Roll No. | | | | | | | | |

(Write Roll Number from left side exactly as in the Admit Card)

Signature of Invigilator

Question Booklet Series **X**

PAPER–II

Question Booklet No.
(Identical with OMR Answer Sheet Number)

Subject Code : 21

ELECTRONIC SCIENCE

Time : 2 Hours *Maximum Marks: 200*

Instructions for the Candidates

1. Write your Roll Number in the space provided on the top of this page as well as on the OMR Sheet provided.
2. At the commencement of the examination, the question booklet will be given to you. In the first 5 minutes, you are requested to open the booklet and verify it:
   (i) To have access to the Question Booklet, tear off the paper seal on the edge of this cover page.
   (ii) Faulty booklet, if detected, should be got replaced immediately by a correct booklet from the invigilator within the period of 5 (five) minutes. Afterwards, neither the Question Booklet will be replaced nor any extra time will be given.
   (iii) Verify whether the Question Booklet No. is identical with OMR Answer Sheet No.; if not, the full set is to be replaced.
   (iv) After this verification is over, the Question Booklet Series and Question Booklet Number should be entered on the OMR Sheet.
3. This paper consists of One hundred (100) multiple-choice type questions. All the questions are compulsory. Each question carries *two* marks.
4. Each Question has four alternative responses marked: (A) (B) (C) (D) . You have to darken the circle as indicated below on the correct response against each question.

   Example: (A) (B) ● (D), where (C) is the correct response.
5. Your responses to the questions are to be indicated correctly in the OMR Sheet. If you mark your response at any place other than in the circle in the OMR Sheet, it will not be evaluated.
6. Rough work is to be done at the end of this booklet.
7. If you write your Name, Phone Number or put any mark on any part of the OMR Sheet, except in the space allotted for the relevant entries, which may disclose your identity, or use abusive language or employ any other unfair means, such as change of response by scratching or using white fluid, you will render yourself liable to disqualification.
8. Do not tamper or fold the OMR Sheet in any way. If you do so, your OMR Sheet will not be evaluated.
9. You have to return the Original OMR Sheet to the invigilator at the end of the examination compulsorily and must not carry it with you outside the Examination Hall. You are, however, allowed to carry question booklet and duplicate copy of OMR Sheet after completion of examination.
10. **Use only Black Ball point pen.**
11. **Use of any calculator, mobile phone, electronic devices/gadgets etc. is strictly prohibited.**
12. **There is no negative marks for incorrect answer.**

PAPER II

(ELECTRONIC SCIENCE)

1. According to Einstein relation, for any semiconductor the ratio of diffusion constant to mobility of carriers

(A) depends upon the temperature of the semiconductor.

(B) depends upon the type of the semiconductor.

(C) varies with the lifetime of the semiconductor.

(D) is a universal constant.

2. A zener diode works on the principle of

(A) tunneling of charge carriers across the junction.

(B) thermionic emission.

(C) diffusion of charge carriers across the junction.

(D) hopping of charge carriers across the junction.

3. A particular green LED emits light of wavelength 5490Å. The energy bandgap of the semiconductor material used there is (Plank's constant = $6{\cdot}626 \times 10^{-34}$ J–S)

(A) 2·26 eV

(B) 1·98 eV

(C) 1·17 eV

(D) 0·74 eV

4. The threshold voltage of an n-channel MOSFET can be increased by

(A) increasing the channel dopant concentration.

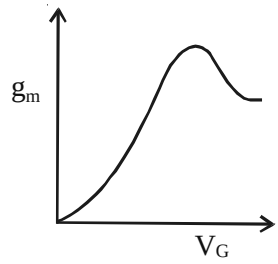
(B) reducing the channel dopant concentration.

(C) reducing the gate oxide thickness.

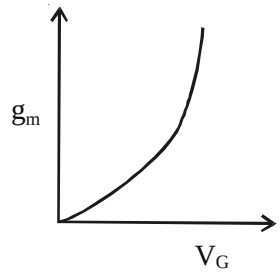
(D) reducing the channel length.

5. The measured trans-conductance g_m of an NMOS transistor operating in the linear region is plotted against the gate voltage V_G at a constant drain voltage V_D. Which of the following figures represents the expected dependence of g_m on V_G?

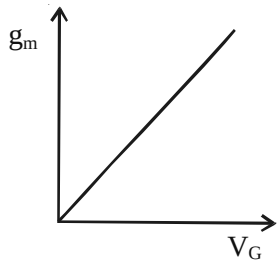
(A)



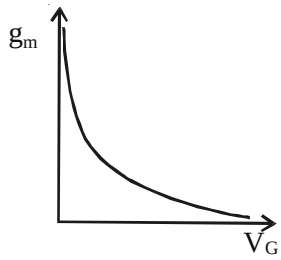
(B)



(C)



(D)



6. MOSFET can be used as a

(A) current controlled capacitor.

