

Roll No. ....

Question Booklet Number

O. M. R. Serial No.

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Question Booklet Number
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## M. Sc. (Electronics) (Fourth Semester)

EXAMINATION, 2022-23

### WIRELESS AND MOBILE COMMUNICATION

Paper Code						
E	L	C	4	0	1	N

Questions Booklet Series
<b>A</b>

Time : 1:30 Hours ]

[ Maximum Marks : 75

#### Instructions to the Examinee :

परीक्षार्थियों के लिए निर्देश :

1. Do not open the booklet unless you are asked to do so.
  2. The booklet contains 100 questions. Examinee is required to answer 75 questions in the OMR Answer-Sheet provided and not in the question booklet. All questions carry equal marks.
  3. Examine the Booklet and the OMR Answer-Sheet very carefully before you proceed. Faulty question booklet due to missing or duplicate pages/questions or having any other discrepancy should be got immediately replaced.
1. प्रश्न-पुस्तिका को तब तक न खोलें जब तक आपसे कहा न जाए।
  2. प्रश्न-पुस्तिका में 100 प्रश्न हैं। परीक्षार्थी को 75 प्रश्नों को केवल दी गई OMR आन्सर-शीट पर ही हल करना है, प्रश्न-पुस्तिका पर नहीं। सभी प्रश्नों के अंक समान हैं।
  3. प्रश्नों के उत्तर अंकित करने से पूर्व प्रश्न-पुस्तिका तथा OMR आन्सर-शीट को सावधानीपूर्वक देख लें। दोषपूर्ण प्रश्न-पुस्तिका जिसमें कुछ भाग छपने से छूट गए हों या प्रश्न एक से अधिक बार छप गए हों या उसमें किसी अन्य प्रकार की कमी हो, तो उसे तुरन्त बदल लें।

(Remaining instructions on the last page)

(शेष निर्देश अन्तिम पृष्ठ पर)

***(Only for Rough Work)***

1. Full duplex communication system has :
  - (A) Communication in single direction
  - (B) Communication in both the directions
  - (C) Communication in single direction at a time
  - (D) All of the above
  
2. Location area is a group of ..... in wireless communication.
  - (A) Cells
  - (B) MSC
  - (C) Mobile phones
  - (D) None of the above
  
3. The maximum transceivers handled by BSS are ..... .
  - (A) 4
  - (B) 8
  - (C) 16
  - (D) 32
  
4. 1G technology uses ..... for the division of channels.
  - (A) TDMA
  - (B) FDMA
  - (C) TDD
  - (D) FDD
  
5. Edge excited hexagonal system has :
  - (A) Directional antenna
  - (B) Yagi uda antenna
  - (C) Omnidirectional antenna
  - (D) None of the above
  
6. The advantage of using frequency reuse is :
  - (A) Increased capacity
  - (B) Limited spectrum is required
  - (C) Both (A) and (B)
  - (D) None of the above
  
7. In a dynamic channel assignment strategy :
  - (A) Each cell is assigned a predefined set of frequencies
  - (B) The call is served by unused channels of cell
  - (C) The call get blocked if all the channels are occupied
  - (D) None of the above
  
8. OSS stands for ..... .
  - (A) Open source software
  - (B) Open source system
  - (C) Operator services system
  - (D) Operation and support system

9. In the GSM network GPRS is a part present in .....
- (A) BTS
  - (B) BSS
  - (C) NSS
  - (D) HLR
10. Which service is not extra charged by the service providers ?
- (A) Call barring
  - (B) Calling number identification
  - (C) Call conferencing
  - (D) Advice of charge
11. Direct RF pulse system helps in calculating :
- (A) Impulse response infrequency domain
  - (B) Impulse response in phase domain
  - (C) Power delay profile
  - (D) None of the above
12. DECT stands for :
- (A) Digital European Cordless Telex
  - (B) Digitized Emergency Cellular Telephone
  - (C) Digital European Cordless Telephone
  - (D) Digital European Cellular Telephone
13. TMSI stands for :
- (A) Temporary Mobile Service Industry
  - (B) Temporary Mobile Subscriber Identity
  - (C) Temporary Mobile Subscription Identification
  - (D) Temporary Mobile Service Identification
14. The node variants of GSN in GPRS are :
- (A) GGSN
  - (B) SGSN
  - (C) Both (A) and (B)
  - (D) BTS
15. The 2G GSM technology uses a carrier separation of :
- (A) 200 kHz
  - (B) 30 kHz
  - (C) 12 kHz
  - (D) 1.02 MHz
16. PIN used to protect SIM card has ..... digits.
- (A) 3
  - (B) 4
  - (C) 5
  - (D) 6

