60614

ROLL No. | | | | | |

TEST BOOKLET No. 266

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. Space for rough work is provided 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 any 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.

SEAL

60614

ELECTRONIC SCIENCE

1. The unit of carrier mobility in a semiconductor is

   (A) $cm/v-s$ (B) $cm^2/v-s$
   (C) cm^2/v (D) cm^2/s

2. As the temperature is increased, the voltage across a diode carrying a constant current

   (A) increases
   (B) decreases
   (C) remains constant
   (D) may increase or decrease depending upon the doping levels

3. The RMS value of a half wave rectified symmetrical square wave of 1A is

   (A) $\frac{1}{\sqrt{2}}$A (B) 1A
   (C) $\sqrt{2}$A (D) 2A

4. If α of a BJT = 0.995 and $I_{CO} = 0.5\ mA$, then I_{CEO} will be

   (A) $100\mu A$ (B) $25\mu A$
   (C) $10.1\mu A$ (D) $10.5\mu A$

5. The early effect in a BJT is caused by

   (A) fast turn on
   (B) fast turn off
   (C) large collector base reverse bias
   (D) large emitter base forward bias

6. A switched mode power supply operating over 20 kHZ to 100 kHZ range uses as the main switching element

(A) SCR
(B) UJT
(C) triac
(D) MOSFET

7. The cardinal advantage of a bridge rectifier over a full wave rectifier using a centre-tapped transformer is

(A) lower peak inverse requirement
(B) lower ripple factor
(C) higher efficiency
(D) that larger current can be delivered

8. The breakdown voltage of a BJT with its base open is BV_{CEO} and that with emitter open is BV_{CBO}. Then

(A) $BV_{CEO} < BV_{CBO}$
(B) $BV_{CEO} = BV_{CBO}$
(C) $BV_{CEO} > BV_{CBO}$
(D) the voltage BV_{CEO} and BV_{CBO} are unrelated

9. The UJT is a

(A) voltage controlled device
(B) current controlled device
(C) relaxation oscillator
(D) BJT

10. The lowest output impedance is obtained in case of

(A) CB configuration only
(B) CE configuration only
(C) both CB and CE configurations
(D) CC configuration

11. Tunnel diodes are fabricated from

(A) silicon only
(B) germanium only
(C) either silicon or germanium
(D) either germanium or gallium arsenide

12. N channel FETs are superior to P channel FETs because

(A) they have a higher input impedance
(B) they have larger switching time
(C) mobility of electrons is greater than that of holes
(D) they consume less power

13. DIAC is a solid state device which works as a

(A) 2 terminal unilateral switch
(B) 2 terminal bidirectional switch
(C) 3 terminal bidirectional switch
(D) 4 terminal bidirectional switch

14. A transistor is said to be in the quiescent state when

(A) no signal is applied at the input
(B) it is unbiased
(C) no currents are flowing
(D) emitter junction bias is equal to the collector junction bias

15. In the CE configuration the input and output signals are

(A) always equal
(B) in phase
(C) out of phase
(D) always negative

16. When the positive voltage on the gate of a P channel JFET is increased, the drain current

(A) remains the same
(B) increases
(C) decreases
(D) fluctuates erratically

17. If the collector and emitter terminals of a BJT are interchanged, the β of the inverted mode will be

(A) equal to β of normal mode
(B) greater than β of normal mode
(C) less than β of normal mode
(D) zero

18. A transformer cannot be called an amplifier because it cannot give

(A) current gain
(B) voltage gain
(C) gain at high frequencies
(D) power gain

19. Solar cell is an example of

(A) photoconductive device
(B) photoemissive device
(C) both photoconductive device and photoemissive device
(D) photovoltaic device

20. In a FET, the drain voltage above which there is no increase in drain current is called

(A) critical voltage
(B) pinchoff voltage
(C) breakdown voltage
(D) pick up voltage

21. In a JFET source follower, $\mu = 200$, $r_d = 20k\Omega$ and source load resistance $R_L = 1k\Omega$. The output resistance of the source follower is approximately

