to the message signal.

31.

Which one of the following is NOT correct as per cyclic redundancy check codes?

- (a) Cyclic codes are extremely well-suited for error detection.
- (b) A cyclic code used for error-detection is referred to as cyclic redundancy check code.
- (c) All error-detecting codes used in practice are of the cyclic-code type.
- (d) All error patterns with an even number of errors if the generator polynomial $g(X)$ for the code has an even number of nonzero coefficients.

32.

The information capacity of a continuous channel of bandwidth B Hertz, perturbed by additive white Gaussian noise of power spectral density $N_0/2$ and limited in bandwidth to B , where P is the average transmitted power, is given by

- (a) $C = B \log_2(1 + \frac{2P}{N_0B})$ bits per second
- (b) $C = B \log_2(1 + \frac{P}{2N_0B})$ bits per second
- (c) $C = 2B \log_2(1 + \frac{P}{N_0B})$ bits per second
- (d) $C = B \log_2(1 + \frac{P}{N_0B})$ bits per second

33.

Which one of the following multiplexing techniques relies on the use of PN codes with different generators for the individual users?

- (a) Time division multiplexing
- (b) Frequency division multiplexing
- (c) Code division multiplexing
- (d) Quadrature amplitude multiplexing

34.

Which one of the following represents the amount of uncertainty remaining about the channel input after the channel output has been observed?

- (a) Entropy
- (b) Conditional entropy
- (c) Mutual information
- (d) Channel capacity

35.

If E_b is transmitted energy per bit, N_0 is noise spectral density and $\text{erfc}(\cdot)$ is the complementary error function then the average probability of symbol error (P_e) or bit error rate for coherent binary PSK is

(a) $P_e = \frac{1}{2} \text{erfc}\left(\sqrt{\frac{E_b}{2N_0}}\right)$

(b) $P_e = \frac{1}{2} \text{erfc}\left(\sqrt{\frac{E_b}{N_0}}\right)$

(c) $P_e = \frac{1}{2} \text{erfc}\left(\sqrt{\frac{2E_b}{N_0}}\right)$

(d) $P_e = 2 \text{erfc}\left(\sqrt{\frac{E_b}{2N_0}}\right)$

36.

A pseudo-noise (PN) sequence is a periodic binary sequence with a noiselike waveform that is usually generated by means of

- (a) a shift register
- (b) serial in serial out shift register
- (c) a feedback shift register
- (d) parallel in parallel out shift register

37.

What are the timer's clock frequency and its period respectively for 8051-based system with the crystal frequency of 12 MHz?

- (a) 1 MHz and 1 μ s
- (b) 1.333 MHz and 0.75 μ s
- (c) 921.6 KHz and 1.085 μ s
- (d) 2.666 MHz and 3.5 μ s

38.

Which one of the following includes five flip-flops, which are set or reset after an operation according to data conditions of the result in the accumulator and other registers?

- (a) Instruction decoder
- (b) Register arrays
- (c) Timing and control unit
- (d) ALU

39.

Which one of the following is 2-byte instruction in 8085 processor?

- (a) MVI B, F2H
- (b) JMP 2085H
- (c) LDA 2050H
- (d) MOV C, A

40.

Which one of the following can initiate the operations, for which individual pins on the microprocessor chip are assigned: Reset, Interrupt, Ready, Hold?

- (a) Memory
- (b) External devices
- (c) Stack pointer
- (d) Program counter

41.

How many number of machine cycles and T-states are required respectively in 8085 processor for the instruction Load H and L Registers Direct (LHLD)?

- (a) 2, 7
- (b) 5, 16
- (c) 4, 14
- (d) 4, 13

42.

Which one of the following statements is correct regarding 8085 processor?

- (a) OUT 01H transfers data from the accumulator to the output device.
- (b) OUT 01H transfers data from memory to the output device.
- (c) OUT 01H transfers data from stack pointer to the output device.
- (d) OUT 01H transfers data from program counter to the output device.

43.

Which one of the following statements is NOT correct regarding lattice filter structure?