17. MAHO stands for :
- (A) MSC Assisted Handoff
  - (B) Mobile Assisted Handoff
  - (C) Machine Assisted Handoff
  - (D) Man Assisted Handoff
18. The time ever which a call can be maintained within a cell without handoff is :
- (A) Run time
  - (B) Peak time
  - (C) Dwell time
  - (D) Cell time
19. Umbrella cell approach is possible by using .....
- (A) Antenna of same heights
  - (B) Antenna of different heights
  - (C) Different voice channels
  - (D) Different control channels
20. Interference on voice channel causes :
- (A) Crosstalk
  - (B) Blocked calls
  - (C) Queuing
  - (D) Missed calls
21. What is the cluster size for CDMA ?
- (A) 10
  - (B) 100
  - (C) 1
  - (D) 7
22. Who developed the fundamental of tunking theory ?
- (A) Newton
  - (B) Ohm
  - (C) Erlang
  - (D) Einstein
23. Mobile assisted handoff MAHO provides :
- (A) MSC need not to monitor the signal
  - (B) Faster handoff
  - (C) Suitability for handoff
  - (D) All of the above
24. Which method of cellular network assists in minimizing the co-channel interference with angle of degree ?
- (A) Cell splitting
  - (B) Cell sectoring
  - (C) Cell segmentation
  - (D) None of the above

25. Co-channel reuse ratio depends on :
- (A) Radius of the cell
  - (B) Reuse distance
  - (C) Frequency allocation of nearest cell
  - (D) Both (A) and (B)
26. Far field region is also known as :
- (A) Near Far region
  - (B) Fraunhofer region
  - (C) Erleng region
  - (D) Fresnel region
27. When a wave falls on a perfect dielectric :
- (A) Wave is partially reflected and perfectly refracted.
  - (B) All energy is reflected back without loss of energy.
  - (C) Part of energy get absorbed
  - (D) None of the above
28. Small cells are also called :
- (A) Microcell
  - (B) Macrocell
  - (C) Femtocell
  - (D) Picocell
29. Calculate the brewster angle for permittivity of 4 :
- (A) 56.26
  - (B) 46.26
  - (C) 36.26
  - (D) 26.26
30. Total number of available radio channels is :
- (A) N
  - (B) 2N
  - (C) nN
  - (D) Q/R
31. Why the shape of cell is not a circle ?
- (A) Omnidirectionality
  - (B) Small area
  - (C) Gaps are left
  - (D) Complex design
32. What is frequency reuse factor for N cells in a cluster ?
- (A) N
  - (B) 2N
  - (C) 7N
  - (D) 1/N

33. Capacity of a cellular system is directly proportional to :
- (A) Number of cells
  - (B) Number of times cell is replicated
  - (C) Number of base stations
  - (D) Number of users
34. EIRP is :
- (A) Effective isotropic radiated power
  - (B) A factor of power and gain of transmitter
  - (C) Maximum radiated power by transmitter
  - (D) None of the above
35. PN sequence size depends on :
- (A) Correlator
  - (B) Adder
  - (C) Shift registers
  - (D) PLL
36. The digital modulation technique used in flat fading channel is :
- (A) BPSK
  - (B) ASK
  - (C) FSK
  - (D) QPSK
37. Working of Adaptive Equalizer include :
- (A) Training
  - (B) Tracking
  - (C) Modulation
  - (D) Both (A) and (B)
38. Which of the following is not a channel parameter ?
- (A) Bandwidth
  - (B) Coherence time
  - (C) Rms delay spread
  - (D) Doppler spread
39. Flat fading channel is also known as :
- (A) Amplitude varying channel
  - (B) Wideband channel
  - (C) Phase varying channel
  - (D) Frequency varying channel
40. If coherence time of the channel is more than the symbol period of the transmitted signal, it is :
- (A) Fast fading
  - (B) Slow fading
  - (C) Frequency selective fading
  - (D) Frequency non-selective fading

41. For rayleigh fading signal mean and median differ by :
- (A) 2 dB
  - (B) 10 dB
  - (C) 0.55 dB
  - (D) 100 dB
42. The envelope of bandpass noise is .....
- (A) Uniformly distributed
  - (B) Rayleigh
  - (C) Ricean
  - (D) Gaussian
43. Level crossing rate is a function of .....
- (A) Transmitted power
  - (B) Power density of receiver
  - (C) Mobile speed
  - (D) None of the above
44. According to two ray around reflection model :
- (A) Received power falls with fourth of the distance between the transmitter and receiver
  - (B) Increases with square of the distance between the transmitter and receiver
  - (C) Received power increases with gains of transmitting and receiving antennas
  - (D) All of the above
45. Doppler shift refers to :
- (A) Change in received signal frequency
  - (B) Temporary failure of message transfer
  - (C) Large coherence time of the channel as compared to the delay constraints
  - (D) None of the above
46. The rapid fuctuations due to small scale fading affect the ..... design.
- (A) Transmitter
  - (B) Receiver
  - (C) MSC
  - (D) BSC
47. Increase in Co-channel reuse ratio indicates :
- (A) Better transmission quality
  - (B) Low co-channel interference
  - (C) Both (A) and (B)
  - (D) None of the above