(B) voltage controlled capacitor.

(C) current controlled inductor.

(D) voltage controlled inductor.

7. If 'f_r' be resonant frequency and Δf is the difference between two half power frequencies then Q of the unloaded resistor is

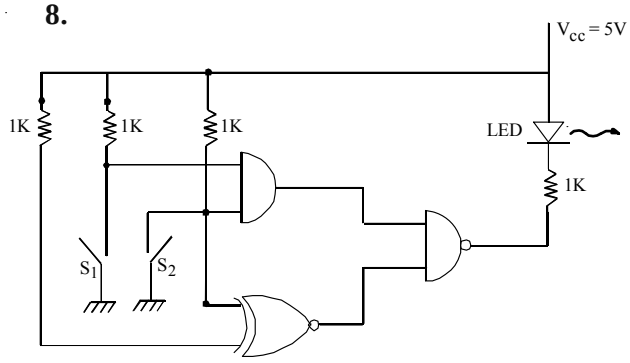
(A) $Q = \Delta f / f_r$

(B) $Q = \Delta f \times f_r$

(C) $Q = f_r / \Delta f$

(D) $Q = 2\pi f_r / \Delta f$

8.



The LED

(A) emits light when both S_1 and S_2 are closed.

(B) emits light when both S_1 and S_2 are open.

(C) emits light when either S_1 or S_2 is closed.

(D) does not emit light; irrespective of the switch position.

9. The diffusion length of carriers depends on

(A) the shape of the semiconductor.

(B) the lifetime of the carrier alone.

(C) the mobility and the lifetime of the carrier.

(D) the mobility of the carrier alone.

10. The reverse saturation current in a p–n junction diode operated below the breakdown voltage

(A) depends upon the magnitude of the reverse bias.

(B) increases with the increase in device temperature.

(C) decreases with the increase in device temperature.

(D) independent of the nature of the semiconductor used in the fabrication of the diode.

11. A tunnel diode

(A) shows a differential negative resistance under proper forward bias.

(B) shows a differential negative resistance under reverse bias.

(C) is a very high power microwave source.

(D) is a four terminal device.

12. Which method of thickness measurement follows optical principle?

(A) Ellipsometer

(B) Screw gauge technique

(C) Ultrasonic thickness meter

(D) Profilometer

13. Which etching technique does not include physical etching process?

(A) Plasma etching

(B) Reactive ion etching

(C) Wet etching

(D) Sputter etching

14. Which lithorgraphy process has higher resolution?

(A) Photolithography

(B) e-beam lithography

(C) ion beam lithography

(D) X-ray lithography

15. Which compounds are formed in etching of SiO_2 using dry etching process with CF_4 gas?

(A) SiF_4, CO_2

(B) O_2, Si

(C) F_2, O_2

(D) Si, F_2

16. In 8086 microprocessor, one of the following statements is not true:

(A) Coprocessor is interfaced in max mode.

(B) Coprocessor is interfaced in min mode.

(C) I/O can be interfaced in max/min mode.

(D) Supports pipelining.

17. If $X(n) = X_R(n) + jX_i(n)$ is a complex sequence whose Fourier transform is given as $X(\omega) = X_R(\omega) + jX_i(\omega)$, then what is the value of $X_R(\omega)$?

(A) $\sum_{n=0}^{\infty} \left(X_R(n)\text{Cos}\omega n - X_i(n)\text{Sin}\omega n\right)$

(B) $\sum_{n=0}^{\infty} \left(X_R(n)\text{Cos}\omega n + X_i(n)\text{Sin}\omega n\right)$

(C) $\sum_{n=-\infty}^{\infty} \left(X_R(n)\text{Cos}\omega n + X_i(n)\text{Sin}\omega n\right)$

(D) $\sum_{n=-\infty}^{\infty} \left(X_R(n)\text{Cos}\omega n - X_i(n)\text{Sin}\omega n\right)$

