

**BSNL Telecom Technical Assistant (TTA) Recruitment Test: Sample Paper**

1. One of the following statement which is true for relative dielectric constant is -

- a) It is dimensionless
- b) It is not equal to unity for vacuum
- c) Its value for all substances is less than one
- d) None

2. Pure metals generally have-

- a) high conductivity and low temperature coefficient
- b) high conductivity and large temperature coefficient
- c) low conductivity and zero temperature coefficient
- d) low conductivity and high temperature coefficient

3. For small size, high frequency coils, the most common core material is

- a) Air
- b) Ferrite
- c) Powdered iron
- d) Steel

4. For an abrupt junction Varactor diode, the dependence of device capacitance (C) on applied reverse bias (V) is given by-

- a)  $C \propto V^{1/3}$
- b)  $C \propto V^{-1/3}$
- c)  $C \propto V^{1/2}$
- d)  $C \propto V^{-1/2}$

5. A superconductor is a-

- a) A material showing perfect conductivity and Meissner effect below a critical temperature
- b) A conductor having zero resistance
- c) A perfect conductor with highest diamagnetic susceptibility
- d) A perfect conductor which becomes resistive when the current density through it exceeds a critical value

6. When a semiconductor based temperature transducer has a temperature coefficient of  $\approx 2500 \text{ mV}/^\circ\text{C}$  then this transducer is indeed a-

- a) Thermistor
- b) Forward biased pn junction diode
- c) Reverse biased pn junction diode

d) FET

7. The location of lightning arrestor is -

a) Near the transformer

b) Near the circuit breaker

c) Away from the transformer

d) None

8. Time constant of an RC circuit increases if the value of the resistance is -

a) Increased

b) Decreased

c) Neither a nor b

d) Both a and b

9. Intrinsic semiconductors are those which -

a) Are available locally

b) Are made of the semiconductor material in its purest form

c) Have more electrons than holes

d) Have zero energy gaps

10. The primary control on drain current in a JFET is exerted by -

a) Channel resistance

b) Size of depletion regions

c) Voltage drop across channel

d) Gate reverse bias

11. The electrical conductivity of metals which is expressed in  $\text{ohm}^{-1} \text{m}^{-1}$  is of the order of -

a) 1010

b) 105

c)  $10^{-4}$

d)  $10^{-6}$

12. When biased correctly, a zener diode ?

a) acts as a fixed resistance

b) has a constant voltage across it

c) has a constant current passing through it

d) never overheats

13. The current amplification factor  $\alpha_{dc}$  is given by ?

a)  $I_C/I_E$

b) IC/IB

c) IB/IC

d) IB/IC

14. Compared to bipolars, FETs have-

a) high input impedance

b) low input impedance

c) same input impedance

d) none

15. The source-drain channel of JFET is -

a) ohmic

b) bilateral

c) unilateral

d) both a and b

16. diac is equivalent to a -

a) Pair of SCRs

b) Pair of four layer SCRs

c) Diode and two resistors

d) Triac with

17. When a sample of N type semiconductor has electron density of  $6.25 \times 10^{11} / \text{cm}^3$  at 300K and if the intrinsic concentration of carriers in this sample is  $2.5 \times 10^{13} / \text{cm}^3$  then the hole density will be ?

a)  $10^6 / \text{cm}^3$

b)  $10^3 / \text{cm}^3$

c)  $10^{10} / \text{cm}^3$

d)  $10^{12} / \text{cm}^3$

18. The statement 'In any network of linear impedances, the current flowing at any point is equal to the algebraic sum of the currents caused to flow at that point by each of the sources of emf taken separately with all other emf's reduced to zero?' represents -

a) Kirchhoff's law

b) Norton's theorem

c) Thevenin's theorem

d) Superposition theorem

19. One of the following modes which has the characteristics of attenuation becoming less as the frequency is increased and is attractive at microwave frequencies of circular cylindrical wave guides is ?

- a) TE1 mode
- b) TM01 mode
- c) TE01 mode

d) Higher order mode

20. A two-port network is symmetrical if ?

a)  $z_{11}z_{22} \neq z_{12}z_{21} = 1$

b)  $h_{11}h_{22} \neq h_{12}h_{21} = 1$

c)  $AD \neq BC = 1$

d)  $y_{11}y_{22} \neq y_{12}y_{21} = 1$

21. For transmission line load matching over a range of frequencies, it is best to use a-

- a) balun
- b) broad band directional coupler
- c) double stub
- d) single stub of adjustable position

22. The poles and zeros of a driving point function of a network are simple and interlace on the negative real axis with a pole closest to the origin. It can be realised -

- a) by an LC network
- b) as an RC driving point impedance
- c) as an RC driving point admittance
- d) only by an RLC network

23. Poles and zeros of a driving point function of a network are simple and interlace on the  $j\omega$  axis. The network consists of elements ?