48. Intersymbol interference leads to ..... probability of receiver for making an error in detecting the symbols.
- (A) increased
  - (B) decreased
  - (C) zero
  - (D) one
49. Why spread spectrum technique is inefficient for a single user ?
- (A) Large transmission bandwidth
  - (B) Small transmission bandwidth
  - (C) Fixed transmission bandwidth
  - (D) Fixed null bandwidth
50. Which of the following is not a property of spread spectrum techniques ?
- (A) Interference rejection
  - (B) Multipath fading
  - (C) Frequency planning
  - (D) Multiple access
51. DSSS system spreads the baseband signal by ..... baseband signal and PN sequence.
- (A) Adding
  - (B) Subtracting
  - (C) Multiplying
  - (D) Dividing
52. The interference between the neighboring base stations is avoided by :
- (A) Assigning different group of channels
  - (B) Using transmitters with different power level
  - (C) Using different antennas
  - (D) All of the above
53. Which two channels are responsible for voice transmission ?
- (A) FCC, RCC
  - (B) FCC, RVC
  - (C) FVC, RVC
  - (D) RCC, FVC
54. Which of the following is not the channel parameter ?
- (A) Bandwidth
  - (B) Mean delay
  - (C) Doppler spread
  - (D) Rms delay spread
55. .... leads to time dispersion and frequency selective fading.
- (A) Doppler spread
  - (B) Multipath delay spread
  - (C) Time dispersion parameters
  - (D) None of the above

56. Flat fading channel is also known as :
- (A) Amplitude varying
  - (B) Phase varying
  - (C) Frequency varying
  - (D) Wideband channel
57. In slow fading channel, Doppler spread of the channel is much less than ..... of baseband signal.
- (A) Symbol period
  - (B) Phase
  - (C) Coherence time
  - (D) None of the above
58. What is the main disadvantage of RF pulse system ?
- (A) Simplicity
  - (B) Interference and noise
  - (C) Not real time
  - (D) Complexity
59. Which of the following distributions is used for describing statistical nature of received envelope of multipath component ?
- (A) Rayleigh distribution
  - (B) Doppler distribution
  - (C) Log normal distribution
  - (D) Hata distribution
60. What is the set of possible carrier frequencies in FH-SS ?
- (A) Hop
  - (B) Hop set
  - (C) Symbols
  - (D) Chips
61. The phase difference between a direct line of sight path and diffracted path is function of :
- (A) Height and position of obstruction
  - (B) Only height
  - (C) Operating frequency
  - (D) Polarization
62. Scattering occur when medium consists of objects with dimensions ..... compared to wavelength.
- (A) Same
  - (B) Small
  - (C) Very Small
  - (D) Large

63. Surface roughness are often tested using :
- (A) Nyquist criterion
  - (B) Rayleigh criterion
  - (C) Lawson criterion
  - (D) Barkhausen criterion
64. Which of the following memory device stores information such as subscriber's identification number in GSM ?
- (A) SIM
  - (B) Register
  - (C) Flip flop
  - (D) SMS
65. Which of the following does not come under subsystem of GSM architecture ?
- (A) RSS
  - (B) NSS
  - (C) OSS
  - (D) Channel
66. Which of the following is not a property of MSK ?
- (A) Self synchronizing capability
  - (B) Variable envelope
  - (C) Spectral efficiency
  - (D) Good BER performance
67. Free space propagation model is to predict :
- (A) Received signal strength
  - (B) Transmitted power
  - (C) Gain of transmitter
  - (D) Gain of receiver
68. The actual received signal is ..... than what is predicted by reflection and diffraction model.
- (A) weak
  - (B) equal
  - (C) stronger
  - (D) very weak
69. A surface is considered rough if protuberance is ..... than critical height.
- (A) equal
  - (B) less
  - (C) greater
  - (D) no relation
70. Power density is basically termed as ..... power per unit area.
- (A) Reflected
  - (B) Refracted
  - (C) Radiated
  - (D) Diffracted