18. Laplace transform of $u(t)\sin(at)$ —

(A) $S/a^2 + S^2$

(B) $a/a^2 + S^2$

(C) $S^2/a^2 + S^2$

(D) $a^2(a^2 + S^2)$

19. The Fourier series expansion of a periodic function with half-wave symmetry contains only

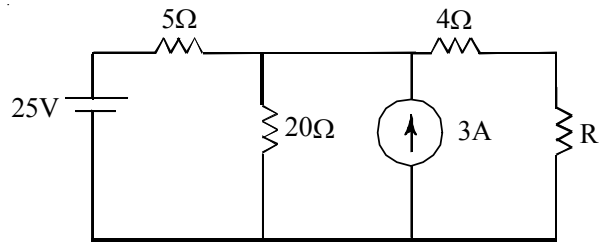
(A) Sine terms

(B) Cosine terms

(C) Odd harmonics

(D) Even harmonics

20. The value of R required for maximum power transfer in the network shown below is



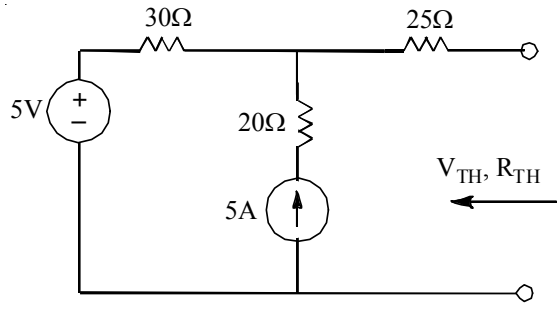
(A) 2Ω

(B) 4Ω

(C) 8Ω

(D) 16Ω

21. Thevenin equivalent voltage V_{TH} and resistance R_{TH} of the following circuit are



(A) –100V, 75Ω

(B) 155V, 55Ω

(C) 155V, 37Ω

(D) 145V, 75Ω

22. A 2-port resistive network satisfies the condition $A = D = \frac{3}{2}B = \frac{4}{3}C$. The Z_{11} of the network is

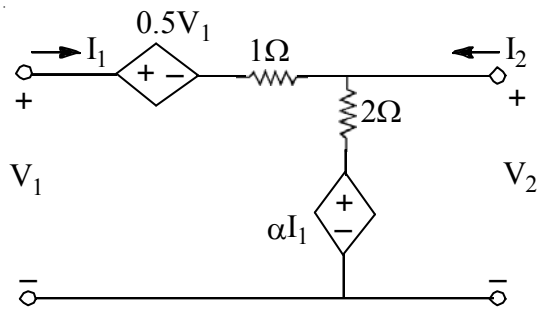
(A) $\frac{4}{3}$

(B) $\frac{3}{4}$

(C) $\frac{2}{3}$

(D) $\frac{3}{2}$

23. The circuit shown in the figure below is reciprocal if α is



(A) 2
(B) –2
(C) 1
(D) –1

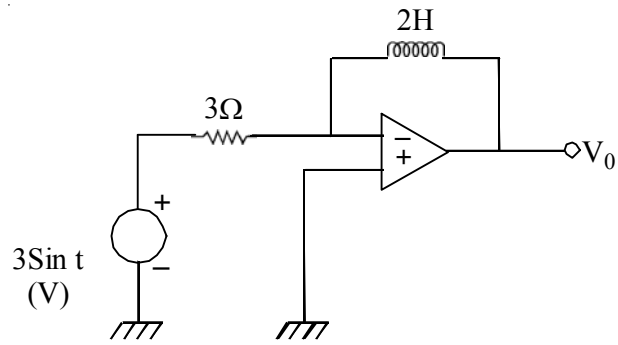
24. Which of the following statements is not correct?

(A) Multivibrators are non-sinusoidal oscillators.
(B) Multivibrators can be classified as astable, monostable and bistable.
(C) Multivibrators are purely sinusoidal oscillators.
(D) Astable multivibrators have no stable state.

25. A capacitively coupled amplifier has a midband gain of 100 and upper 3-dB frequency is 10kHz. Midband gain is reduced to 10 by applying negative feedback. The upper half power frequency with feedback in kHz will be

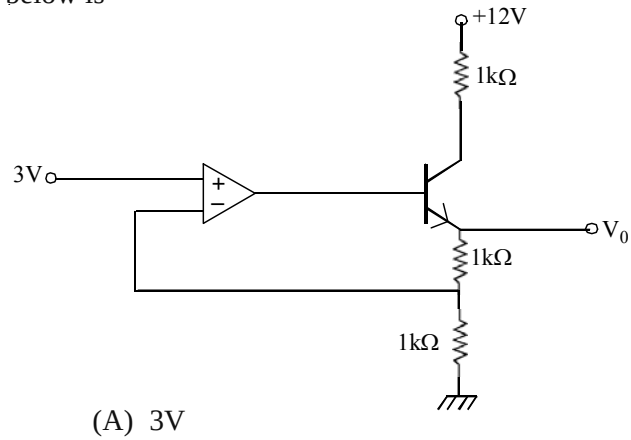
(A) 0·1
(B) 10
(C) 100
(D) 1

26. The output voltage (V_0) in volt of the following circuit is



(A) –2 Sin t
(B) –2 Cos t
(C) –1·5 Sin t
(D) –1·5 Cos t

27. The value of output voltage V_0, in the circuit below is



(A) 3V
(B) 6V
(C) 1·5V
(D) 8V

28. The breakdown voltage of a transistor 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) BV_{CEO} is not related to BV_{CBO}.