- a) R and C
- b) L and C
- c) R and L
- d) R, L and C

24. For a two port reciprocal network, the output open circuit voltage divided by the input current is equal to ?

- a) B
- b)  $Z_{12}$
- d)  $h_{12}$

25. In a short electric doublet the radiation properties are so that-

- a) The induction field diminishes as the square root of the distance and is only appreciable in the vicinity of the conductor.

- b) In the radiation, magnetic field is minimum when the current is maximum.
- c) The radiation resistance of a short doublet antenna is extremely high.
- d) Mean rate of power through a unit area of spherical sphere surrounding this doublet is proportional to the square of the elemental length, other factors remaining constant.
26. The frequency modulated (FM) radio frequency range is nearly -
- a) 250 ? 300 MHz
- b) 150 ? 200 MHz
- c) 90 ? 105 MHz
- d) 30-70 MHz
27. In an underground cable the distortion in the transmission of carrier frequency can be eliminated by using -
- a) Inductive loading
- b) Resistive loading
- c) Capacitive loading
- d) Shielding
28. The characteristic impedance of a transmission line with inductance 0.294 mH /m and capacitance 60 pF/m is -
- a) 49 W
- b) 60 W
- c) 70 W
- d) 140 W
30. For a quarter wavelength ideal transmission line of characteristic impedance 50 ohms and load impedance 100 ohms, the input impedance will be ?
- a) 25W
- b) 50W
- c) 100W
- d) 150W
31. The depth of penetration or skin depth for an electromagnetic field of frequency  $f$  in a conductor of resistivity  $r$  and permeability  $m$  is-
- a) inversely proportional to  $r$  and  $f$  and directly proportional to  $m$
- b) directly proportional to  $r$  and inversely proportional to  $f$  and  $m$
- c) directly proportional to  $f$  and inversely proportional to  $r$  and  $m$
- d) inversely proportional to  $r$  and  $m$  and directly proportional to  $f$
32. When an antenna has a gain of 44dB then assuming that the main beam of the antenna is circular in cross-section the beam width will be -
- a) 0.4456 0

b) 1.44560

c) 2.44560

d) 3.44560

33. Lens antennas used for microwaves are usually made of -

a) Polystyrene

b) Glass of low refractive index

c) Paraboloid surfaces

d) Dielectric media having large refractive index

34. One of the following types of instrument which is an electrometer is -

a) Electrodynamometer

b) PMMC

c) Electrostatic

d) Moving iron

35. When an ac current of 5A and dc current of 5A flow simultaneously through a circuit then which of the following statement is true ?

a) An ac ammeter will read less than 10A but more than 5A

b) An ac ammeter will read only 5A

c) A dc ammeter will read 10A

d) A dc ammeter will read zero

36. When Q factor of a circuit is high, then -

a) power factor of the circuit is high

b) impedance of the circuit is high

c) bandwidth is large

d) none of these

37. The resolution of a logic analyser is -

a) the maximum number of input channels

b) the minimum duration of the glitch it can capture

c) it's internal clock period

d) the minimum amplitude of input signal it can display

38. A memoryless system is ?

a) causal

b) not causal

c) nothing can be said

d) none

39. An air capacitor is a ?

a) time variant

b) active device

c) time invariant

d) time invariant and passive device

40. Thermistors are made of -

a) pure metals

b) pure insulators

c) sintered mixtures of metallic oxides

d) pure semiconductor

41. Pirani gauge is used to measure ?

a) very low pressures

b) high pressures

c) pressures in the region of 1 atm

d) fluid flow

42. These circuits convert input power at one frequency to output power at a different frequency through one stage conversion ?

a) AC voltage controllers

b) Cyclo converters

c) Phase controlled rectifiers

d) Inverters

43. In a forward voltage Triggering thyristor changes from ?

a) off state to on state

b) on state to off state

c) on state to on state

d) off state to off state

44. A thyristor, when triggered, will change from forward blocking state to conduction state if its anode to cathode voltage is equal to -

a) peak repetitive off state forward voltage

b) peak working off state forward voltage

c) peak working off state reverse voltage

d) peak non-repetitive off state forward voltage

45. Gate characteristic of a thyristor-

a) is a straight line passing through origin

b) is of the type  $V_g = a + b I_g$

c) is a curve between  $V_g$  and  $I_g$

d) has a spread between two curves of  $V_g$  ?  $I_g$

46. A four quadrant operation requires-

a) two full converters in series

b) two full converters connected back to back

c) two full converters connected in parallel

d) two semi converters connected back to back

47. If for a single phase half bridge inverter, the amplitude of output voltage is  $V_s$  and the output power is  $P$ , then their corresponding values for a single phase full bridge inverter are ?