- (a) Lattice structures are less sensitive to coefficient quantization effects (finite-word-length effect) than direct-form filter structures.
- (b) Lattice structures are computationally more efficient than other filter structures for the implementation of wavelet transforms using filter banks.
- (c) The filter order can be increased by adding extra stages and calculating the coefficients of the new stages alone.
- (d) The lattice structures simultaneously yield only in forward prediction errors.

44.

Which one of the following statements is NOT correct regarding filters?

- (a) Stability of the IIR filter depends on the locations of the poles.
- (b) The IIR filters are stable if all its poles lie inside the unit circle.
- (c) The IIR filters can have exactly linear phase response.
- (d) In the FIR filters, the present output depends on the present and past inputs.

45.

Causal raised-cosine window is defined as

- (a) $w(n) = \begin{cases} 0.54 - 0.46 \cos\left(\frac{2\pi n}{M-1}\right); & 0 \leq n \leq M-1 \\ 0 & ; \text{ otherwise} \end{cases}$
- (b) $w(n) = \begin{cases} 0.5 - 0.5 \cos\left(\frac{2\pi n}{M-1}\right); & 0 \leq n \leq M-1 \\ 0 & ; \text{ otherwise} \end{cases}$
- (c) $w(n) = \begin{cases} 1 - \frac{2|n - \frac{M-1}{2}|}{M-1} & ; 0 \leq n \leq M-1 \\ 0 & ; \text{ otherwise} \end{cases}$
- (d) $w(n) = \begin{cases} 0.54 - 0.46 \cos\left(\frac{2\pi n}{M-1}\right); & -\frac{M-1}{2} \leq n \leq \frac{M-1}{2} \\ 0 & ; \text{ otherwise} \end{cases}$

46.

Consider a finite-length sequences $x(n) = \delta(n) + 2\delta(n-5)$. What is the sequence $y(n)$

that has a DFT $Y(k) = X(k)e^{-j\frac{2\pi}{10}3k}$, where $X(k)$ is 10 point DFT of $x(n)$?

- (a) $\delta(n-3) + 2\delta(n-8)$
- (b) $\delta(n-2) + 2\delta(n-8)$
- (c) $\delta(n-6) + 2\delta(n-1)$
- (d) $\delta(n-6) + 2\delta(n-8)$

47.

What is the relationship between frequency bin (or index) k and the original analog frequency Ω ?

- (a) $\Omega = \frac{k}{NT_s}$
- (b) $\Omega = \frac{2\pi k}{NT_s}$
- (c) $\Omega = \frac{kf_s}{NT_s}$
- (d) $\Omega = \frac{kf_s}{T_s}$

48.

For the direct-form structure of FIR filter of order $(M-1)$, the computation of each output sample, $y(n)$, requires

- (a) M multiplications, $(M-1)$ additions, and M memory locations to store the M coefficients.
- (b) $(M-1)$ multiplications, M additions, and M memory locations to store the M coefficients.
- (c) M multiplications, M additions, and $(M-1)$ memory locations to store the M coefficients.
- (d) $(M-1)$ multiplications, M additions, and $(M-1)$ memory locations to store the M coefficients.

49.

Which one of the following is scattering matrix of a matched three port network?

- (a) $[s] = \begin{bmatrix} 1 & S_{12} & S_{13} \\ S_{21} & 1 & S_{23} \\ S_{31} & S_{32} & 1 \end{bmatrix}$
- (b) $[s] = \begin{bmatrix} 0 & S_{12} & S_{13} \\ S_{21} & 0 & S_{23} \\ S_{31} & S_{32} & 0 \end{bmatrix}$
- (c) $[s] = \begin{bmatrix} 0 & S_{12} & S_{13} \\ -S_{21} & 0 & S_{23} \\ -S_{31} & -S_{32} & 0 \end{bmatrix}$
- (d) $[s] = \begin{bmatrix} 1 & S_{12} & S_{13} \\ -S_{21} & 1 & S_{23} \\ -S_{31} & -S_{32} & 1 \end{bmatrix}$

50.

The coupling factor indicates

- (a) the fraction of the input power that is coupled to the output port.
- (b) the fraction of the output power that is coupled to the input port.
- (c) the fraction of the input power that is coupled to the input port.
- (d) the fraction of the output power that is coupled to the output port.

51.

Which one of the following statements is NOT correct regarding the power dividers and directional couplers?