(A) 333Ω
(B) 500Ω
(C) 600Ω
(D) $1k\Omega$

22. In a full wave rectifier using a centre tapped transformer RMS value of secondary voltage = 560V and load = $2k\Omega$. The RMS voltage across each diode is

(A) 280V
(B) 201.3V
(C) 395.3V
(D) 790.7V

23. When two identical stages with upper cut off of ω_H are cascaded, the overall 3 dB point is at

(A) ω_H
(B) $0.5\,\omega_H$
(C) $2\,\omega_H$
(D) $0.64\,\omega_H$

24. Which one of the following can be achieved by using the reset terminals in a tuner chip?

(A) Keyed oscillations
(B) Delayed monostable action
(C) Square wave generation
(D) Pulse generation

25. A two stage amplifier with negative feedback has an overshoot when the damping factor is

(A) zero
(B) less than unity
(C) negative
(D) greater than unity

26. Which one of the following relations for a transistor is correct?

(A) $h_{ie} = \dfrac{1+h_{fb}}{h_{ib}}$
(B) $h_{ie} = \dfrac{h_{ib}}{1+h_{fb}}$
(C) $h_{ie} = \dfrac{1-h_{fb}}{h_{ib}}$
(D) $h_{ie} = \dfrac{h_{ib}}{1-h_{fb}}$

27. In a class C amplifier the output current is zero for

(A) half cycle
(B) full cycle
(C) less than half cycle
(D) more than half cycle

28. A class B push pull amplifier suffers from

(A) crossover distortion
(B) excessive harmonic distortion
(C) intermodulation distortion
(D) None of the above

29. An oscillator of the LC type that has a split capacitor in the tank circuit is

(A) Hartely oscillator
(B) Colpitts oscillator
(C) Wein bridge oscillator
(D) Pierce oscillator

30. Clamper circuits are also known as

(A) AC restorer
(B) DC restorer
(C) voltage to frequency converter
(D) frequency to voltage converter

31. Frequency multiplication can be obtained by using

(A) Class A amplifiers
(B) Class B amplifiers
(C) Class C amplifiers
(D) Class AB amplifiers

32. The feedback network of a phase shift oscillator usually consists of

(A) RC circuit
(B) RL circuit
(C) LC circuit
(D) None of the above

33. CB amplifier is most suitable for use in

(A) very high frequency circuits
(B) low frequency circuits
(C) medium frequency circuits
(D) low current circuits

34. A loudspeaker is operated by

(A) audio voltage amplifier
(B) audio current amplifier
(C) audio power amplifier
(D) None of the above

35. Which of the following amplifiers has largest bandwidth?

(A) RC coupled amplifier
(B) Difference amplifier
(C) Transformer coupled amplifier
(D) Direct coupled amplifier

36. The potential difference between two points, neither of which is grounded, is to be amplified. We will use

(A) RC coupled amplifier
(B) audio power amplifier
(C) difference amplifier
(D) transformer coupled amplifier

37. The upper cut-off frequency of an RC coupled amplifier mainly depends on

(A) coupling capacitor
(B) cathode bypass capacitor
(C) output capacitance of the signal source
(D) interelectrode capacitance and stray capacitance

38. When the emitter resistance is bypassed by a capacitor in an amplifier

(A) voltage gain is reduced
(B) voltage gain is increased
(C) thermal runaway is caused
(D) the Q-point is stabilised

39. To amplify a RF signal containing 870 kHZ, 875 kHZ and 880 kHZ, we use

(A) audio frequency amplifier
(B) wide band amplifier
(C) tuned voltage amplifier
(D) push-pull amplifier

40. The frequency response characteristic of a voltage amplifier has a slope of –10dB/decade in the high frequency region. This is equivalent to

(A) –3dB/octave
(B) –1.5dB/octave
(C) –6dB/octave
(D) –5dB/octave

41. The term "free running" is usually associated with

(A) bistable multivibrator
(B) astable multivibrator
(C) monostable multivibrator
(D) Any of the above

42. When a PNP transistor is saturated

(A) base, emitter and collector are at the same potential
(B) emitter is at a higher potential than base and collector
(C) collector is at a higher potential than base and emitter
(D) base is at a higher potential than emitter and collector