a)  $V_s$ ,  $P$

b)  $V_s/2$ ,  $P$

c)  $2V_s$ ,  $2P$

d)  $2V_s$ ,  $P$

48. In an enhancement type MOSFET the output V-I characteristics has ?

a) only an ohmic region

b) only a saturation region

c) only ohmic region at low voltage value followed by a saturation region at higher voltages

d) an ohmic region at large voltage values preceded by a saturation region at lower voltages

49. The energy gap in a semiconductor -

a) increases with temperature

b) remains constant

c) slightly increase with temperature

d) decrease with temperature

50. In an electronic circuit matching means -

a) connecting a high impedance directly to low impedance

b) selection of components which are compatible

c) transferring maximum amount of signal between different kinds of circuits.

d) RC coupled stages

51. P channel FETs are less superior than N channel FETs because



a) They have higher input impedance

b) They have high switching time

c) They consume less power

d) Mobility of electrons is greater than that of holes

52. Small increase in temperature in the CE connected transistor is the -

a) Increase in  $I_{CEO}$

b) Increase in ac current gain

c) Decrease in ac current gain

d) Increase in output resistance

53. An amplifier has a band width of 20 KHz and a midband gain of 50 without feedback. If a negative feedback of 1% is applied then bandwidth with feedback is -

a) 13.3 KHz

b) 30KHz

c) 10KHz

d) 40KHz

54. The output of a class B amplifier -

a) is distortion free

b) consists of positive half cycles only

c) is like the output of a full wave rectifier

d) comprises short duration current pulses

55. An amplifier with negative feedback -

a) lowers its lower 3 dB frequency

b) raises its upper 3 dB frequency

c) increases its bandwidth

d) all of the above

56. What changes would be necessary in block C if FM signals are to be received -

a) Block becomes redundant

b) A FM detector would be required

c) A high frequency signal generator

d) An additional local oscillator will be needed

57. The main disadvantage of Diode-Transistor logic (DTL) is its-

a) greater speed

- b) slower speed
- c) average speed
- d) none of the above

58. Time delay  $D_t$  in digital signals in an SISO shift register is given by ?

- a)  $D_t = N \cdot F_c$
- b)  $D_t = N \cdot 1/F_c$
- c)  $D_t = 1/N \cdot F_c$
- d)  $D_t = N \cdot 1/F_c$

59. The output  $Q_n$  is 1 in a JK flip flop and it does not change when clock pulse is applied) The possible combination of  $J_n$  and  $K_n$  can be ?

(y denotes don't care)

- a) y and 0
- b) y and 1
- c) 0 and y
- d) 1 and y

60. Basic memory cell of dynamic RAM consists of ?

- a) a flip flop
- b) a transistor acting as a capacitor
- c) a transistor
- d) a capacitance

61. The 2's complement of 10002 is ?

- a) 0111
- b) 0101
- c) 1000
- d) 0001

62. Master slave flip-flop is made up of ?

- a) two flip flops connected in series
- b) two flip flops connected in parallel
- c) a debouncer circuit
- d) a-D- latch

