

Paper: BEL Placement Paper (Technical-Electronics Ist)

1. The gray code equivalent of binary 1100 is
 - a. 1011 b. 1101 c. 1010 d. 1100
2. A Multiplexer has
 - a. Multiple inputs and single output
 - b. Single input and Multiple outputs
 - c. Multiple inputs and Multiple outputs
 - d. Multiple inputs for Storage of Data
3. A binary half adder
 - a. Adds two binary digits and produces their sum and carry
 - b. Adds half the sum to the carry
 - c. Adds two binary digits and carry from previous addition
 - d. Adds two binary digits at half the speed
4. An index register in a computer is for
 - a. Arithmetic and logic functions
 - b. Storage of results
 - c. Modifying the address
 - d. Counting the no of programmes
5. An example of volatile memory is
 - a. RAM b. ROM c. EPROM d. Magnetic tape
6. Barrier voltage in a P-N junction is caused by
 - a. Thermally generated electrons and holes
 - b. Diffusion of majority carriers across the junction

- c. Migration of minority carriers across the junction
- d. Flow of drift current
7. The temperature coefficient of an intrinsic semiconductor is
- a. Positive b. Negative c. Zero d. Like metals
8. A silicon transistor has a leakage current $I_{CBO} = 1 \text{ ma}$. If the temp. rises by 50°C the leakage current will be
- a. 30 ma b. 32ma c. 50ma d. no change
9. The noise figure of an ideal amplifier in decibel is
- a. 0.5 b. 0 c. 1 d. 10
10. The rise time of an amplifier is 200 nsec. Its bandwidth is
- a. 70MHz b. 140MHz c. 100MHz d. 1.75Mhz
11. MOSFET operates in
- a. Depletion mode only
- b. Enhancement mode only
- c. Depletion and enhancement mode
- d. None of these of the above
12. A device which behaves like SCRs is
- a. UJT b. Triac c. MOSFET d. SRD
13. A plate modulated class C RF amplifier produces 100 KW of radiated power at 100 % modulation. The modulating audio amplifier supplies approximately
- a. 25KW b. 33KW c. 50KW d. 66KW
14. A 100 MHz FM carrier, modulated by a 5 KHz sine wave deviates by 50 KHz
- If the frequency of the modulating sine wave is doubled, the deviation will
- a. Double b. Half c. Quadruple d. Have no change

15. Noise generated by a resistor is dependent on

- a. Its Value
- b. Its temperature
- c. Both value and temp
- d. None of these

16. A 32 channel 8 bit PCM system samples at 8 KHz rate. The overall bit rate in kilobits per second will be

- a. 2048 b. 2000 c. 1920 d. 64

17. Stub matching eliminates standing wave on

- a. Load side of the stub
- b. Source side of the stub
- c. Both sides
- d. On the stub

18. A half wave folded dipole has a radiation resistance of

- a. 72 W b. 50W c. 144W d. 288W

19. Top loading is used in antennas for

- a. Decrease in impedance
- b. Increase in bandwidth
- c. Increase in effective height
- d. Decrease the height

20. The term critical frequency in Ionospheric propagation is

- a. Lowest frequency reflected by Ionosphere
- b. Highest frequency reflected by the Ionosphere at vertical incidence
- c. Lowest frequency reflected by the Ionosphere at vertical incidence