43. Crossover distortion is eliminated in a push-pull amplifier by

(A) using a transformer with a large step down ratio
(B) using a transformer with a large step up ratio
(C) providing a small forward bias to the transistors
(D) supplying both transistors with in phase signals

44. In a single stage RC coupled amplifier, the phase of the output with respect to the input at very low and at very high frequencies approaches respectively

(A) 135° and 225°
(B) 90° and 270°
(C) 270° and 90°
(D) 90° and 180°

45. For which of the following configurations, does the input impedance of the amplifier depend strongly on the load resistance?

(A) CE
(B) CC
(C) CB
(D) CE and CB

46. In a RC coupled amplifier, the rate of change of voltage gain in the high frequency range is

(A) –3dB/octave
(B) –10dB/octave
(C) –16dB/octave
(D) None of the above

47. The input to a push-pull amplifier contains components of 150 Hz, 300Hz, 450 Hz and 600 Hz. The output will contain

(A) only 150 Hz
(B) only 150 Hz and 450 Hz
(C) only 300 Hz and 600 Hz
(D) All the four components

48. An important advantage of the RC coupling scheme is

(A) economy.
(B) good frequency response
(C) high efficiency
(D) good impedance matching

49. A Zener diode is primarly used for

(A) rectification
(B) producing constant current
(C) producing constant voltage
(D) detection of audio signals in radio waves

50. The low frequency cut-off in an amplifier is due to

(A) only coupling capacitors
(B) only bypass capacitors
(C) both coupling and bypass capacitors
(D) the internal transistor junction capacitances

51. The Boolean expression $\overline{x}\ \overline{y}\ z + yz + xz$ after minimisation becomes

(A) x
(B) y
(C) z
(D) $x + y + z$

52. The Hamming code 1101101 has been received. Fault has occurred at

(A) second portion
(B) third portion
(C) fourth portion
(D) fifth portion

53. Extremely low power dissipation and low cost per gate can be achieved in

(A) MOS ICs
(B) CMOS ICs
(C) TTL ICs
(D) ECL ICs

54. Which of the following digital IC families gives the maximum fan-out?

(A) ECL
(B) PMOS
(C) HTL
(D) CMOS

55. An example of a universal logic gate is

(A) AND
(B) OR
(C) NOT
(D) NOR

56. A positive logic AND gate is the same as a negative logic .....

(A) OR gate
(B) AND gate
(C) NAND gate
(D) NOR gate

57. An example of a weighted self-complementing code is

(A) 8421 code
(B) 7421 code
(C) $84\bar{2}\bar{1}$ code
(D) Gray code

58. An example of a binary number which is equal to its 2's complement is

(A) 0000
(B) 1000
(C) 0001
(D) 1111

59. The octal equivalent of decimal 0.3125 is

(A) 0.16
(B) 0.26
(C) 0.24
(D) 0.124

60. An example of a 16 bit μp is

(A) Zi log 80
(B) 8085
(C) Motorola 6800
(D) 8086

61. Which one of the following A/D converters utilises a logic programmer?

(A) Dual slope A/D converter
(B) Continuous balance type A/D converter
(C) Successive approximation A/D converter
(D) Stair case ramp type A/D converter

62. The ASCII code is

(A) an error detecting code
(B) a self correcting code
(C) an alphanumeric code
(D) a weighted code

63. Module – 2 addition is represented by

(A) $\overline{x}\ y + x\overline{y}$
(B) $xy + \overline{x}\,\overline{y}$
(C) $x + \overline{x}\ y$
(D) $xy + \overline{x}\ z + yz$

64. Which one of the following is correct?

(A) $\overline{x}\,\overline{y}\,z + yz + xz = \overline{y}\,z + xz$
(B) $\overline{x}\ yz + yz + xz = xy + \overline{x}\,z$
(C) $xy + \overline{x}\,z = xy + \overline{x}\,z + yz$
(D) $x + \overline{x}\,y = xy$