63. Number of nybbles making one byte is ?

- a) 2
- b) 4

c) 8

d) 16

64. The intrinsic impedance of free space-

a) is independent of frequency

b) decreases with increase of frequency

c) increases with increase of frequency

d) varies as square root of frequency

65. A system consists of 12 poles and 2 zeroes. Its high frequency asymptote in its magnitude plot has a slope of -

a) ?200 dB/decade

b) ?240 dB/decade

c) ?230 dB/decade

d) ?320 dB/decade

66. Considering the conditions-

1. High loop gain 2. Less ringing

3. Greater damping 4 Negative dB gain margin

System stability requirements would include

a) 1 and 3

b) 1, 2 and 3

c) 1 and 4

d) 2, 3 and 4

67. In the equatorial plane only Geosynchronous satellite are launched because it is the only plane which provides ?

a) 24 hour orbit

b) stationary satellite

c) global communication

d) zero-gravity environs

68. Radio Broadcasting is an example of ?

a) space multiplexing

b) time multiplexing

c) frequency multiplexing

d) none of the above

69. PAM signals can be demodulation by using a ?

a) Low pass filters (LPE) alone

b) A Schmitt trigger followed by a LPF

c) A differentiator followed by a LPF

d) A clipper circuit by a LPF

70. In an FDM receiver channels can be separated by using ?

a) AND gates

b) Band pass

c) differentiation

d) Integration

71. The most common modulation system used for telegraphy is-

a) frequency shift keying

b) two ? tone modulation

c) pulse code modulation

d) single tone modulation

72. Use of varactor diode in generation of modulated signal be-

a) FM generation only

b) 100AM generation only

c) PM generation only

d) both PM and AM generation

73. In colour picture tube shadow mask is used to-

a) reduce x-ray emission

b) ensure that each beam strikes only its own dots

c) increase screen brightness

d) provide degaussing for the screen

74. The circuit that separates composite video waveform from the sync pulses is-

a) the keyed AGC amplifier

b) a clipper

c) an integrator

d) a sawtooth current

75. Band width of microwaves is-

a) 1GHz -103 GHz

b) 1GHz ?100 GHz

c) 1 GHz ?10 GHz

d) 1 GHz ? 106 GHz

76. In transverse Magnetic mode-

- a) no electric line is in direction of propagation
- b) no magnetic line is in direction of propagation
- c) both magnetic & electric lines are in direction of propagation
- d) neither magnetic nor electric lines in direction of propagation

77. Signal transmission in sky wave propagation is due to ?

- a) Refraction of wave
- b) Reflection of wave
- c) Propagation through Ionosphere
- d) None

78. According to Barkhausen Criterion Phase shift of signal should be ?

- a) 600
- b) 900
- c) 1800
- d) 3600

79. The transmission does not have -

- a) Partition noise
- b) Flicker noise
- c) resistance
- d) Shot noise

80. Varactor diode has non linearity of -

- a) capacitance
- b) Inductance
- c) Resistance
- d) Is a linear device

81. Noise figure is calculated as ?

- a) i/p signal to noise ratio X o/p signal to noise ratio
- b) i/p S/N Ratio / O/P S/N Ratio
- c) i/p S/N Ratio / O/P S/N Ratio X 100
- d) i/p S/N Ratio + O/P S/N Ratio

82. You can determine quickly the effect of adding poles and zeros by ?

- a) Nichols chart
- b) Nyquist plot

c) Bode plot

d) Root locus.

83. The polar plot of  $G(S)$  intercepts real axis at  $w = w_o$ . Then, the real part and  $w_o$  are given by-

a) 5, 1

b) 2.5, 1

c) 5, 0-5

d) 5, 2

84. Laplace transform  $F(s)$  of a function  $f(t)$  is given by

The initial and final values of  $F(t)$  will be respectively-

a) zero and 1

b) zero and 10

c) 10 and zero

d) 70 and 80

85. A satellite link uses different frequencies for receiving and transmitting in order to ?

a) avoid interference from terrestrial microwave links

b) avoid interference between its powerful transmitted signals and weak incoming signal

c) minimize free-space losses

d) maximize antenna gain

86. The first determining factor in selecting a satellite system is its-

a) EIRP

b) Antenna size

c) Coverage area

d) Antenna gain

87. Equalizing pulses in TV are sent during-

a) horizontal blanking

b) vertical blanking

c) the serrations

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- b) inherited
- c) admired
- d) attempt

89. Essayist works with words as sculptor with-

- a) water
- b) stone
- c) air
- d) hills

90. What is a collection of sheep called ?

- a) bunch
- b) flock
- c) herd
- d) comet

91. Join these sentences meaningfully by choosing the correct alternative from the following :

You can buy a book. You can read it.

a) and

b) nor

c) either

d) neither

92. What is the opposite of Asperity ?

a) gentility

b) superiority

c) kindness

d) clarity

93. The Election Commission functions under-

a) Ministry of Home Affairs

b) Ministry of Law

c) Prime Minister's Secretariat

d) None of these

94. Article 352 of Indian Constitution needs to be revoked in case-

a) President's Rule is to be imposed

b) Emergency is declared

c) Services of a Government servant are to be terminated without any enquiry

d) A political party of national level is to be banned

95. Radio-activity was first discovered by-

a) Becquerel

b) Madam Curie

c) Rutherford

d) Jenner

96. Ninth Plan in India ranges from-

a) 1995-2000

b) 1996-2001

c) 1997-2002

d) 1998-2003

97. How much electricity does India propose to generate through nuclear power by the year 2000 AD?

a) 5,000 MW

b) 10,000 MW

c) 15,000 MW

d) 20,000 MW

98. In which year did the fall of Bastille take place?

a) 1769

b) 1789

c) 1889

d) 1869

99. To form a quorum how many members of the Lok Sabha or Rajya Sabha should be present?

a) 1/10th of total membership

b) 1/6th of total membership

c) 1/4th of total membership

d) 1/5th of total membership

100. How many countries are non-permanent members of the Security Council?

a) 6

b) 7

c) 9

d) 10