29. Ripple factor for a half-wave rectifier —

(A) 1·21

(B) 0·48

(C) 0·11

(D) 0·99

30. The desirable characteristics of a trans-conductance amplifier are

(A) high input resistance and high output resistance.

(B) high input resistance and low output resistance.

(C) low input resistance and high output resistance.

(D) low input resistance and low output resistance.

31. Efficiency of class A power amplifier is

(A) 25%

(B) 50%

(C) 75%

(D) 100%

32. In a multistage R–C coupled amplifier the coupling capacitor

(A) limits the low frequency response.

(B) limits the mid frequency response.

(C) does not effect the frequency response.

(D) blocks the dc components without affecting the frequency response.

33. A dc power supply has a no-load voltage of 30V and a full-load voltage of 25V at a full-load current of 1A. Its output resistance and load regulation respectively are

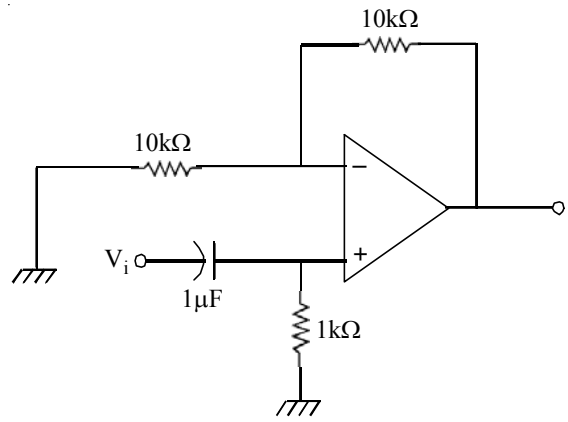
(A) 5Ω and 20%

(B) 25Ω and 20%

(C) 5Ω and 16·7%

(D) 25Ω and 16·7%

34. The op-amp circuit shown in the figure is a filter. The type of filter and its cut-off frequency are respectively



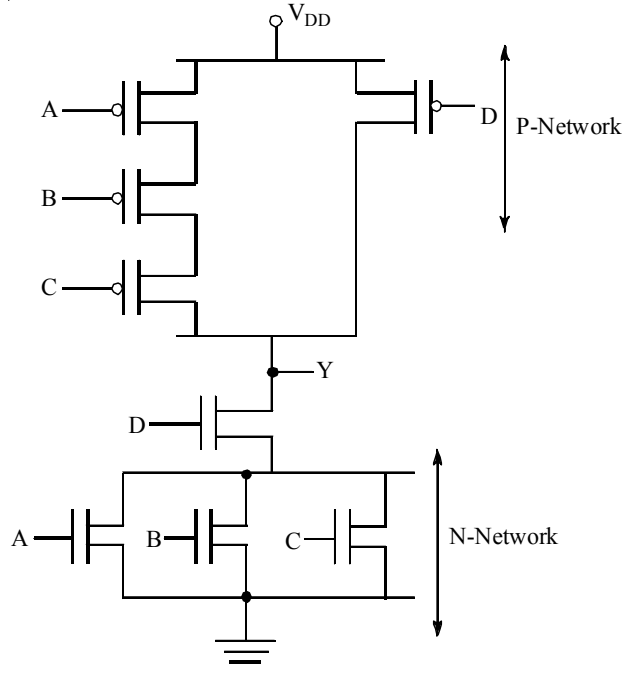
(A) High Pass; 1000 rad/sec.

(B) Low Pass; 1000 rad/sec.

(C) High Pass; 10000 rad/sec.

(D) Low Pass; 10000 rad/sec.

