

Electronics and Telecommunication Engineering

RT -20-11-2016

1. What is the electrical conductance of a 2 m length of Nichrome wire at 20°C , if it has a cross-sectional area of 1 mm^2 and conductivity as $0.9 \times 10^6\text{ S m}^{-1}$?
 - (a) 0.045 S
 - (b) 0.45 S
 - (c) 4.5 S
 - (d) 45 S

2. The atomic packing factor (APF) is equal to
 - (a) Volume of atoms in unit cell + Volume of the unit cell
 - (b) Volume of atoms in unit cell – Volume of the unit cell
 - (c) Volume of atoms in unit cell \times Volume of the unit cell
 - (d) Volume of atoms in unit cell \div Volume of the unit cell

3. Above absolute zero Kelvin, silicon in its purest form behaves as
 - (a) Intrinsic semiconductor
 - (b) Extrinsic semiconductor
 - (c) Conductor
 - (d) An insulator

4. In diamagnetic materials, $M H$ relationship is:
 - (a) Linear and sign of χ is positive
 - (b) Linear and sign of χ is negative
 - (c) Non-linear and exhibit hysteresis
 - (d) Non-linear but exhibit no hysteresis

5.

The core of an electromagnet requires

- (a) Hard magnetic material
- (b) Piezo resistive material
- (c) Soft magnetic material
- (d) Polymer polystyrene

6.

Consider the following statements for the ferromagnetic materials

1. It shows an anti-parallel alignment of adjacent atomic moments
2. The moments are unequal
3. There is a net response to an external field
4. The most important group under this category are ferrites

Which of the above statements are correct?

- (a) 1, 2, 3 and 4
- (b) 1, 2 and 3
- (c) 3 and 4 only
- (d) 1, 2 and 4 only

7.

Consider the following statements in the ferromagnetic materials

1. Each atom has a relatively large dipole moment
2. The dipole moments are mainly due to orbiting electrons
3. Iron, Cobalt and Nickel are good examples
4. Ferromagnetic materials are isotropic in single crystal

Which of the above statements are correct?

- (a) 1 and 3
- (b) 1 and 2
- (c) 2 and 3
- (d) 3 and 4

8.

A diamagnetic material is one in which

1. The permanent magnetic moment of each atom is zero
2. The magnetic fields produced by an orbital motion and the field produced due to spin combine to produce a net zero field
3. The internal field exceeds the value of the applied magnetic field

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.

Consider the following statements for RF Inductor

1. Operates at high frequency ranges
2. Characterized by high current rating and low electrical resistance
3. It suffers from a proximity effect
4. Characterized by low current rating and high electrical resistance

Which of the above statements are correct?

- (a) 1, 2 and 3
- (b) 1, 3 and 4
- (c) 1 and 4 only
- (d) 3 and 4 only

10.

Consider the following statements:

1. Capacitance of a 2-conductor system is the ratio of the magnitude of the total charge on either conductor to the magnitude of the potential difference between the conductors
2. The capacitance is dependent on the potential and the total charge only
3. The capacitance is a function only of the physical dimensions of the system of conductors and of the permittivity of the homogeneous dielectric

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

11.

The pure iron exists at room temperature as a body-centered-cubic structure. What is its packing factor?

- (a) 0.87
- (b) 0.74
- (c) 0.68
- (d) 0.52

12.

Consider the following statements regarding ceramic resonator circuits:

1. They specify larger load capacitance values than crystal circuits
2. They draw still more current than crystal circuit using the same amplifier

Which of the above statements is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

13.

In an intrinsic semiconductor, breaking of a covalent bond results in the generation of:

- (a) An electron in the conduction band and a hole in the valence band
- (b) An electron in the valence band and a hole in the conduction band
- (c) An electron and a hole in the conduction band
- (d) An electron and a hole in the valence band

14.

When a group III impurity is doped into silicon

- (a) Holes become majority
- (b) Electrons become majority
- (c) Either holes or electrons may become majority
- (d) Concept majority of charge carrier can be decided

15.