65. SN 7410 IC is a

(A) quad 2 input NAND gate
(B) triple 3 input NAND gates
(C) dual m/s JK flip-flops
(D) multiplexer

66. The primary data pointers of 8085 are

(A) registers B and C
(B) registers D and E
(C) registers H and L
(D) registers B and D

67. The value of the most significant bit of the result following the execution of an instruction by 8085 is stored in

(A) carry status flag
(B) auxiliary carry status flag
(C) sign status flag
(D) zero status flag

68. The 8080 μp has an instruction set of 91 instructions. The op-code needed should be at least

(A) 6 bits long
(B) 7 bytes long
(C) 7 bits long
(D) 8 bits long

69. Which memory does a microprogrammed computer have in its control memory unit?

(A) Semiconductor ROM
(B) Semiconductor RAM
(C) Magnetic RAM
(D) None of the above

70. The photomasking process during fabrication of ICs

(A) controls the depth of diffusion of impurities
(B) forms an insulating layer that prevents diffusion in selected areas
(C) is used to remove selected areas of SIO_2
(D) is used for removal of photoresist

71. The basic RS flip-flop is a

(A) bistable multivibrator
(B) monostable multivibrator
(C) astable multivibrator
(D) free running multivibrator

72. In a positive logic system a logic 1 represents

(A) zero voltage
(B) –1 volts
(C) more negative of the two voltage levels
(D) more positive of the two voltage levels

73. The input impedance of an OP-AMP is

(A) zero (B) small
(C) very high but not infinite (D) infinite

74. The equivalent decimal number for Gray code 1011 is

(A) 14 (B) 13
(C) 41 (D) 31

75. The output of an OP-AMP is

(A) 90° out of phase with the input
(B) -90° out of phase with the input
(C) 45° out of phase with the input
(D) 180° out of phase from the input

76. If the gain of a chopper amplifier is 1000 and the OP-AMP gain is 50,000, then the DC gain of the chopper stabilised OP-AMP will be

(A) 50,000 (B) 1000
(C) 50 (D) 50×10^{6}

77. Which of the following memories has got equal access time for all locations of the memory unit?

(A) ROM (B) PROM
(C) RAM (D) ERAM

78. A source programme is translated into machine language by

(A) programmer
(B) operator
(C) compiler
(D) card reader

79. MSI circuit usually contains

(A) less than 10 gates
(B) 10 to 100 gates
(C) more than 100 gates
(D) 1000 gates

80. LSI circuits usually contain

(A) less than 10 gates
(B) 10 to 100 gates
(C) more than 100 gates
(D) more than 1000 gates

81. For building a decode counter, the minimum number of flip-flops is

(A) 4
(B) 5
(C) 6
(D) 10

82. The characteristic equation of a T flip-flop is

(A) $Q_{N+1} = \overline{T}Q_N + T\overline{Q}_N$
(B) $Q_{N+1} = TQ_N$
(C) $Q_{N+1} = \overline{T}Q_N$
(D) $Q_{N+1} = \overline{TQ}_N$

83. Every processor must necessarily have a

(A) data bus
(B) data bus and address bus
(C) control bus
(D) data bus, control bus and an address bus

84. How much of memory a μp with a 12 bit address bus be able to access?

(A) 1 KB
(B) 4 KB
(C) 8 KB
(D) 0.4 KB

85. Which of the following flag conditions are not available in 8085?

(A) Zero flag
(B) Parity flag
(C) Overflow flag
(D) Auxiliary carry flag

86. The frequency of the driving network connected between pins 1 and 2 of a 8085 must be

(A) twice the desired clock frequency
(B) equal to the desired clock frequency
(C) four times the desired clock frequency
(D) half of the desired clock frequency

87. A high on RESET OUT line signifies that

(A) all of the registers of the CPU are being reset
(B) all the registers and counters are being reset
(C) all the registers and counters are being reset and in addition this signal can be used to reset the external support chips
(D) processing can begin when this signal goes high

88. The 8085 instruction MOV r_1, r_2 uses the following mode of addressing

(A) register direct
(B) immediate
(C) implied
(D) relative

89. READY signal in 8085 is useful when the CPU communicates with

(A) a slow peripheral chip
(B) a fast peripheral chip
(C) an OMA controller chip
(D) a PPI chip

90. Which of the following tasks is not performed by an assembler?

(A) Providing a storage allocation
(B) Creating a table of labels etc.
(C) Doing assembly time arithmetic
(D) Translate a programme written in high level language to machine code programme

91. Which of the following instructions copies a byte of data into the accumulator from the memory address given in the instruction?

