137/2021

Question Booklet Alpha Code	**A**	Question Booklet Serial Number

| **Total Number of questions : 100**	**Time : 75 Minutes**
Maximum Marks : 100	

INSTRUCTIONS TO CANDIDATES

1. The question paper will be given in the form of a Question Booklet. There will be four versions of question booklets with question booklet Alpha Code viz.A, B, C & D.

2. The Question Booklet Alpha Code will be printed on the top left margin of the facing sheet of the question booklet.

3. The Question Booklet Alpha Code allotted to you will be noted in your seating position in the Examination Hall.

4. If you get a question booklet where the Alpha Code does not match to the allotted Alpha Code in the seating position, please draw the attention of the Invigilator IMMEDIATELY.

5. The Question Booklet Serial Number is printed on the top right margin of the facing sheet. If your question booklet is unnumbered, please get it replaced by new question booklet with same Alpha Code.

6. The question booklet will be sealed at the middle of the right margin. Candidate should not open the question booklet, until the indication is given to start answering.

7. Immediately after the commencement of the examination, the candidate should check that the question booklet supplied to him contains all the 100 questions in serial order. The question booklet does not have unprinted or torn or missing pages and if so, he/she should bring it to the notice of the Invigilator and get it replaced by a complete booklet with same Alpha Code. This is most important.

8. A blank sheet of paper is attached to the question booklet. This may be used for rough work.

9. **Please read carefully all the instructions on the reverse of the Answer Sheet before marking your answers.**

10. Each question is provided with four choices (A), (B), (C) and (D) having one correct answer. Choose the correct answer and darken the bubble corresponding to the question number using Blue or Black Ball Point Pen in the OMR Answer Sheet.

11. **Each correct answer carries 1 mark and for each wrong answer 1/3 mark will be deducted. No negative mark for unattended questions.**

12. No candidate will be allowed to leave the examination hall till the end of the session and without handing over his/her Answer Sheet to the Invigilator. Candidates should ensure that the Invigilator has verified all the entries in the Register Number Coding Sheet and that the Invigilator has affixed his/her signature in the space provided.

13. Strict compliance of instructions is essential. Any malpractice or attempt to commit any kind of malpractice in the Examination will result in the disqualification of the candidate.

1. A semiconductor has _____ valence electrons.

   (A) 2   (B) 3

   (C) 4   (D) 5

2. In a _____ the energy gap between the conduction band and valence band of a substance is of the order of 0.7 eV

   (A) conductor   (B) semiconductor

   (C) insulator   (D) none of the above

3. In a Zener regulator, change in load current produces change in _____

   (A) Zener current   (B) Zener voltage

   (C) A & B   (D) None of the above

4. Maximum efficiency of a half wave rectifier is _____

   (A) 50%   (B) 25%

   (C) 40.6%   (D) 81.2%

5. A center tap full wave rectifier consists of _____ diodes.

   (A) 1   (B) 2

   (C) 3   (D) 4

6. What is the type of filter shown in the figure?
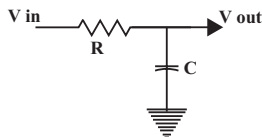
   (A) Low pass filter   (B) High pass filter