- (a) Hybrid junctions have either a 90° (Quadrature) or a 180° (magic-T) phase shift between the output ports.
- (b) Three port networks take the form of T-junctions, directional couplers and hybrids.
- (c) The coupler may be a three-port component or four-port component.
- (d) Power dividers and directional couplers are passive microwave components used for power division or power combining.

52.

How many propagating modes that can be excited by a source for TEM or quasi-TEM lines?

- (a) One
- (b) Two
- (c) Three
- (d) Four

53.

Which one of the following antennas is most commonly used at microwave frequencies and has moderate gain?

- (a) Wire antenna
- (b) Aperture antenna
- (c) Printed antenna
- (d) Reflector antenna

54.

Microstrip circuit allows the convenient integration of which of the following component(s)?

- (a) Active component only
- (b) Passive component only
- (c) Resistive component only
- (d) Active and passive components

55.

Analog single channel per carrier (SCPC) systems employ which one of the following modulation techniques to transmit a single voice frequency channel on its own carrier frequency?

- (a) AM
- (b) DSB-SC
- (c) SSB-SC
- (d) FM

56.

Which one of the following equations is called the rocket equation if Δv is the rocket velocity, v_e is the exhaust velocity, m_0 is the initial mass and m is the final mass?

- (a) $\Delta v = -\frac{mv_e}{m_0}$
- (b) $\Delta v = v_e \ln \frac{m_0}{m}$
- (c) $\Delta v = \ln \frac{mv_e}{m_0}$
- (d) $\Delta v = -\ln \frac{m_0}{v_e m}$

57.

The actual relationship by which electromagnetic radiation density diminishes with distance, is called

- (a) Free space loss
- (b) Spreading loss
- (c) Radiation loss
- (d) Temperature loss

58.

The uplink and downlink bands are separated in frequency to prevent oscillation within the satellite amplifier, while permitting simultaneous transmission and reception at different frequencies through a device called

- (a) Transponder
- (b) Multiplexer
- (c) Oscillator
- (d) Channel filter

59.

Which one of the following statements is NOT correct regarding transfer orbit?

- (a) During the transfer orbit, the orientation of the spacecraft must be maintained at a favourable sun angle to satisfy solar power and thermal balance constraints.
- (b) During the transfer orbit, the stability of the spacecraft is maintained by spinning it about its axis.
- (c) The angle between the spacecraft axis and the sun line should be as close to 90° as possible, usually in the approximate range from 65° to 115° .
- (d) The satellite is allowed to remain in the transfer orbit for about two revolutions until its subsystems are checked.

60.

Which one of the following is becoming increasingly important in satellite transmission, because of its use of the one additional bit for error correction coding, rather than information?

- (a) ASK
- (b) FSK
- (c) Eight-phase PSK
- (d) PSK

61.

Consider the following statements regarding Kepler's laws:

- 1. The orbit of each planet (satellite) is an ellipse with the sun (earth) at one focus.
- 2. The line joining the sun (earth) to a planet (satellite) sweeps out equal areas in equal times.
- 3. The period of revolution is proportional to the cube of the semimajor axis.

Which of the above statements are correct?

- (a) 1 and 2 only
- (b) 1 and 3 only
- (c) 2 and 3 only
- (d) 1, 2 and 3

62.

Consider the following statements regarding the radio frequency satellite link:

- 1. A channel is a one-way link from a transmitting earth station through the satellite to the receiving earth station.
- 2. A half-circuit is a two-way link between an earth station and the satellite only.
- 3. A circuit is a full-duplex link between two earth stations.

Which of the above statements are correct?

- (a) 1 and 2 only
- (b) 1 and 3 only
- (c) 2 and 3 only
- (d) 1, 2 and 3

63.

In which one of the following satellite orbits, the satellite motion is synchronised with the earth's rotation?

- (a) Geosynchronous orbit
- (b) Geostationary orbit
- (c) Molniya orbit
- (d) Circular orbit

64.

The range corresponding to the time difference between the received echo pulse and the last transmitted pulse is called

- (a) True range
- (b) Apparent range
- (c) Pulse repetition range
- (d) Sampling range

65.