35. A Boolean function is implemented with the CMOS logic shown in the figure below. The output function Y of the circuit is



(A) $(A + B + C)\,D$

(B) $\overline{A}\,\overline{B}\,\overline{C} + \overline{D}$

(C) $ABC\overline{D}$

(D) $BC + A\overline{D}$

36. Two ECL gates are cascaded. The voltage levels are $V_{OH} = -0{\cdot}96V$, $V_{OL} = -1{\cdot}65V$, $V_{IH} = -1{\cdot}105V$ and $V_{IL} = -1{\cdot}475V$. The low and high state noise margins are

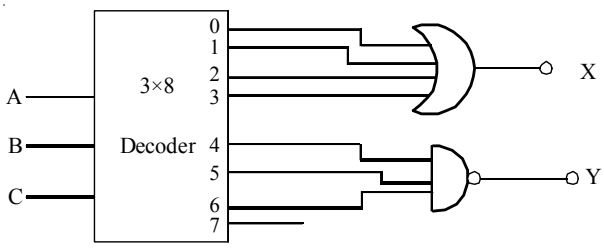
(A) 0·37V and 0·69V

(B) 0·545V and 0·51V

(C) 0·175V and 0·145V

(D) –2·065V and – 3·125V

37. The outputs of the 3 × 8 decoder are taken through two logic gates as shown in the figure. The outputs X and Y will be



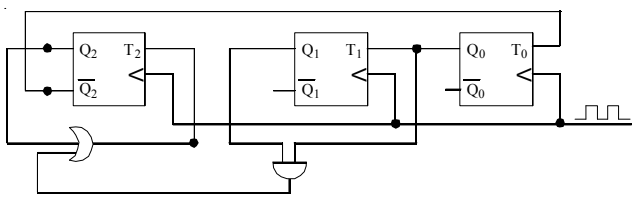
(A) $X = \overline{A}B\overline{C} + \overline{B}\overline{C}, Y = A + B$

(B) $X = \overline{A}\,\overline{C} + \overline{B}\overline{C}, Y = 1$

(C) $X = \overline{A}, Y = 1$

(D) $X = \overline{A}, Y = 0$

38. A mod-N synchronous counter is shown in figure below with T F/F and Q_2 as MSB. If initially $Q_0 = 0$, $Q_1 = 0$, $Q_2 = 0$, the value of N is



(A) 8

(B) 6

(C) 5

(D) 4

39. The capacity of a PROM is 2K × 16. If it is expanded into 16K × 16, the number of address lines in the expanded memory will be

(A) 16

(B) 14

(C) 12

(D) 10

40. The function $F = A \oplus B \oplus C \oplus D$ can be represented in canonical SOP form as

(A) $\sum m(2,3,5,6,7,8,12,14)$

(B) $\sum m(0,1,3,5,7,8,14,15)$

(C) $\sum m(3,4,6,7,8,9,13,14)$

(D) $\sum m(1,2,4,7,8,11,13,14)$

41. In BCD to seven segment display, the minimum number and maximum number of outputs of the decoder, that will be active one time are

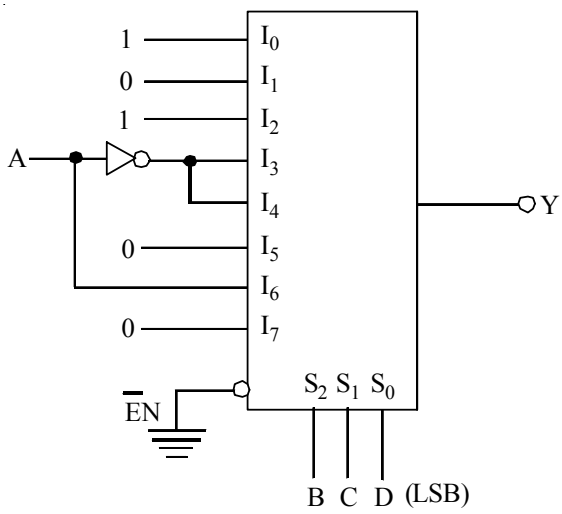
(A) 1, 6

(B) 2, 7

(C) 3, 5

(D) 2, 8

42. An 8 × 1 multiplexer with section lines B, C and D is given below. The Boolean function Y implemented is



(A) $\sum m(1,3,4,6)$

(B) $\sum m(0,2,3,4,8,10,14)$

(C) $\sum m(0,3,4,8,11,15)$

(D) $\sum m(1,3,5,7,9,15)$

43. If spacing between the wires of a transmission line is increased, its characteristic impedance will

(A) increase.

(B) decrease.

(C) remains unaffected.

(D) None of the above

44. The structural code for 4 bit adder in VHDL is given below:

```
COMPONENT adder IS
GENERIC (n : INTEGER : = 3);
PORT (input : IN BIT _ VECTOR (n DOWN TO O);
OUTPUT : OUT BIT_VECTOR (n DOWN TO O);
END COMPONENT;
```

If it is required to convert this code into 8 bit adder, the changed variable would be

(A) Component

(B) Input

(C) Output

(D) n

45. Which one of the following is true with respect to CPLD and FPGA devices?

(A) CPLD architecture offers greater flexibility.