   (C) Band pass filter   (D) Band reject filter

7. In a transistor there are _____ depletion layers.

   (A) 1   (B) 2

   (C) 3   (D) 4

8. If the value of α in a transistor is 0.9, then value of β is _____

   (A) 9   (B) 10

   (C) 90   (D) 100

9. Where should be the bias point set in order to make transistor work as an amplifier?

   (A) active   (B) cutoff

   (C) saturation   (D) none of the above

10. Emitter follower is used for _____

    (A) current gain (B) voltage gain

    (C) impedance matching (D) none of the above

11. Which among the following does not belong to the category of LC oscillators?

    (A) Hartley oscillator (B) Colpitts oscillator

    (C) crystal oscillator (D) none of the above

12. The channel of a JFET is between the _____

    (A) input and output (B) gate and drain

    (C) gate and source (D) drain and source

13. Choose the correct statement

    (A) MOSFET is a unipolar, voltage controlled, two terminal device

    (B) MOSFET is a bipolar, current controlled, two terminal device

    (C) MOSFET is a unipolar, voltage controlled, three terminal device

    (D) MOSFET is a bipolar, current controlled, three terminal device

14. What are the working regions of a unijunction transistor?

    (A) Negative Resistance region (B) Saturation region

    (C) Linear region (D) Cutoff region

15. Which of the following is/are optoelectronic devices?

    (A) photodiodes (B) light emitting diodes

    (C) solar cells (D) all of the above

16. An optocoupler provides _____ between input and output

    (A) induction (B) amplification

    (C) isolation (D) oscillation

17. Clamping is the process of introducing a/an _____

    (A) dc level to a dc signal (B) dc level to an ac signal

    (C) ac level to a dc signal (D) ac level to an ac signal

18. A square wave oscillator is a/an _____ multivibrator.

    (A) astable (B) monostable

    (C) bistable (D) none of the above

19. The Op-amp can amplify _____

    (A) dc signals only (B) ac signals only

    (C) both dc and ac signals (D) none of the above

20. The common-mode voltage gain of an Op-amp is _____
    (A) equal to differential voltage gain
    (B) smaller than differential voltage gain
    (C) greater than differential voltage gain
    (D) none of the above

21. What is the feedback factor of voltage follower circuit?
    (A) zero   (B) unity
    (C) between zero and one   (D) infinity

22. The internal circuitry of the 555 timer consists of _____, an *R-S* flip-flop, a transistor switch, an output buffer amplifier, and a voltage divider.
    (A) a peak detector   (B) a comparator
    (C) a voltage amplifier   (D) two comparators

23. The 7912 regulator IC provides _____
    (A) 5v   (B) –5v
    (C) 12v   (D) –12v

24. The fastest A/D converter is _____ ADC
    (A) single slope ramp comparator   (B) dual slope integrator
    (C) successive approximation   (D) counter type

25. What is the disadvantage of binary weighted type DAC?
    (A) slow switching   (B) requires wide range of resistors
    (C) high operationg frequency   (D) high power consumption

26. The phase velocity of a waveguide at cutoff frequency is
    (A) Zero   (B) Finite
    (C) Infinite   (D) One

27. For a short circuited loss-less line having length less than a quarter wavelength will have input impedance
    (A) Purely Inductive   (B) Purely resistive
    (C) Resonative   (D) Purely capacitive

28. The main reason for occurring of standing waves is due to
    (A) Dispersion   (B) Impedance mismatch
    (C) Reflection   (D) Transmission mode

29. The speakers which cover the frequencies from 16Hz to 1000Hz are called

    (A) Squawkers   (B) Tweeters

    (C) Baffle   (D) Woofers

30. The ratio of the current or voltage entering the network to the current or voltage leaving the network is known as

    (A) Characteristic Impedance   (B) Propagation Constant

    (C) Iterative Impedance   (D) Image Impedance

31. A number of identical parallel antennas arranged along a line perpendicular to the line of array axis and each element fed with current of equal magnitude and same phase is known as

    (A) Broad side array   (B) Log periodic array

    (C) End fire array   (D) Collinear array

32. RF amplifier in a super heterodyne receiver is used to

    (A) increase tracking

    (B) increase adjacent-channel rejection

    (C) increase the tuning range

    (D) increase rejection of the image frequency

33. In TV circuits the equalizing pulses are sent during

    (A) horizontal blanking   (B) horizontal retrace

    (C) vertical retrace   (D) vertical blanking

34. Frequencies in the UHF range are normally propagated by

    (A) space waves   (B) sky waves

    (C) surface waves   (D) ground waves

35. An example for multiband HF receiving antenna is

    (A) conical horn   (B) folded dipole

    (C) rhombic loop   (D) log periodic

36. A PIN diode is

    (A) a semiconductor point-contact diode

    (B) used as a microwave switch

    (C) often used as a microwave detector

    (D) a microwave mixer diode

37. The modulation system which is commonly used in telegraphic communication is
    (A) pulse-code modulation
    (B) two-tone modulation
    (C) frequency-shift keying
    (D) single-tone modulation