(A) LDA address
(B) LDA×B
(C) LHLD address
(D) STA address

92. A DAD H instruction is same as

(A) shifting each bit one position to the left
(B) shifting each bit one position to the right
(C) shifting each bit one position to the left with a zero inserted in LSB position
(D) shifting each bit one position to the right with a zero inserted in MSB position

93. In an ORA r instruction

(A) zero flag is set
(B) auxiliary carry flag is set
(C) carry flag is set
(D) None of the flags are affected

94. Return from a subroutine is affected by

(A) a jump instruction
(B) an RST instruction
(C) a RET instruction
(D) a hardware interrupt signal

95. PSW stands for

(A) accumulator contents
(B) flag byte
(C) accumulator and the flag byte
(D) accumulator and temporary register byte

96. Which of the following control signal does not belong to printer interface?

(A) DAV
(B) DACC
(C) NEW LINE ACK
(D) TRACK OO

97. Which of the following methods, used in formatting a floppy disk, is not IBM compatible?

(A) Single density single side
(B) Double density single side
(C) Single density double side
(D) All of the above

98. A USART chip provides

(A) half duplex operation
(B) full duplex operation
(C) diplex operation
(D) full duplex operation, but cannot work in asynchronous mode

99. The calibration signal available from a CRO is of

(A) square waveshape
(B) sawtooth waveshape
(C) sinusoidal waveshape
(D) Any of the above

100. The input impedance of an oscilloscope must be

(A) low
(B) high
(C) inductive
(D) capacitive

101. To double the current range of a $50\mu A$, 2000Ω meter movement, the shunt resistance required is

(A) 40Ω
(B) 50Ω
(C) 2000Ω
(D) 25Ω

102. The purpose of the INT/EXT switch in a CRO is to

(A) select the input to SYNC control
(B) provide an internal signal to the vertical input
(C) select inputs to the horizontal terminals
(D) None of the above

103. Two sinusoids of peak amplitude ratio 1:2 differing in phase by 90° give a Lissajo's pattern as

(A) straight line in first and third quadrants
(B) straight line in second and fourth quadrants
(C) ellipse
(D) circle

104. A transformer with a 20:1 voltage step down ratio has 6V across 0.6Ω in the secondary. I_s and I_p are given by

(A) 10A, 5A
(B) 5A, 10A
(C) 10A, 0.5A
(D) 1A, 0.5A

105. A voltmeter utilises a $20\mu A$ meter movement. The sensitivity of the voltmeter is

(A) 1000Ω/V
(B) 20000Ω/V
(C) 50kΩ/V
(D) 10 micro ohms per volt

106. The scale used for moving coil meter is

(A) a nonlinear scale
(B) a linear scale
(C) a square scale
(D) a log scale

107. Maximum input frequency = f and chopping frequency = F. In a chopper amplifier

(A) $F > 10f$
(B) $F < 0.1f$
(C) $F = 2f$
(D) $F = 0.5f$

108. Damping ratio = δ and rise time = t_r. If the bandwidth of a system is increased

(A) both δ and t_r increase
(B) δ decreases but t_r increases
(C) δ increases but t_r decreases
(D) both δ and t_r decrease

109. An amplitude detector detects

(A) the peak value of the modulation signal
(B) the envelope of the modulating signal
(C) the peak value of the carrier signal
(D) the average value of the carrier signal

110. Microwave links are generally preferred to co-axial cable for TV transmission because

(A) they have less overall phase distortion
(B) they are cheaper
(C) of their greater bandwidth
(D) of their relative immunity to impulse noise