The value of constant γ in the equation for density of states, $N(E) = \gamma E^{\frac{1}{2}}$, is

- (a) 2.50×10^{23}
- (b) 6.82×10^{23}
- (c) 2.50×10^{27}
- (d) 6.82×10^{27}

16. An active filter uses

- (a) Resistors and inductors
- (b) Resistors and capacitors
- (c) Inductors only
- (d) Capacitors only

17.

For an alloy junction diode expression for transition capacitance (with the symbols having their standard meaning) is

- (a) $\in \frac{W}{A}$
- (b) $\in \frac{A}{W}$
- (c) $\in AW$
- (d) $\frac{1}{\in} \frac{A}{W}$

18.

Consider the following characteristics for a junction field effect transistor:

1. High input impedance
2. Low noise
3. Dependence on flow of majority carriers only
4. Good thermal stability

Which of the above statements are correct?

- (a) 1, 2 and 3 only
- (b) 1, 2 and 4 only
- (c) 3 and 4 only
- (d) 1, 2, 3 and 4

19.

In a normal operation of a PNP transistor:

- (a) Its both junctions are forward biased
- (b) Its both junctions are reverse biased
- (c) Its emitter base is reverse biased and collector base is forward biased
- (d) Its emitter base is forward biased and collector base is reverse biased

20.

Consider the following statements about CE configuration:

1. Its power gain is the highest
2. It is only configuration providing phase inversion
3. Its output resistance is very high
4. It provides voltage and current gains more than unity

Which of the above statements are correct?

- (a) 1, 2 and 3 only
- (b) 3 and 4 only
- (c) 1, 2 and 4 only
- (d) 1, 2, 3 and 4

21.

Consider the following statements with respect to a linear system:

1. The system equation must involve only linear operators
2. The system must contain no internal independent sources
3. The system must be relaxed

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

22.

If the phase of a signal $x[n]$ is reversed but its magnitude spectrum remains the same then the signal is

- (a) Scaled
- (b) Shifted in frequency domain
- (c) Shifted in time domain
- (d) Folded

23.

In a set of signals, if no signal can be represented as a linear combination of the remaining signals, then such signals are termed as

- (a) Linearly independent
- (b) Linearly dependent
- (c) Orthogonal
- (d) Ortho-normal

24.

A system which has a unique relationship between its input and output is called

- (a) Linear system
- (b) Causal system
- (c) Time invariant system
- (d) Invertible system

25.

The system $y[n] - \frac{1}{2} y[n - 1] = n x[n]$ is

- (a) Nonlinear, time varying and unstable
- (b) Nonlinear, time invariant and unstable
- (c) Linear, time varying and stable
- (d) Linear, time varying and unstable

26.

In a Trigonometric Fourier series representation of a signal; a_o (or A_o) is:

- (a) The average value
- (b) The RMS value
- (c) The Mean square value
- (d) The peak value

27.

Let $x_1(t) = \begin{cases} 6 & \text{for } 0 < t < 4 \\ 0 & \text{otherwise} \end{cases}$ and $x_2(t) = u(t - \tau)$

and $y(t) = x_1(t) * x_2(t)$, then the value of $y(4)$ is

- (a) 4
- (b) 8
- (c) 12
- (d) 24

28.

The unit impulse response of a system is $-4 e^{-t} + 6 e^{-2t}$. Step response of the same system for $t \geq 0$ is $A e^{-t} + B e^{-2t} + C$, where A, B and C are respectively

- (a) $-4, -3$ and $+1$
- (b) $+4, +3$ and $+1$
- (c) $-4, +3$ and -1
- (d) $+4, -3$ and -1

29.

Consider the following relations in the continuous time domain:

1. $\delta(t) = 0, \quad t \neq 0$ and $\delta(t) \rightarrow \infty, \quad t = 0$

2. $\int_a^b \delta(t) dt = 1$

Which of the above relations are required for the definition of the unit impulse function?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

30.

In convolution of $x(t)$ and $h(t)$ is given by:

$$y(t) = \int_{-\infty}^{\infty} x(z) h(t - z) dz, \text{ then}$$

- (a) Both $x(t)$ and $h(t)$ are causal
- (b) Both $x(t)$ and $h(t)$ are non-causal
- (c) $x(t)$ is causal but $h(t)$ is non-causal
- (d) $x(t)$ is non-causal but $h(t)$ is causal

31.