d. Lowest communication frequency possible

21. The cathode ray oscilloscope can be used to measure

a. Frequency b. Time interval c. Voltage d. All the above

22. A wein bridge is used for measurement of

a. Resistance b. Capacitance c. Inductance d. Audio frequency

23. The frame rate per second used in India TV is

a. 60 b. 50 c. 25 d. 30

24. VHF signals are propagated

a. Via the ionosphere

b. Along the ground

c. Through the troposphere

d. By reflection in ionosphere

25. The impedance of a 3 element yagi antenna is around

a. 75W b. 300W c. 50W d. 100W

26. A PIN diode is microwave

a. Oscillator b. Mixer c. Detector d. Switch

27. A transmission line of VSWR 2 has a reflection coefficient

a. 0.25 b. 0.5 c. 75 d. 0

28. Microwave repeaters are typically

a. 25 b. 50 c. 75 d. 100 Kms apart

29. To overcome fading in a ship-to-ship communication system we can efficiently use

a. Broadband Antenna

b. Directional Antenna

c. Space Diversity

d. Frequency Diversity

30. Frequency in the UHF range is propagate by waves of

a. Ground b. sky c. Space d. Surface

31. A duplexer is used to

a. Receive two signals in one antenna

b. Prevent interference between two antenna

c. Mix two signals to the same antenna

d. Allow one antenna for both transmission and reception

32. Strapping is used in a magnetron to

a. Prevent mode jumping

b. Reduce frequency drift

c. Ensure proper bunching

d. Dissipate heat

33. A rectangular waveguide behaves like a filter of

a. Band pass b. High pass c. Low pass d. Band stop

34. The signal propagation time in milliseconds for a geosynchronous satellite is

a. 540 b. 270 c. 135 d. 100

35. The silicon solar cell is a

a. Photo conductive

b. Photo emissive

c. Photo voltaic

d. Photo resistive

36. For the national TV and radio network, INSAT-IB uses

- a. 400MHz b. 2.5GHz c. 2.5 and 5GHz d. 4 and 6 GHz

37. A typical fibre-optic detector is

- a. Step recovery diode
- b. Light emitting diode
- c. Avalanche photo diode
- d. Field effect transistor

38. A modem is a device used for

- a. Digitizing voice data
- b. Transmission of data on lines
- c. Modulating and demodulating signals sent on a line
- d. Suppressing noise interference

39. The most effective anti-jamming technique is

- a. Frequency hopping
- b. Spread Spectrum
- c. Frequency synthesis
- d. Burst transmission

40. Mono-mode is a term used in

- a. Fibre-optics
- b. Radar
- c. Satellite communication
- d. Magnetics

41. Monopulse technique is used in

- a. Radar
- b. Radio relay
- c. Data communication
- d. Fibre-optics

42. HDLC is a term for

- a. Data communication protocol
- b. Synchronizing pulses
- c. Gain control in receivers
- d. Error checking

43. A gateway

- a. Is a place where radars are connected
- b. Permits dissimilar networks to communicate
- c. Bifurcates the RF path of a transmitter
- d. Is a feeder cable

44. Ethernet is a name of

- a. Medium of computer communication
- b. Network for computer communication
- c. Procedures for computer communication network
- d. Software for computer communication

45. If several stations in a network want to use a single channel without interfering with one another, the technique used is called

- a. Carrier sense
- b. Phantom-freeze

c. Packet switching

d. Multiplexing

46. In a monolithic IC, resistors are formed from

a. Ceramic materials

b. Copper

c. P-type semiconductor

d. Aluminium deposition

47. ICs made by sputtering of materials on a ceramic substrate are called

a. Monolithic b. Hybrid c. Thick film d. Thin film

48. Two coils (inductors) connected in series have a combined inductance of 15mH. When terminals of one of the coils are reversed and connected to the other, the combined inductance is measured to be 9mH. What is the value of mutual inductance

a. 1.5mH b. 3mH c. 6mH d. 12mH

49. If a parallel LC circuit is excited at frequency less than its resonant frequency, the nature of its effective impedance is

a. Resistive b. Inductive c. Capacitive d. None of these of these

50. The wave length of 1 Giga Hertz frequency signal is

a. 10cm b. 30cm c. 3cm d. 1cm

51. Which of the following microwave tubes can be considered as broad band devices

a. Magnetrons

b. Klystrons

c. Reflex klystrons

d. Traveling wave tubes[TWT]

52. Which family of the following integrated circuits has the highest speed

a. DTL b. ECL c. TTL d. CMOS

53. The most important feature of CMOS family of ICs is

- a. High speed
- b. Small size
- c. Low power consumption
- d. Low input impedance

54. What is the resolution of 8 bit A/D converter if its full scale voltage is 10v

- a. 0.02v b. 0.01 c. 0.039v d. 0.078v

55. What value of resistance is to be used in LSB of 4 bit weighted ladder D/A converter if MSB has 10 kW resistor

- a. 160k b. 80k c. 240k d. 100k

56. The pulse width of a radar transmitter is 0.6m sec. and the pulse repetition rate is 700 Hz. The average power measured is 420 watts. What is the peak power

- a. 100KW b. 420KW c. 1MW d. None of these

57. The device used for isolating the transmitter and receiver in a radar system is called

- a. Diplexer
- b. Duplexer
- c. Directional coupler
- d. None of these

58. Baud is

- a. Total No. of bits/sec in each character
- b. Reciprocal of shortest signal element in a character
- c. Duration of a character in data transmission
- d. None of these