111. In amplitude modulation, the magnitude of the sidebands is $(m_a = \text{modulation index})$

(A) m_a times the carrier amplitude
(B) $2m_a$ times the carrier amplitude
(C) $m_a / 2$ times the carrier amplitude
(D) $m_a / 4$ times the carrier amplitude

112. Sinusoidal carrier voltage of frequency 1 MHz is amplitude modulated by a band of frequencies from DC to 5 kHZ. The frequency of the upper sideband and lower sideband will be

(A) 1005 kHZ and 1000 kHZ
(B) 1010 kHZ and 990 kHZ
(C) 1005 kHZ and 995 kHZ
(D) 1500 kHZ and 995 kHZ

113. The RMS value of the antenna current is 5A before modulation and it increases to 5.8A after amplitude modulation. The percentage of modulation index is

(A) 88%
(B) 80%
(C) 83.14%
(D) 81.21%

114. In FM demodulation, Foster-Seely discriminator uses a

(A) single tuned circuit
(B) double tuned circuit in which primary and secondary are tuned to different frequencies
(C) double tuned circuit in which primary and secondary are tuned to the same frequency
(D) combination of two transistors in push-pull operation

115. Polarised relays

(A) can distinguish between the two directions of current flow through their coil windings
(B) cannot distinguish between the two directions of current flow through their coil windings
(C) cannot operate at high speed
(D) can be used as smallest element of signaling code

116. Simplex circuit is one in which

(A) two messages are transmitted by one station and received by the other simultaneously over the same line
(B) only one message is sent at a time over a line
(C) one character of a word is transmitted independently of another
(D) two messages are sent in opposite directions simultaneously over the same line

117. The channel capacity of a band limited Gaussian channel is given by

(A) $C = B \log_2\left(2 + \frac{S}{N}\right)$ (B) $C = B \log_2(1 + S/N)$

(C) $C = B \log_{10}(1 + S/N)$ (D) $C = B \log_e(1 + S/N)$

118. If x and y are independent Gaussian random variables each with average value zero and with same variance, their joint probability density function is given by

(A) $p(x,y)=p(x+y)$ (B) $p(x,y)=p(x)p(y)$
(C) $p(x,y)=p(x)+p(y)$ (D) $p(x,y)=p(x)+p(x)p(y)$

119. In a random ergodic communication process

(A) ensemble and time averages are different
(B) ensemble and time averages are same
(C) ensemble and time averages are opposite to each other
(D) None of the above

120. Fidelity in a communication receiver is provided by

(A) audio stage
(B) mixer stage
(C) detector stage
(D) combination of audio and detector stages

121. EM waves are refracted when they

(A) pass into a medium of different dielectric constant
(B) are polarised at right angles to the direction of propagation
(C) encounter a perfectly conducting medium
(D) pass through a small slot in a conducting medium

122. Tropospheric scalter is used for communication in the frequency range of

(A) HF (B) VHF
(C) UHF (D) VLF

123. Line of sight transmission is a characteristic of propagation for

(A) VHF only
(B) VHF and UHF
(C) low radio frequencies below 1MHz
(D) AM picture signal but not FM sound signal

124. When a line of any odd multiple of a quarter wavelength is short circuited, it represents

(A) infinite impedance
(B) zero impedance
(C) unity impedance
(D) characteristic impedance Zo

125. Ungrounded antenna near the ground

(A) acts as an antenna array
(B) acts as a single antenna of twice the height
(C) must be vertically polarised
(D) must be horizontally polarised

126. For matching purposes, tapers are preferred to transformers because of

(A) ease of fabrication
(B) low cost
(C) durability
(D) low loss

127. A crystal which has a sensitivity of –55 dBm with a 1 MHz BW amplifier, will have a sensitivity with 4 MHz BW amplifier equal to

(A) –55 dBm
(B) –52 dBm
(C) +58 dBm
(D) 52 dBm

128. A helical antenna is used for satellite because of its

(A) circular polarisation
(B) broad bandwidth
(C) good front to back ratio
(D) None of the above

129. In a TV transmission system

(A) the picture is AM and sound is FM
(B) the picture is FM and sound is AM
(C) both the picture and the sound are AM
(D) both the picture and the sound are FM