38. The code which is used for parity checks is
    (A) Gray
    (B) ASCII
    (C) EBCDIC
    (D) Baudot

39. The transmission rate of data in a modem is measured in
    (A) bytes per second
    (B) Gigahertz
    (C) bits per second
    (D) word per minute

40. The On-Off keying method of data transmission is otherwise known as
    (A) ASK
    (B) FSK
    (C) PSK
    (D) BPSK

41. The type of microphone used in telephone is
    (A) Condenser microphone
    (B) Ribbon microphone
    (C) Peizo electric
    (D) Carbon microphone

42. The type of noise which is having greater impact at high frequencies is
    (A) random noise
    (B) Johnson noise
    (C) transit-time noise
    (D) shot noise

43. Which of the following modulation system is the most noise resistant one?
    (A) PWM
    (B) Delta
    (C) PCM
    (D) Differential PCM

44. The reason for Rayleigh scattering loss in optical fibre is
    (A) bending of fibre
    (B) structural fault in glass
    (C) impurities present
    (D) due to dispersion

45. Quantizing noise occurs in
    (A) amplitude modulation
    (B) frequency modulation
    (C) pulse-code modulation
    (D) pulse-width modulation

46. The main disadvantage of CW Doppler radar is
    (A) does not give target range
    (B) does not give target position
    (C) does not give target velocity
    (D) does not give angular position of target

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

    (A) Schmitt trigger   (B) a clipper

    (C) an integrator   (D) a differentiator

48. Optical fibres used for communication purpose are mostly fabricated using

    (A) Silica   (B) Plastic

    (C) Ceramics   (D) Copper

49. Which of the following expression is true in the case of open circuit parameters?

    (A) $V_1 = Z_{11} V_1 + Z_{12} I_2$ (B) $V_1 = Z_{11} I_1 + Z_{12} V_2$

    (C) $V_1 = Z_{11} I_1 + Z_{12} I_2$ (D) $V_2 = Z_{11} I_1 + Z_{12} I_2$

50. The A scope displays

    (A) target position and range   (B) the target velocity

    (C) the target position   (D) the target range only

51. According to Kepler's law, the orbit of any smaller body about a larger body is always _____

    (A) Circular   (B) Polar

    (C) Ellipse   (D) Inclined

52. Perigee is

    (A) the point on the satellite orbit farthest from the centre of earth

    (B) the point on the satellite orbit nearest to the centre of earth

    (C) the point on the earth that is farthest from the centre of satellite orbit

    (D) the point on the earth nearest to the centre of satellite orbit

53. The inclination of a retrograde orbit lies between

    (A) 0° and 90°   (B) 90° and 180°

    (C) 180° and 270°   (D) 270° and 360°

54. Geosynchronous orbit is at a distance of _____ above the surface of the earth

    (A) 5000 KM   (B) 46756 KM

    (C) 34000 KM   (D) 35786 KM

55. The project Iridium is the most important application of

    (A) LEO satellites   (B) MEO satellites

    (C) GEO satellites   (D) HEO satellites

56. 'The apogee and perigee are always exactly opposite to each other' – the statement is
    (A) True
    (B) False
    (C) Partially True
    (D) Irrelevant

57. The basic cassegrain antenna consists of
    (A) a main paraboloid and a sub reflector, which is an ellipsoid
    (B) a main paraboloidal reflector
    (C) a main paraboloid and a sub reflector which is hyperboloid
    (D) a main hyperboloid and a sub reflector which is paraboloid