59. The advantage of Totem pole output stage in TTL ICs is

- a. Low output impedance
- b. Can sink more current
- c. Oscillations avoided
- d. None of these

60. The capacitance value of a varactor is controlled by

- a. A reverse voltage applied to it
- b. A series resistance
- c. Varying its supply voltage
- d. Current through the device

61. Electron volt is equivalent to

- a. 3.8×10^{-20} erg
- b. 1.602×10^{-12} erg
- c. 1.602×10^{-18} erg
- d. 1.602×10^{-16} erg

62. The kinetic energy of photo electrons emitted by a photo sensitive surface depends on

- a. Intensity of the incident radiation
- b. Wavelength of the incident radiation
- c. Angle of incident of radiation
- d. Surface conditions of the surface

63. Flux is expressed in radio-metric system in

- a. Lumens
- b. Photons
- c. Watts

d. Candles

64. In a three-phase bridge rectifier circuit, the ripple frequency is

a. Same as line frequency

b. Twice the line frequency

c. Thrice the line frequency

d. Six times the line frequency

65. Energy stored in a capacitor as a function of voltage is given by

a. CV^2

b. $1/2 CV^2$

c. $\frac{1}{2} CV^2$

d. $1/2 CV$

66. The operational amplifier used in analog computers have usually open loop flat gain approximately upto

a. 1MHz b. 100MHz c. 10MHz d. 0.1MHz

67. An oscillator of 350 MHz is fed with a pulse of rise time 2 n sec. The rise time of the displayed waveform is approximately

a. 1 n sec b. 2.2 n sec c. 2.0 n sec d. 1.7 n sec

68. A radar transmits a peak power of 100 KW with pulse width of 1 m sec and a pulse repetition rate of 100 KHz. The average output power of the radar is

a. 100KW b. 10KW c. 1000KW d. 50KW

69. The incremental inductance in a coil is due to

a. Saturation

b. Superimposed DC

c. Mutual inductance

d. Change of frequency

70. Microwave tube based on velocity modulation principle is

a. Klystron

b. Magnetron

c. Light house tube

d. Traveling wave tube

71. Noise output from the receiver decreases uniformly with noise side band frequency for

a. Frequency modulation

b. Amplitude modulation

c. Pulse amplitude modulation

d. None of these

72. In amplitude modulation the maximum permissible modulation index is

a. Unity b. 100 c. infinity d. None of these

73. In frequency modulation the maximum permissible modulation index is

a. Unity b. 50 c. 1000 d. no limit

74. In FM transmission and reception, the pre-emphasis and de-emphasis are used to improve the

a. Signal to noise ratio

b. Frequency response of the receiver

c. Frequency response of the transmitter

d. The sensitivity of the transmitter

75. De-emphasis network uses the combination of

a. R-L b. R-C c. R-L-C d. Transformer

76. The usage of micro sec for defining emphasis is a standard practice but this micro sec definition means

- a. 3 dB point of the network means
- b. mid point of the network response
- c. roll off the network response
- d. the stop band ripple of the network response

77. Delayed AGC is applied

- a. For all signal strength
- b. For signal strength exceeding a specified limit
- c. For low signal strength
- d. For FM receiver

78. Selectivity means

- a. Bandwidth
- b. Gain
- c. Modulation index
- d. None of these

79. Narrow bandwidth broadcast reduces

- a. The quality and noise
- b. Quality alone
- c. Noise alone
- d. Quality and intelligibility

80. Squelch means keeping the receiver

- a. ON in the absence of carrier
- b. OFF in the absence of carrier

c. To remove AGC

d. Increase the AGC

81. Let Z be the series impedance and Y be the shunt admittance of the transmission line, then the characteristic impedance

a. $\tilde{A}-ZY$ b. $\tilde{A}-Y/Z$ c. $\tilde{A}-Z/Y$ d. All the above

82. Noise figure of an amplifier is defined as

a. Input SNR output SNR

b. Input SNR / output SNR

c. Output SNR / input SNR

d. Input SNR / gain

83. A broadcast radio transmitter radiates 10 KW power when modulation is 60%. Its carrier power will be

a. 8.47KW b. 8.92KW c. 8.31KW d. 10.00KW

84. In AM transmission antenna current is 8 Ampere at zero modulation indexes but increased to 8.93 Ampere when modulated on single sine wave. Then the % of modulation is approximately