(B) FPGA devices have very complex configurable logic blocks.

(C) CPLD devices offer relatively lower flexibility but more predictable timing characteristics.

(D) FPGA devices offer relatively lower flexibility but more predictable timing characteristics.

46. Conversion time of an eight bit successive approximation type A/D converter run by a 10MHz clock would be

(A) 12·75 μS

(B) 25·5 μS

(C) 800 nS

(D) 80 nS

47. Which one is sequencial access secondary storage device?

(A) Magnetic tape

(B) Hard Disk

(C) Floppy Disk

(D) CD-ROM

48. Which of the following is volatile memory?

(A) SRAM

(B) Flash Memory

(C) EPROM

(D) EEPROM

49. Peripheral devices that are found on microcontroller chip does not include

(A) Counter

(B) USB port

(C) Serial communication interface

(D) Parallel communication interface

50. Identify the peripheral function that is provided in microcontroller by a pulse which modulator followed by a filter.

(A) A/D converter

(B) D/A converter

(C) Timer

(D) Counter

51. A 8 bit microcontroller has an external RAM in the memory map from 8000H to 9FFFH. The no. of bytes that this RAM can store is

(A) 8193

(B) 8192

(C) 8191

(D) 8000

52. Consider the following set of instructions:

```
MVI A,  BYTE 1
RLC
MOV     B, A
RLC
RLC
ADD     B
```

If BYTE1 = 07H, then the content of A after the execution of the program will be

(A) 46H

(B) 70H

(C) 38H

(D) 68H

53. A set of 8085 instruction is given by

```
XRA     A
MVI     B, 4AH
SUI     4FH
ANA     B
HLT
```

The contents of registers A and B are respectively

(A) 05, 4A

(B) 4F, 00

(C) B1, 4A

(D) 00, 4A

54. The largest number that can be processed by a microprocessor in a single operation is determined by the size of which bus?

(A) External data bus

(B) Internal data bus

(C) Address bus

(D) Control bus

55. The synchronization between microprocessor and memory is done by

(A) ALE signal

(B) HOLD signal

(C) READY signal

(D) HLDA signal

56. The memory device has both high density and high speed access and in-circuit electrical erasbility feature is

(A) EEPROM

(B) UV EPROM

(C) Cache Memory

(D) Flash Memory

57. In quenched domain mode, the period of microwave oscillation (τ) is related with the domain transit time (T) as

(A) $\tau = T$

(B) $\tau < T$

(C) $\tau = T/2$

(D) $\tau > T$

58. An open-ended, lossless transmission line of length 5 km has a phase shift constant, $\beta = \pi/10$ radian/km and a characteristic impedance of 500Ω.

The input impedance at the mid-point of this line in Ω will be

(A) 250

(B) $-j500$

(C) $-j125$

(D) $j500$

59. The characteristic impedance (Z_o) of a transmission line can be expressed as (here, *R*, *L*, *G*, *C* are primary constants of the transmission line)

(A) $\sqrt{RG}$

(B) $\sqrt{\frac{R+j\omega L}{G+j\omega C}}$

(C) $\sqrt{\frac{R+1/j\omega C}{G+j\omega L}}$

(D) $\sqrt{\frac{G+1/j\omega C}{R+j\omega L}}$

60. The diagonal elements of a microwave magic-T must be

(A) 1, 0, 0, 1

(B) 1, 1, 1, 1

(C) 0, 1, 1, 0

(D) 0, 0, 0, 0

61. The continuity equation $\vec{\nabla}.\vec{J}+\frac{\partial \rho}{\partial t}=0$ expresses the conservation of

(A) Energy

(B) Power

(C) Momentum

(D) Charge

62. A linear array of 10 half-wave dipole antennas with an inter-element spacing of one wavelength directs its maximum radiation in a direction perpendicular to the line of the array. The width of the principal lobe of the array in radian, when the antenna elements are fed in phase by a microwave signal of frequency 1GHz, will be

(A) 0·2

(B) $\frac{\pi}{3}$

(C) 0·1

(D) $\frac{\pi}{5}$

63. A hollow metallic waveguide with rectangular cross-section of 3cm × 2cm will have a ratio of cut-off frequencies for TE_{10} and TE_{01} modes equal to

(A) 1 : 2

(B) 2 : 1

(C) 2 : 3

(D) 1 : 3

64. A two-cavity Klystron amplifier is operated with a dc accelerating voltage of 100 volts and it amplifies a microwave signal of frequency 3 GHz. The buncher gap width is 1mm. The beam coupling coefficient of the buncher cavity is