58. Denoting the focal distance of a parabolic reflector by 'p' and focal length 'f' then the Space Attenuation Function (SAF) is given by
    (A) $\dfrac{p}{f}$
    (B) $\left(\dfrac{p}{f}\right)^2$
    (C) $\dfrac{f}{p}$
    (D) $\left(\dfrac{f}{p}\right)^2$

59. Satellites known as 'spinners' are used for
    (A) Spin control
    (B) Attitude control
    (C) Power control
    (D) Orbit control

60. Station keeping is applicable for
    (A) Orbit control of Geostationary satellites
    (B) Attitude control of Geostationary satellites
    (C) Power control of Geostationary satellites
    (D) Thermal control of Geostationary satellites

61. The system which allows the antenna to handle transmit or receive signals simultaneously is known as
    (A) Diplexer
    (B) Duplexer
    (C) Combiner
    (D) Divider

62. Which was the first communication satellite placed in the Geostationary orbit?
    (A) MSAT
    (B) INSAT I
    (C) VSAT
    (D) INTELSAT I

63. The series of interconnected units which forms a single communication channel between transmit and receive antennas in a communication satellite is known as
    (A) Transceivers
    (B) Demultiplexers
    (C) Transponders
    (D) Duplexers

64. The TV system employs a single outdoor unit so that all channels are made available simultaneously at the indoor receiver is named as
(A) MA TV
(B) DBS TV
(C) FM TV
(D) CA TV

65. The ascending nodes of orbits in the GPS constellation are separated by _____ and the inclination of each orbit is _____
(A) 70°, 65°
(B) 60°, 55°
(C) 50°, 45°
(D) 40°, 35°

66. 'The passive satellite cannot generate power of its own and it reflects the incident power'; the statement is
(A) True
(B) False
(C) Partially True
(D) Irrelevant

67. Which co-ordinate system is used with GPS system?
(A) Geosynchronous-equatorial co-ordinate system
(B) Earthcentric-equatorial co-ordinate system
(C) Geocentric-equatorial coordinate system
(D) Both (B) & (C)

68. The effects of eclipse does not affect the operation of Geostationary satellite, if the satellite longitudes are _____ of earth station.
(A) North East
(B) North West
(C) East
(D) West

69. Solar panels in satellites are arranged in the form of _____ to obtain high power.
(A) rectangular arrays
(B) cylindrical arrays
(C) rectangular solar sails
(D) cylindrical solar sails

70. The system which transmits information about the satellite to earth station and receives command signals from the earth station is known as
(A) Transponder
(B) TT & C
(C) Transceiver
(D) LNA

71. The temperature extremes experienced from solar flux and cold background of deep space can be minimized by
(A) Spinning satellites
(B) Body stabilized satellites
(C) Both (A) & (B)
(D) None of the above

72. 'Space Transportation System (STS) is an expendable launch vehicle' – the statement is
    (A) True
    (B) False
    (C) Irrelevant
    (D) None of these

73. Which band of frequencies are used for the satellite services in MSAT?
    (A) C-band
    (B) Ka-band
    (C) Ku-band
    (D) L-band

74. In C-band, the nominal up link and downlink frequencies are
    (A) 8GHz and 6GHz
    (B) 12GHz and 4GHz
    (C) 6GHz and 4GHz
    (D) 12GHz and 6GHz

75. The conditions required for an orbit to be geostationary
    (A) the orbit must be elliptical
    (B) the orbit must be circular
    (C) the orbit must be polar
    (D) the orbit must be inclined

76. First version of GSM used
    (A) 64 full duplex channels
    (B) 124 full duplex channels
    (C) 64 half duplex channels
    (D) 124 half duplex channels

77. The minimum distance which allows the same frequency to be reused will depend on
    (A) Number of co-channel cells in the vicinity of center cell
    (B) The type of geographic terrain
    (C) The antenna height and transmitted power at each cell site
    (D) All of the above

78. Transmission power of a cell has to be limited in order to
    (A) Achieve higher capacity
    (B) Avoid interference with the next cell using the same frequency
    (C) Avoid multipath propagation
    (D) None of the above