The ROC of z-transform of a sequence: $\left(\frac{4}{5}\right)^n u(n) - \left(\frac{5}{4}\right)^n u(n)$ must be

- (a) $|z| < \frac{4}{5}$
- (b) $|z| > \frac{5}{4}$
- (c) $\frac{4}{5} < |z| < \frac{5}{4}$
- (d) $\frac{5}{4} < |z| < \frac{4}{5}$

32.

Which one of the following properties is exhibited by the autocorrelation function of a complex valued signal?

- (a) Commutative property
- (b) Distributive property
- (c) Conjugate property
- (d) Associative property

33.

Consider a passive linear RLC network with ideal parameters:

1. In evaluating the Thevenin's equivalent voltage, the independent voltage sources of the given network are replaced by zero internal impedance and independent current sources by infinite internal impedance
2. The ideal voltage source has infinite internal impedance while the ideal current source has zero internal impedance

Which of the above statements is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

34.

The value of Q in terms of conductance G and susceptance B of the circuit is defined as:

- (a) $\frac{G}{B}$
- (b) $\frac{B}{G}$
- (c) $\frac{|G|}{B}$
- (d) $\frac{G}{|B|}$

35.

The z -parameters of a 2-port network are:

$z_{11} = 10$, $z_{22} = z_{21} = z_{12} = 5$, The $ABCD$ parameters of this network are

- (a) $\begin{bmatrix} 1 & \frac{1}{5} \\ 5 & 2 \end{bmatrix}$
- (b) $\begin{bmatrix} 2 & 5 \\ \frac{1}{5} & 1 \end{bmatrix}$
- (c) $\begin{bmatrix} 1 & \frac{1}{5} \\ 15 & 4 \end{bmatrix}$
- (d) $\begin{bmatrix} 5 & 2 \\ 1 & \frac{1}{5} \end{bmatrix}$

36.

The z -parameters of a network are:

$z_{11} = 10$, $z_{21} = z_{12} = 5$; $z_{22} = 5$. If a load of 5Ω is connected across 2-2 terminals, the input impedance across 1-1 terminals is

- (a) 12.5Ω
- (b) 10.0Ω
- (c) 7.5Ω
- (d) 5.0Ω

37.

The electric field at a point (1, 2, 3) due to a charge of 5 nC at (1, 0, 1) in vacuum is

- (a) $0.7 (1 \vec{i} + 2 \vec{j} + 3 \vec{k})$
- (b) $5 (\vec{i} + \vec{k})$
- (c) $5.625 (2 \vec{j} + 2 \vec{k})$
- (d) $25 (\vec{i} + \vec{j} + \vec{k})$

38.

A loss-less line length x such that $\beta x = \frac{\pi}{2}$ is connected in between a line of characteristic impedance of 100Ω and a load impedance of 400Ω . The line so connected should have a characteristic impedance of

- (a) 100Ω
- (b) 200Ω
- (c) 300Ω
- (d) 400Ω

39.

The intrinsic impedance of medium (air or vacuum) viz. Z_{cell} has its numerical value as;

- (a) 3Ω
- (b) 37Ω
- (c) 218Ω
- (d) 377Ω

40.

What is the average power density (S_{av}) on a transmission line for which $V = 180 \sin 2\pi 60 t$ V and $I = 600 \sin(2\pi 60 t + 30^\circ)$ mA, when average power is confined inside a hollow conducting tube 1 m in diameter?

- (a) 9.3 W m^{-2}
- (b) 49.3 W m^{-2}
- (c) 99.35 W m^{-2}
- (d) 149.3 W m^{-2}

41.

For a square cross-section of 100 mm the cut-off frequency TE_{11} is

- (a) 1.11 GHz
- (b) 2.12 GHz
- (c) 3.24 GHz
- (d) 4.56 GHz

42.