Which one of the following equations is related to orbit eccentricity (e) in terms of apogee and perigee distances?

- (a) $e = \frac{\text{Apogee} - \text{Perigee}}{\text{Apogee} + \text{Perigee}}$
- (b) $e = \frac{\text{Apogee} + \text{Perigee}}{\text{Apogee} - \text{Perigee}}$
- (c) $e = \frac{\text{Apogee} - \text{Perigee}}{2}$
- (d) $e = \frac{\text{Apogee} + \text{Perigee}}{2}$

66.

The angle produced by the intersection of the local horizontal plane and the plane constituted by satellite, center of earth and earth station with the line of sight between the satellite and the earth station is called

- (a) Azimuth angle
- (b) Elevation angle
- (c) Earth coverage angle
- (d) Slant angle

67.

Which one of the following is NOT commonly used tracking methodologies?

- (a) Lobe switching
- (b) Sequential lobing
- (c) Frequency comparison monopulse
- (d) Phase comparison monopulse

68.

Which one of the statements is correct regarding parallel system?

- (a) It executes programs of several problems simultaneously by a single processor computer.
- (b) The time-slot cycle is adjusted so that each user feels that the CPU is dedicatedly assigned till the completion of job.
- (c) It is a system consisting of more than one processor that is tightly coupled.
- (d) It comprises of a large central computer to which a large number of remote terminals are attached.

69.

Which one of the following is a memory management technique that permits a program's memory (contiguous) to be non-contiguous into the physical memory and thereby allowing a program to be allocated physical memory wherever it is possible?

- (a) Paging
- (b) Segmentation
- (c) Thrashing
- (d) Best-fit

70.

Which one of the following is known as light weight process?

- (a) Thread
- (b) Time sharing
- (c) Parallel processing
- (d) Demand paging

71.

Consider the following page reference string:

0 1 2 3 0 1 2 3 0 1 2 3 4 5 6 7

How many page faults would occur for Least Frequently Used algorithm with 3 memory frames?

- (a) 14
- (b) 12
- (c) 10
- (d) 9

72.

Which one of the following is cloud service provider?

- (a) Botnet
- (b) 3Tera
- (c) Online stalkers
- (d) Bing

73.

Which one of the following techniques is used to launch phishing attacks?

- (a) Filter evasion
- (b) Gillnet
- (c) Network probe
- (d) Vishing

74.

The Diffie-Hellman key exchange is being used to establish a secret key between Alice and Bob. Alice sends Bob (227, 5, 82). Bob responds with (125). Alice's secret number, x , is 12, and Bob's secret number, y , is 3. What is the secret key computed by Alice and Bob?

- (a) 124
- (b) 155
- (c) 161
- (d) 158

75.

Use the RSA public key cryptosystem, with $a = 1$, $b = 2, \dots, y = 25$, $z = 26$. If $p = 5$ and $q = 13$, what are the five legal values for d ?

- (a) 121, 241, 361, 481 and 681
- (b) 5, 7, 11, 13 and 17
- (c) 3, 5, 7, 9 and 13
- (d) 5, 9, 13, 15 and 17

76.

What is the dotted representation of 32-bit hexadecimal address 80D00297 to denote its IP address?

- (a) 128.208.2.152
- (b) 128.208.2.151
- (c) 128.206.3.09
- (d) 128.206.3.152

77.

Which one of the following protocols is collision-free protocol?

- (a) Slotted ALOHA protocol
- (b) CSMA with collision detection
- (c) Bit-Map protocol
- (d) Limited-contention protocol

78.

Which one of the following algorithms is used to include in a frame formed for the data to transmit from source to destination in the data link layer?

- (a) Byte count algorithm
- (b) Checksum algorithm
- (c) Routing algorithm
- (d) DES algorithm

79.

A criminal offence conducted using social engineering techniques similar to phishing is called

- (a) Vishing
- (b) Victim
- (c) VoIP spam
- (d) Smishing

80.

Every incoming packet is sent out on every outgoing line except the one it arrived on, is called

- (a) Hopping
- (b) Searching
- (c) Routing
- (d) Flooding

81.

A radio frequency terminal which could be moved during operation is called

- (a) Mobile station
- (b) Base station
- (c) Switching center
- (d) Forward channel

82.