79. The time over which a call is made within a cell without handoff is called _____
    (A) delay time
    (B) dwell time
    (C) seek time
    (D) guard time

80. In fast fading
   (A) Coherence time is greater than symbol period
   (B) Coherence time is lesser than symbol period
   (C) Coherence time is equal to symbol period
   (D) Coherence time is independent of symbol period

81. In FDM, frequency band overlapping is avoided using
   (A) Guard band
   (B) Framing band
   (C) Synchronizing pulses
   (D) None of the above

82. In a cell, which is the radio channel used for transmission of call setup, call request and call initiation _____?
   (A) Forward channel
   (B) Control channel
   (C) Uplink channel
   (D) Reverse channel

83. The handoff operation involves
   (A) Identifying the MSC and the call will be connected to the MSC
   (B) Identifies the voice channel to instruct the mobile telephone to ring
   (C) Identifying a new base station and reallocating the channels with the new base station.
   (D) Instructs the base station to move the call to an unused voice channel within the cell

84. Code Division multiple access scheme is based on
   (A) QPSK   (B) BPSK
   (C) Spread spectrum technology   (D) BFSK

85. Delay spread is due to
   (A) Multipath reflection   (B) Frequency dispersion
   (C) Fresnel zone   (D) Doppler effect

86. Which of the following is true in a DECT system?
   (A) The range is limited to about 300m from base station
   (B) Can handle handover, but it is not designed to work at high speed
   (C) Works at a frequency range of 1880-1990 MHz
   (D) All of the above

87. The channel capacity may be improved by using

(A) Cell splitting (B) Hand off

(C) Frequency hopping (D) Channel spacing

88. If bandwidth over which the channel has constant gain and linear phase response is smaller than the bandwidth of the transmitted signal, the received signal undergoes _____

(A) Flat fading (B) Rayleigh fading

(C) Frequency selective fading (D) Slow fading

89. _____ is a dynamic database which stores all important information needed for users currently associated to the MSC.

(A) ISDN (B) VLR

(C) HLR (D) EIR

90. In mobile communication, the commonly used shape of a cell is hexagon because

(A) Fewer number of cells are required

(B) Provides maximum processing density than any other geometrical shape

(C) It leaves no uncovered area

(D) All of the above

91. Which of the following multiple access scheme is using soft handover?

(A) FDMA (B) TDMA

(C) SDMA (D) CDMA

92. The operation subsystem of GSM has OMC, AuC and EIR. Here EIR stands for

(A) Enhanced identity register

(B) Equipment identity register

(C) Electronic identity register

(D) Equipment inbuilt register

93. Crosstalk from two different radio transmitters using the same channel may result in _____.

(A) Adjacent channel interference (B) Multiple access interference

(C) Co-channel interference (D) Self-interference

94. _____ resolves the problem of limited radio spectrum.

(A) handover (B) cell splitting

(C) frequency hopping (D) MAC

95. The statistical measure of the range of frequency over which the channel can be considered flat is known as _____

(A) Coherence time
(B) Transmission bandwidth
(C) Coherence bandwidth
(D) Propagation time

96. In a GSM system identify the function of MSC.

(A) Takes care of handoff from one BTS to the other
(B) Stores dynamic information while logged onto GSM
(C) Co-ordinates all the activities of base station and connects the entire cellular system to PSTN.
(D) All of the above

97. In GSM _____ is used to separate uplink and downlink

(A) TDM
(B) FDD
(C) TDD
(D) FDM

98. Suppose there are N cells in a cellular system and each cell is allocated K channel the total number of available channel is given by

(A) S = N + K
(B) S = K/N
(C) S = N/K
(D) S – K * N

99. Before a subscriber can use any service from GSM network, he must be authenticated. This authentication is based on _____

(A) ISDN
(B) SIM
(C) DTMF
(D) BTS

100. Near-far effect is a severe problem in wireless networks using _____

(A) TDMA
(B) FDMA
(C) SDMA
(D) CDMA

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