The cut-off wavelength in a rectangular waveguide is

- (a) $\frac{2}{\sqrt{\frac{m}{a} + \frac{n}{b}}}$
- (b) $\frac{\frac{2}{\pi}}{\sqrt{\left(\frac{m}{a}\right)^2 + \left(\frac{n}{b}\right)^2}}$
- (c) $\frac{2}{\sqrt{\left(\frac{m}{a}\right)^2 + \left(\frac{n}{b}\right)^2}}$
- (d) $\frac{\frac{2}{\pi}}{\sqrt{\frac{m}{a} + \frac{n}{b}}}$

43.

With V_{OC} = open circuit voltage at the terminals of an antenna produced by a uniform exciting field (E), what does the relation $(-\frac{V_{OC}}{E})$ correspond to?

- (a) Physical length of antenna
- (b) Radiation range of antenna
- (c) Effective length of antenna
- (d) Distance at which first null occurs

44.

In an experiment the power factor was determined by measuring power, voltage and current. The relative errors in their measurements are, respectively, $\pm 0.5\%$; $\pm 1\%$ and $\pm 1\%$. The relative limiting of error in the power factor would be

- (a) $\pm 0.5\%$
- (b) $\pm 1.5\%$
- (c) $\pm 2.0\%$
- (d) $\pm 2.5\%$

45.

Wagner's earth device is employed in ac bridges for:

- (a) Eliminating the effect of earth capacitances
- (b) Shielding the bridge arm elements
- (c) Eliminating the inter-component capacitances
- (d) Eliminating the stray electrostatic capacitances

46.

What is the change in resistance in a metal wire of resistance 120Ω , that results from a strain of $1000 \mu m/m$, employing strain gauge?

- (a) 0.16Ω
- (b) 0.24Ω
- (c) 0.33Ω
- (d) 0.42Ω

47.

Consider the following statements related to a strain gauge:

1. It is a passive transducer
2. It converts mechanical pressure into a change of resistance
3. Its efficiency is described in terms of Gauge factor
4. Its Gauge factor is equal to $\left(\frac{\Delta R}{R} \times \frac{1}{\sigma}\right)$

Which of the above statements are correct?

- (a) 1 and 3
- (b) 2 and 3
- (c) 1 and 4
- (d) 2 and 4

48.

Semiconductor strain gauges are usually made of

- (a) Rochelle salt
- (b) Ammonium dihydrogen phosphate
- (c) Quartz
- (d) Silicon

49.

What is the Q -point for a fixed-bias transistor with $I_B = 75 \mu A$; $B_{DC} = 100$, $V_{CC} = 20 V$, $R_C = 1.5 k\Omega$

- (a) $V_C = 20.25 V$
- (b) $V_C = 11.25 V$
- (c) $V_C = 8.75 V$
- (d) $V_C = 2.75 V$

50.

Consider the following conditions for parallel operation of a transformer:

1. Percentage impedance should be the same
2. Phase must be identical
3. Rating must be the same

Which of the above conditions are necessary?

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

51.

The following quantities are measured in a CE amplifier circuit:

1. With ac output short circuited:

$$I_V = 10 \mu A; \quad I_C = 1 \text{ mA}, \quad V_{bc} = 10 \text{ mV}$$

2. With input ac output short circuited:

$$V_{bc} = 0.65 \text{ mV}; \quad I_C = 60 \mu A, \quad V_{CE} = 1V$$

The values of h_{ie} and h_{re} as determined by the above observations are, respectively

- (a) 1000 and 0.65×10^{-3}
- (b) 100 and 60×10^{-6}
- (c) 1000 and 60×10^{-6}
- (d) 100 and 0.65×10^{-3}

52.

Introducing a resistor in the emitter of a common emitter amplifier stabilizes the dc operating point against variation in

1. Only temperature
2. Only the current gain β of transistor

Which of the above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

53.

A single tuned amplifier with capacitance coupling consists tuned circuit having $R = 10 \Omega$, $L = 20 \text{ mH}$ and $C = 0.05 \text{ F}$. What is the Bandwidth of the amplifier?

- (a) 523.2 Hz
- (b) 632 Hz
- (c) 769.2 Hz
- (d) 5032 Hz

54.

The simplified output of $Y = AB + \overline{AC} + A\overline{B}C(AB + C)$ is

- (a) 0
- (b) B
- (c) AB
- (d) None of these

55.