(A) 0·57

(B) 0·82

(C) 0·75

(D) 0·63

65. The characteristic polynominal of a system is

$$q(s) = 2s^5 + s^4 + 4s^3 + 2s^2 + 2s + 1$$

The system is

(A) stable

(B) marginally stable

(C) unstable

(D) oscillatory

66. A conventional cylindrical magnetron is operated with dc anode voltage of 2000 volt. The cathode has a radius of 5 cm and the anode radius measured from the cathode centre is 10 cm. The cut-off magnetic field of this magnetron in milliweber/m^2 is

(A) 1

(B) 4

(C) 9

(D) 2

67. If the closed loop transfer function of a control system is given as $T(S) = \frac{S-5}{(S+2)(S+3)}$, then it is

(A) unstable system.

(B) an uncontrollable system.

(C) a minimum phase system.

(D) a non-minimum phase system.

68. The maximum range of a radar does not depend on the following:

(A) Gain of the transmitting antenna.

(B) Power radiation of the transmitting antenna.

(C) Area of the target.

(D) Medium through which the wave is propogating.

69. Helical antenna is used for satellite tracking because of its

(A) circular polarization

(B) broad bandwidth

(C) good front to back ratio

(D) small size

70. If the minimum range of a radar is to be doubled, the peak power has to be increased by a factor of

(A) 2

(B) 4

(C) 8

(D) 16

71. The blind speed of an MTI radar can be avoided by changing the

(A) carrier frequency

(B) antenna rotation rate

(C) pulse repetition frequency

(D) transmitted power

72. In certain cases circular waveguide is the better choice than a rectangular waveguide, because of

(A) smaller cross-section.

(B) lower attenuation.

(C) freedom from spurious modes.

(D) higher cut-off frequency.

73. The relationship between the phase velocity v_p and group velocity v_g in a waveguide is

(A) $v_p = v_g$

(B) $v_p \,.\, v_g = c^2/_2$

(C) $v_p \,.\, v_g = c^2$

(D) $v_p \,.\, v_g = c$

74. Intrinsic impedance is given by

(A) $\sqrt{\frac{\varepsilon}{\mu}}$

(B) $\sqrt{\frac{\mu}{\varepsilon}}$

(C) $\sqrt{\mu\varepsilon}$

(D) μ/ε

75. If a right-handed circularly polarized wave is incident normally on a plane perfect conductor, then the reflected wave will be

(A) right-handed circularly polarized.

(B) left-handed circularly polarized.

(C) elliptically polarized with a tilt angle of 45^o.

(D) horizontally polarized.

76. In a transmission line with $\omega L >> R$ and $\omega C >> G$, phase constant β is proportional to

(A) ω

(B) ω^2

(C) $\sqrt{\omega}$

(D) $1/\omega$

77. The input impedance of a short circuited lossless transmission line quarter wave long is

(A) purely reactive.

(B) purely resistive.

(C) infinite.

(D) dependent on the characteristic impedance of the line.

78. The frequency of oscillation of a Klystron depends on

(A) cavity dimension

(B) dc voltage

(C) distance between the two cavities

(D) repeller voltage

79. Gallium arsenide is preferred to silicon for use in Gunn diode because it has

(A) lower noise at high frequencies.

(B) better frequency stability.

(C) high ion mobility.

(D) suitable empty energy band which silicon does not have.

80. Periodic permanent magnet focussing is used with TWTs to

(A) improve electron bunching.

(B) allow pulsed operation.

(C) allow coupled-cavity operation at highest frequencies.

(D) avoid the bulk of an electromagnet.

81. For an FM station transmitting at 100MHz, the frequency deviation is 75 kHz. Find the approximate bandwidth required for transmission of voice signals (0 – 3kHz).

(A) 78 kHz

(B) 156 kHz

(C) 175 kHz

(D) 158 kHz

82. In amplitude modulation, the modulation envelope has a peak value which is double the unmodulated carrier value. What is the value of the modulation index?