a. 70.1% b. 80.1% c. 65.1% d. 10.0%

85. In AM transmission antenna current is 8 Ampere at zero modulation index. At 80% modulation index the antenna current will be

a. 10.00A b. 8.72A c. 9.19A d. 9.79A

86. If two sine waves are amplitude modulated with modulation index m_1 and m_2 , the effective modulation index is

a. $\tilde{A}-m_1^2/m_2^2$

b. $\tilde{A}-m_1 m_2$

c. $\tilde{A}-m_1^2+m_2^2$

d. $\tilde{A}-m_2^2/m_1^2$

87. If I_t is transmitted current and I_c is transmitter current at zero modulation index and the transmitted current at modulation index of m will

- a. $I_t = I_c \sqrt{1+m}$
- b. $I_t = I_c \sqrt{1+m^2}$
- c. $I_t = I_c \sqrt{1+m/2}$
- d. $I_t = I_c \sqrt{1+m^2}$

88. If R_r is the radiation resistance and R_d is the lumped resistance, then the antenna efficiency is given as ϵ

- a. $(R_r - R_d) / (R_r + R_d)$
- b. $(R_r + R_d) / (R_r + R_d)$
- c. $R_r / (R_r + R_d)$
- d. $R_d / (R_r + R_d)$

89. In end fire array, the current

- a. Magnitude and phase in each element is the same
- b. Magnitude is the same but phase is different in each element
- c. Magnitude is different but no phase difference in each element
- d. Magnitude and phase are different in each element

90. In a broad side array, the current

- a. Magnitude and phase in each element is the same
- b. Magnitude is the same but phase is different
- c. Magnitude is different but no phase difference in each element
- d. Magnitude and phase are different in each element

91. Beam width of the 2 metre paraboloid reflector at 6 GHz is

- a. 4.5°

b. $9.25\lambda_0$

c. $3.5\lambda_0$

d. $7.75\lambda_0$

92. The cut off wave length for TE m, n mode is in a wave guide of dimension $a \times b$ is

a. $\frac{2}{\sqrt{(\frac{m}{a})^2 + (\frac{n}{b})^2}}$

b. $2\sqrt{(\frac{m}{a})^2 + (\frac{n}{b})^2}$

c. $\frac{\sqrt{(\frac{m}{a})^2 + (\frac{n}{b})^2}}{2}$

d. $\sqrt{(\frac{m}{a})^2 + (\frac{n}{b})^2}$

93. For the standard rectangular waveguide dimension of 4×2 cm the cut off wavelength for TM_{11} mode is approximately

a. 1.788cm b. 3.576cm c. 1.682cm d. 2.546cm

94. In IMPATT diode, the voltage and current are

a. In phase

b. Out of phase by 90°

c. Out of phase by 180°

d. None of these of the above

95. Which of the following statement is true

a. Tunnel diode & IMPATT diode are negative resistance devices

b. Tunnel diode is positive resistance device and the IMPATT diode is negative resistance device

c. Tunnel diode is negative resistance device and the IMPATT diode is positive resistance device

d. None of these of the above

96. In a SSB modulation system with 100% modulation index the power saving will be

- a. $\frac{5}{6}$ of carrier power
- b. $\frac{2}{8}$ of carrier power
- c. $\frac{5}{12}$ of the carrier power
- d. $\frac{1}{2}$ of the carrier power

97. In SSB modulation the modulation index is increased from 0.5 to 1.0, then the power will be increased by

- a. 2 times b. 4 times c. 16 times d. 32 times

98. 900 rpm is equal to

- a. 94.2 rad/sec
- b. 47.1 rad/sec
- c. 188.4 rad/sec
- d. 16.72 rad/sec

99. Darlington pair is used to

- a. Increase the voltage gain
- b. Increase the current gain
- c. Decrease voltage gain
- d. Decrease current gain

100. The transfer function of the system shown is

- a. $\frac{G(s)}{1 + H(s)}$
- b. $\frac{G(s) H(s)}{1 + G(s) H(s)}$
- c. $\frac{G(s)}{1 + G(s) H(s)}$ d. $\frac{G(s)}{G(s) H(s)}$