The binary equivalent of decimal 107 is

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

56.

The simplified Boolean function; $(\overline{A \cdot B \cdot C}) + (\overline{A \cdot \overline{B} \cdot C})$

- (a) $A + \overline{B} + \overline{C}$
- (b) 1
- (c) $\overline{A}B + A \cdot \overline{B} \cdot \overline{C}$
- (d) $\overline{A}B + C$

57.

Simplify the Boolean function:

$$F(w, x, y, z) = \Sigma (1, 3, 7, 11, 15)$$

And the don't care conditions:

$$d(w, x, y, z) = \Sigma (0, 2, 5)$$

- (a) $F = zw + zy'$
- (b) $F' = zw' + yz$
- (c) $F' = z' + wy'$
- (d) $F = z'w + zy'$

58.

Commercially available ECL gates use two ground lines and one negative supply in order to

- (a) Increase fan-out
- (b) Reduce loading effect
- (c) Reduce power dissipation
- (d) Eliminate the effect of power line glitches or the biasing circuits

59.

The minimum number of 2 input NAND gates required to realize the equation $y = \bar{A}(B + C + D)$ is,

- (a) 10
- (b) 9
- (c) 8
- (d) 7

60.

If the input to T flip flop is 100 signals, the final output of the three T flip flops in cascade is

- (a) 12.5 Hz
- (b) 333 Hz
- (c) 500 Hz
- (d) 1000 Hz

61.

A MOD-16 ripple counter is holding the count 1001_2 . What will be the count after 31 clock pulses?

- (a) 1000_2
- (b) 1010_2
- (c) 1011_2
- (d) 1101_2

62.

What would be the percentage resolution of an 8-bit digital to analog (D/A) converter?

- (a) 0.392 %
- (b) 0.444 %
- (c) 0.222 %
- (d) 0.692 %

63.

The step size of an 8-bit digital to analog (D/A) converter is 20 mA and full scale output is 5 V . Its percentage resolution is

- (a) 0.692%
- (b) 0.444 %
- (c) 0.392 %
- (d) 0.222 %

64.

A system has forward path transfer function, $G(s) = \frac{20}{s^2}$ and feedback path transfer function, $H(s) = (s + 5)$. The system will have, for a unit step input, a steady state error of:

- (a) 0.8
- (b) 0.5
- (c) 0.2
- (d) 0.1

65.

For a stable type-1 system, having unit step input, what is the value of the steady state error?

- (a) 4
- (b) 2
- (c) 1
- (d) 0

66.

Consider the negative unity feedback linear system with forward loop transfer function, $\frac{4(s+1)}{s^2(s+2)}$. The steady-state error for an input $R(s) = \frac{3}{s} - \frac{1}{s^2} + \frac{1}{2s^3}$ is

- (a) 0
- (b) $\frac{1}{4}$
- (c) $\frac{3}{4}$
- (d) ∞

67.

Consider the following statements:

1. The effect of feedback is to reduce system error
2. Feedback increases the system gain at one frequency but reduces the system gain as another frequency
3. Feedback can cause an originally stable system to become unstable

Which of the above statements are correct?

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

68.

What is the full form of ITAE?

- (a) Integral time axis is essential
- (b) Indexed time axis is essential
- (c) Integral time weighted absolute error
- (d) Indexed time absolute error

69.

The system having a characteristic equation:

$$q(s) = s^4 - 5s^3 + 2s^2 - 13s - 4 = 0, \text{ has}$$

- (a) All roots are in right half plane
- (b) Three roots are in right half plane
- (c) Three roots are in left half plane
- (d) All roots are in left half plane

70.

The relative stability and the transient performance of a closed loop control system are directly related to location of

- (a) Poles in the left half plane
- (b) Zeros in the right half plane
- (c) Closed-loop roots of the characteristic equation in the s plane
- (d) Open loop poles

71.

For an open-loop transfer function of a system, $G(s)H(s) = \frac{1}{s(s+0.5)^2}$ the phase crossover frequency is located at:

- (a) 2 rad/sec
- (b) $\sqrt{2} \text{ rad/sec}$
- (c) $\frac{1}{3} \text{ rad/sec}$
- (d) $\frac{1}{2} \text{ rad/sec}$

72.