Which one of the following is the advantage of FDMA?

- (a) Low transmit power
- (b) Low peak data rate
- (c) Loss due to guard bands
- (d) Sensitive to narrow band interference

83.

For a hexagonal geometry, if the cluster size is N, the co-channel reuse ratio is

- (a) $\frac{\sqrt{3}}{N}$
- (b) $\sqrt{3}N$
- (c) $\sqrt{3N}$
- (d) $\frac{3}{\sqrt{N}}$

84.

Antennas can be co-located by which one of the following diversity techniques?

- (a) Pattern diversity
- (b) Polarization diversity
- (c) Antenna diversity
- (d) Frequency diversity

85.

Which one of the following statements is correct regarding transmitter modulation?

- (a) Voice transmission uses FSK with 8 KHz deviation each way.
- (b) Data transmission uses FM with a maximum deviation of 12 KHz each way.
- (c) Companding with a ratio of 2:1 is used in voice transmission.
- (d) De-emphasis is used in the transmitter.

86.

Phone traffic is defined in

- (a) Erlangs
- (b) Traffic density
- (c) Trunking efficiency
- (d) Voice channels per Km

87.

Which one of the following artificial neural network structures supports short-term memory?

- (a) Feed-forward network
- (b) Recurrent network
- (c) Boosted network
- (d) Single layer feed forward network

88.

Number of nodes needed to examine to pick a best move in alpha-beta pruning, is in the order of

- (a) $O(b^d)$
- (b) $O(b^{\frac{d}{8}})$
- (c) $O(b^{\frac{d}{4}})$
- (d) $O(b^{\frac{d}{2}})$

89.

Which one of the following terms is used for a depth-first search that chooses values for one variable at a time and backtracks when a variable has no legal values left to assign?

- (a) Simulated annealing search
- (b) Tabu search
- (c) Backtracking search
- (d) A* search

90.

Which one of the following algorithms is NOT considered under Heuristic search?

- (a) A* search
- (b) Iterative-deepening A* algorithm
- (c) Hill climbing algorithm
- (d) Depth limited algorithm

91.

Which one of the following implements stochastic hill climbing by generating successors randomly, until one is generated (better than the current state)?

- (a) Random restart hill climbing
- (b) Heuristic search
- (c) First choice hill climbing
- (d) Iterative-deepening A* algorithm

92.

Which one of the following can be implemented by calling “TREE SEARCH” algorithm with an empty fringe that is a first-in-first-out (FIFO) queue?

- (a) Breadth first search
- (b) Depth first search
- (c) Uniform cost search
- (d) Informed search

93.

What is the entropy of tossing a fair coin?

- (a) 0
- (b) 0.5
- (c) 1
- (d) 0.25

94.

One of the main concerns of cloud is

- (a) Multitenancy
- (b) Auditing services
- (c) Reporting services
- (d) Monitoring services

95.

Which one of the following uses the concept of a ‘Security Association’?

- (a) IPSec
- (b) L2CAP
- (c) MQTT
- (d) CoAP

96.

Which one of the following is NOT a routing attack on IoT?

- (a) Selective-backwarding attacks
- (b) Sinkhole attacks
- (c) Hello flood attacks
- (d) Wormhole attacks

97.

Which one of the following protocols is used for collecting device data and communicating it to servers in IoT?

- (a) MQTT
- (b) DDS
- (c) AMQP
- (d) UDP

98.

Which one of the following attacks is designed to gain control of physical or logical systems or to gain access to information?

- (a) Wormhole attack
- (b) DoS attack
- (c) Sinkhole attack
- (d) Capture attack

99.

The objective of M2M communication protocol is to

- (a) enable seamless integration of physical and virtual objects into larger and geographically distributed enterprises by eliminating the need for human intervention.
- (b) meet the requirement of constrained devices with tiny hardware and limited resources.
- (c) enable integration of various virtual objects into larger and geographically distributed enterprises.
- (d) meet the requirement of constrained devices with hardware and more resources.

100.

Which one of the following protocols is used for general purpose in IoT?

- (a) M2M communication protocol
- (b) IP and SNMP protocol
- (c) CoAP protocol
- (d) DDS protocol