(A) 25%

(B) 50%

(C) 75%

(D) 100%

83. The signal $m(t) = \cos 2000\pi t + 2\cos 4000t$ is multiplied by the carrier $c(t) = 100\cos 2\pi f_c t$ where $f_c = 1$MHz to produce the DSB signal. The expression for the upper side band (USB) signal is

(A) $100\cos(2\pi(f_c+1000)t) + 200\cos(2\pi(f_c+200)t)$

(B) $100\cos(2\pi(f_c-1000)t) + 200\cos(2\pi(f_c-2000)t)$

(C) $50\cos(2\pi(f_c+1000)t) + 100\cos(2\pi(f_c+2000)t)$

(D) $50\cos(2\pi(f_c-1000)t) + 100\cos(2\pi(f_c-100)t)$

84. A signal with 3kHz bandwidth is sampled with Nyquist rate and quantized with 128 level quantizer in a PCM system. What will be the corresponding minimum transmission bandwidth?

(A) 42 kHz

(B) 21 kHz

(C) 84 kHz

(D) 384 kHz

85. The bandwidth efficiency of QPSK modulation is doubled compared to BPSK modulation. The probability of bit error for QPSK is

(A) same as BPSK

(B) double of BPSK

(C) half of BPSK

(D) one-fourth of BPSK

86. In an optical fiber link of 15 km, the optical power connected at the input is 50 mw. The optical power measured at the output of the fiber is 8 mw. The attenuation of the fiber in dB/km is

(A) 2·5

(B) 0·75

(C) 0·53

(D) 0·14

87. A mixer stage has a noise figure of 20dB. This mixer stage is preceded by an amplifier which has a noise figure of 9 dB and an available power gain of 15 dB. The overall noise figure referred to the input is

(A) 11·07
(B) 18·23
(C) 56·48
(D) 97·38

88. The Nyquist sampling rate for the signal $g(t) = 10\cos(50\pi t)\cos^2(150\pi t)$, where '$t$' is in seconds is

(A) 150 samples per second
(B) 350 samples per second
(C) 300 samples per second
(D) 200 samples per second

89. In a PCM system, if the quantization levels are increased from 2 to 8, the relative bandwidth requirement will

(A) remain same.
(B) be tripled.
(C) be doubled.
(D) become four times.

90. An InGaAs photodiode has a quantum efficiency of 90% at a wavelength of 1550nm. The responsivity of the photodiode is

(A) 2·25 A/W
(B) 1·12 A/W
(C) 0·92 A/W
(D) 0·56 A/W

91. The tuning current in a DFB laser operating at 1550nm causes a change in effective refractive index of 0·85%. If the source spectral width is 0·04nm for 2Gbps signal, the number of channels that can be operated for DWDM system is

(A) 27
(B) 33
(C) 52
(D) 65

92. An SCR is considered to be a semi-controlled device because

(A) it can be turned off but not on with a Gate pulse.
(B) it conducts only during one half cycle of an alternating current wave.
(C) it can be turned on but not off with a Gate pulse.
(D) it can be found on only during one half cycle of an AC.

93. An SCR has half cycle surge current rating of 3000A for 50 Hz supply. One cycle surge current will be

(A) 1500A
(B) 6000A
(C) 2121·32A
(D) 4242·64A

94. A piezoelectric transducer has a voltage source of 12V with an internal impedance of 12MΩ. It is connected to a digital oscilloscope with an input impedance of 12 MΩ directly. The voltage measured by the oscilloscope is

(A) 3V
(B) 6V
(C) 12V
(D) 24V

95. A *n*-type semiconductor strain gauge has a nominal resistance of 1kΩ and gauge factor of –100. The resistance of the gauge when a compressive strain of 100 μm/m is applied, is

(A) 1100Ω
(B) 1010Ω
(C) 990Ω
(D) 900Ω

96. A copper-iron thermocouple has its measuring junction kept at 110°C and the reference junction at the temperature of 28°C. The temperature emf characteristics of iron-constantan and copper-constantan are $E_{I-C} = 53T\mu V$ and $E_{C-C} = 43T\mu V$, (T is in °C), at 0°C. The emf developed in the thermocouple would be

(A) 1100 μV
(B) 2800 μV
(C) 720 μV
(D) 1380 μV

97. A spectrum analyser displays

(A) peak to peak amplitude of modulating signal.
(B) different frequency amplitudes with respect to time.
(C) Lissajous figures.
(D) different signal amplitudes with respect to frequency.

98. A square wave signal is observed on the oscilloscope to have one cycle measured 5cm at a horizontal sweep rate of 25 μs/cm. The signal frequency is

(A) 125 Hz
(B) 4 kHz
(C) 8 kHz
(D) 16 MHz

99. A DIAC is equivalent to a

(A) triac with two gates
(B) diode and two resistors
(C) pair of SCRs
(D) pair of four layer SCRs

100. Which instruction cannot force the 8086 processor out of 'halt' state?

(A) Interrupt request
(B) Reset
(C) Both interrupt request and reset
(D) Hold

Space for Rough Work

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