Consider the following statements with reference to frequency-domain approaches to analysis of feedback control system:

1. The approach needs an accurate mathematical description of the system
2. The method is independent of the complexity of systems
3. The method gives an approach for trial and error design

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

73.

Gain margin is defined as the reciprocal of the gain $|GH(j\omega)|$ at the frequency at which the phase angle reaches

- (a) $+180^\circ$
- (b) $+90^\circ$
- (c) -90°
- (d) -180°

74.

Gain and phase margins are usually evaluated from

- (a) Nichols chart
- (b) Bode diagram
- (c) Root locus plot
- (d) Signal flow graph

75.

For an open-loop transfer function $G(s)H(s) = \frac{0.75}{s(1+s)(1+0.5s)}$ the gain margin and gain cross-over frequency are, respectively

- (a) 12 db and $\sqrt{2}$ rad/sec
- (b) 6 db and 2 rad/sec
- (c) 12 db and 2 rad/sec
- (d) 6 db and $\sqrt{2}$ rad/sec

76.

The gain and phase cross-over frequencies for an open loop transfer function of a unity feedback, $G(s) = \frac{3 e^{-2s}}{s(s+2)}$ are, respectively

- (a) 0.63 rad/sec and 2.72 rad/sec
- (b) 2.3 rad/sec and 2.72 rad/sec
- (c) 0.63 rad/sec and 0.48 rad/sec
- (d) 2.3 rad/sec and 0.48 rad/sec

77.

For a lead compensator, $G_c(s) = \frac{s+a}{s+b}$; $a < b$,

the maximum phase lead φ_m would be:

- (a) $\cos^{-1} \frac{b+a}{b-a}$
- (b) $\sin^{-1} \frac{b-a}{b+a}$
- (c) $\tan^{-1} \frac{b-a}{b+a}$
- (d) $\sin^{-1} \frac{b+a}{b-a}$

78.

As practical signals are time limited, they have infinite frequency bandwidth. Sampling of such signals lead to aliasing and to avoid it, an anti-aliasing filter is used

- (a) Before the signal is reconstructed
- (b) After the signal is reconstructed
- (c) Before the signal is sampled
- (d) After the signal is sampled

79.

Consider a set of codeword given below: [00000, 01111, 10100, 11011]. The code rate for this set is

- (a) $\frac{1}{2}$
- (b) $\frac{1}{5}$
- (c) $\frac{2}{5}$
- (d) $\frac{2}{3}$

80.

Entropy of a source with 4 symbols is maximum possible. What would be the average Huffman code length of this source?

- (a) 1.5
- (b) 1.75
- (c) 2
- (d) 2.25

81.

In a broadcast superhetrodyne receiver having no *RF* amplifier, the loaded *Q* of the antenna coupling circuit is 100. If the intermediate frequency is 455 *kHz*, the image frequency at 25 *MHz* will be

- (a) 24.45 *MHz*
- (b) 24.91 *MHz*
- (c) 25.45 *MHz*
- (d) 25.91 *MHz*

82.

A 1 *MHz* Sinusoidal carrier is amplitude modulated by a symmetrical square wave of period 100 μ *sec*. Which of the following frequency will not be present in the modulated signal?

- (a) 1000 *kHz*
- (b) 1010 *kHz*
- (c) 1020 *kHz*
- (d) 1030 *kHz*

83.

In a *GSM* system, 8 channels can co-exist in 200 *kHz* bandwidth using *TDMA*. A *GSM* based cellular operator is allocated 5 *MHz* bandwidth. Assuming a frequency reuse factor of $\frac{1}{5}$, i.e. a 5-cell repeat pattern, the maximum number of simultaneous channels that can exist in one cell is

- (a) 80
- (b) 40
- (c) 20
- (d) 10

84.

The 20 m antenna gives a certain uplink gain at frequency of $\frac{4}{6}$ GHz. For getting the same gain in $\frac{20}{30}$ GHz band, the required size of antenna is

- (a) 8 m
- (b) 4 m
- (c) 2 m
- (d) 1 m

85.