130. Delhi TV is transmitting on channel 4. For this channel, the carrier frequency for the picture is

(A) 60 MHz
(B) 62.25 MHz
(C) 67.7 MHz
(D) 68.5 MHz

131. When an EM wave is propagated in a waveguide

(A) they travel along the broader walls of the guide
(B) they are reflected from the walls but do not travel along them
(C) they travel through the dielectric without touching the wall
(D) None of the above

132. The wavelength of an EM wave in waveguide

(A) is directly proportional to phase velocity
(B) is inversely proportional to phase velocity
(C) is greater than that in free space
(D) depends only on the waveguide dimensions and the free space wavelength

133. In an AM wave, $V_{max} = 10V$ and $V_{min} = 5V$. The percentage of modulation is

(A) 2
(B) 33.3
(C) 50
(D) 100

134. For attenuation to be minimum in a transmission line at audio frequencies, the condition is

(A) LG = RC
(B) LC = GR
(C) LR = R
(D) LR = G

135. VSWR on a transmission line is always

(A) less than 1
(B) less than or equal to 1
(C) equal to zero
(D) greater than 1 or equal to 1

136. If bandwidth of an amplifier is reduced, thermal noise in the amplifier will

(A) increase
(B) decrease
(C) not be affected
(D) become random in nature

137. The signal to noise ratio at the input of an amplifier can be improved

(A) by decreasing the source impedance
(B) by increasing the source impedance
(C) by matching the source impedance with the input impedance of the amplifier
(D) None of the above

138. The colour of light emitted by an LED depends on

(A) forward bias
(B) reverse bias
(C) forward current
(D) type of semiconductor material used.

139. Bulk type photoconductive cells have

(A) wide spectral response
(B) small response time
(C) high cost
(D) high dark to light resistance ratio

140. A PN junction photodiode is

(A) operated in forward direction
(B) encased in an opaque package
(C) a very fast photodetector
(D) dependent on thermally generated minority carriers

141. Silicon is invariably used in the manufacture of junction photodiodes because

(A) more electron hole pairs are generated
(B) thermally generated minority current is extremely small
(C) Silicon is more rigged than Ge
(D) it needs less reverse bias

142. A PIN photodiode has ultrafast response primarily due to

(A) the presence of the middle I layer
(B) heavy doping of P and N regions
(C) higher electrical conductivity of silicon
(D) its wide spectral response

143. The superposition theorem is essentially based on the concept of

(A) duality
(B) linearity
(C) reciprocity
(D) non-linearity

144. Thevenin resistance is found

(A) between any two open terminals
(B) by short-circuiting the given two terminals
(C) by removing voltage sources along with their internal resistances
(D) between same open terminals as for V_{th}

145. Norton's equivalent of a circuit consists of a

(A) constant current source with a conductance in parallel
(B) constant current source in series with an infinite resistance
(C) constant voltage source in parallel with a high resistance
(D) single current source and a single voltage source

146. Two identical 3A, 4Ω Norton equivalent circuits are connected in parallel with like polarity to like. The combined Norton equivalent circuit is

(A) 6A, 4Ω (B) 6A, 2Ω
(C) 3A, 2Ω (D) 6A, 8Ω

147. A step recovery diode

(A) has an extremely short recovery time
(B) conducts equally well in both directions
(C) is mainly used as a harmonic generator
(D) is an ideal rectifier of high frequency signals

148. A PIN diode is frequently used as a

(A) peak clipper
(B) voltage regulator
(C) harmonic generator
(D) switching diode for frequencies upto GHz range

149. Intermodal dispersion results from the fact that the light waves propagate through an optical fiber

(A) in different modes (B) along different routes
(C) as a group of frequencies (D) with same velocity

150. An all plastic optical fiber is strong mechanically as compared to an all glass fiber but has

(A) higher losses
(B) lower bandwidth
(C) lower tensile strength
(D) higher losses and lower bandwidth

***

SPACE FOR ROUGH WORK

SPACE FOR ROUGH WORK

SPACE FOR ROUGH WORK

SPACE FOR ROUGH WORK

SEAL