A satellite link frequency is expressed as $\frac{4}{6}$ GHz. It means that

- (a) 5 GHz is the downlink frequency and 6 GHz is the uplink frequency
- (b) 4 GHz is the downlink frequency and 6 GHz is the uplink frequency
- (c) The system operates at a mean frequency of 5 GHz
- (d) 4 GHz frequency is used as backup for 6 GHz frequency

86.

A television (TV) transmission using satellite is an example of which type of transmission?

1. Half duplex
 2. Full duplex
 3. Simplex
- (a) 1, 2 and 3
 - (b) 1 only
 - (c) 2 only
 - (d) 3 only

87.

A reflex Klystron is oscillating at the frequency of its resonant cavity. If the reflector voltage is made slightly less negative, the

- (a) Oscillation will cease
- (b) Output power would increase
- (c) Frequency will decrease
- (d) Bunching would occur earlier in time

88.

The wavelength of a wave with propagation constant $(0.1 \pi + j 0.2 \pi)$ is

- (a) $5 m$
- (b) $10 m$
- (c) $15 m$
- (d) $20 m$

89.

For millimeter waves the favoured mode in circular wave guide is

- (a) TE_{01}
- (b) TE_{21}
- (c) TE_{20}
- (d) TE_{02}

90.

In a microwave communication system, if the minimum carrier to noise (C/N) requirements for a receiver with a 10 MHz bandwidth is 22 dB, the minimum receiver carrier power is

- (a) -64 dBm
- (b) -70 dBm
- (c) -76 dBm
- (d) -82 dBm

91.

Microwave links are generally preferred over coaxial cable for TV transmissions because:

1. of low overall phase distortion
2. of less number of repeater stations for a given distance
3. it is unattended
4. of relative immunity to impulse noise

Which of the above reasons are correct?

- (a) 1, 2, 3 and 4
- (b) 1, 2 and 3 only
- (c) 1, 2 and 4 only
- (d) 3 and 4 only

92.

One hexa-decimal digit is sometimes referred to as:

- (a) Byte
- (b) Nibble
- (c) Group
- (d) Instruction

93.

The hexa-decimal equivalent of the octal number 762.013 is

- (a) $0F7.867$
- (b) $1F2.058$
- (c) $1E8.126$
- (d) $1B6.778$

94.

What is the binary number equivalent to decimal number for, $(151.75)_{10}$?

- (a) 1000111.11
- (b) 11010011.01
- (c) 00011100.00
- (d) 10010111.11

95.

Consider the following declarations:

1. `extern int fun ();`
2. `int fun ();`

Which is the difference between above declarations?

- (a) Both are identical
- (b) No difference, except `extern int fun ();` is probably in another file
- (c) `int fun ();` is observed with `extern int fun ();`
- (d) None of these

96.

How many times does the control unit refer to memory when it fetches and executes an indirect addressing modes instruction if the instruction is a branch type?

- (a) 1 memory reference
- (b) 2 memory reference
- (c) 3 memory reference
- (d) 4 memory reference

97.

Which one of the following correctly represents spatial locality?

- (a) Recently executed programme instruction and is likely to be called a second time very soon
- (b) Instruction adjacent to or surrounding the last recently executed instruction and likely to be called for execution soon
- (c) Instruction temporarily residing in memory
- (d) Programmes are fetched from a specified location in main memory when called by an appropriate instruction

98.

The external memory interfaced with the Intel 8085 microprocessor:

- (a) Creates facilities for developing program and data storage
- (b) Create facilities for developing program only
- (c) Creates facilities for data storage only
- (d) Does not create facilities for developing program and data storage

99.

Which one of the following is not an arithmetic instruction?

- (a) INC (increment)
- (b) CMP (compare)
- (c) DEC (decrement)
- (d) ROL (rotate left)

100.

The space complexity of an algorithm is measured by counting the

- (a) Maximum memory needed by an algorithm
- (b) Minimum memory needed by an algorithm
- (c) Average memory needed by an algorithm
- (d) Maximum disk space needed by an algorithm