71. Doppler shift is directly proportional to :
- (A) Height of antenna
  - (B) Velocity
  - (C) Power of receiving antenna
  - (D) Power of transmitter
72. Average received signal power decreases ..... with distance.
- (A) Exponentially
  - (B) Logarithmically
  - (C) Two times
  - (D) Four times
73. Which distribution describes the shadowing effect ?
- (A) Log normal distribution
  - (B) Nakagami distribution
  - (C) Cauchy distribution
  - (D) Rayleigh distribution
74. What is the name of a database used mainly that stores information of a subscriber along with eligible services under roaming or another MSC area ?
- (A) HLR
  - (B) VLR
  - (C) AuC
  - (D) EIR
75. Antenna efficiency is given by the ratio of .....
- (A) Losses
  - (B) Physical aperture to effective aperture
  - (C) Signal power to noise power
  - (D) Effective aperture to physical aperture
76. The DECT system is based on :
- (A) TCP
  - (B) IP
  - (C) OSI
  - (D) AMPS
77. Which of the following measures spectrum efficiency of a wireless system ?
- (A) Channel capacity
  - (B) Radio capacity
  - (C) Spectral capacity
  - (D) Carrier capacity
78. Which of the following layers consists of paging channel and control channel ?
- (A) Physical layer
  - (B) Network layer
  - (C) Data link layer
  - (D) MAC layer

79. .... is a third generation personal communication system.
- (A) PACS
  - (B) AMPS
  - (C) IS-95
  - (D) GSM
80. Which of the following standard had not adopted digital TDMA for high capacity ?
- (A) USDC
  - (B) GSM
  - (C) PDC
  - (D) IS.95
81. For which type of connection WPA security used ?
- (A) Ethernet
  - (B) Bluetooth
  - (C) WiFi
  - (D) Infrared
82. IEEE 802.11 defines basic service set as building block of a wireless :
- (A) LAN
  - (B) WAN
  - (C) MAN
  - (D) ALOHA
83. Parameter that is normally achieved through a trailer added to end of frame is :
- (A) Flow control
  - (B) Access control
  - (C) Error control
  - (D) None of the above
84. Which of the following specifies WLAN security standard ?
- (A) IEEE 802.11
  - (B) IEEE 802.11g
  - (C) IEEE 802.11b
  - (D) IEEE 802.11i
85. US digital cellular system based on CDMA was standardized as :
- (A) IS-95
  - (B) IS-53
  - (C) IS-12
  - (D) IS-59
86. What was the security algorithm defined for IEEE 802.11 ?
- (A) WEP
  - (B) RSN
  - (C) WPA
  - (D) SSL

87. The smallest beam of a satellite antenna radiation pattern is :
- (A) Zone beam
  - (B) Hemispheric beam
  - (C) Spot beam
  - (D) Global beam
88. The specification of a protocol, along with the chosen key length is known as :
- (A) Cipher suite
  - (B) System suite
  - (C) Key set
  - (D) Service set
89. Several protocols for upper layers in bluetooth use .....
- (A) UDP
  - (B) HSP
  - (C) ITC
  - (D) L2CAP
90. Which is a link layer protocol ?
- (A) ARP
  - (B) TCP
  - (C) UDP
  - (D) HTTP
91. Small scale variations of a mobile radio signal are directly related to :
- (A) Impulse response of mobile radio channel
  - (B) Impulse response of base station
  - (C) Frequency response of antenna
  - (D) Frequency response of base station
92. Determine number of cell in cluster when  $i = 2, j = 2$ .
- (A) 7
  - (B) 12
  - (C) 28
  - (D) 35
93. A spectrum of 30 MHz is allocated to cellular system which uses 50 kHz duplex channel. What is the number of channels available per cell for 4 cell reuse factor ?
- (A) 150
  - (B) 600
  - (C) 50
  - (D) 85
94. What will be coherence bandwidth if approximate delay spread is  $2 \mu \text{ sec}$  ?
- (A) 125 kHz
  - (B) 250 kHz
  - (C) 60 kHz
  - (D) 500 kHz

95. For multipath power profile of a wireless channel, power measurement was (-20 dB, -10 dB, 0 dB, -10 dB) at (10 $\mu$  sec, 15 $\mu$  sec, 20 $\mu$ , sec, 25 $\mu$  sec) correspondingly. What will be mean delay ?
- (A) 5.65  
 (B) 11.56  
 (C) 2.32  
 (D) None of the above
96. GOS is typically given as a likelihood that a ..... .
- (A) Call is in progress  
 (B) Channels are busy  
 (C) Call is blocked  
 (D) Channel is free
97. Discretization of multipath delay axis of impulse response into equal time delay segments is called :
- (A) Excess delay bins  
 (B) Delay bins  
 (C) Discrete bins  
 (D) Digital bins
98. In a microcell zone concept, when a mobile travels from one zone to another within the cell, it retains the same :
- (A) Power level  
 (B) Base station  
 (C) Channel  
 (D) Receiver
99. Consider a vehicle moving at 90 miles/Hr at an angle of 50 degree. What will be Doppler shift of received signal at a carrier frequency of 900 Hz ?
- (A) 146 Hz  
 (B) 1564 Hz  
 (C) 468 Hz  
 (D) None of the above
100. For predicting the field strength in a given service area, it is essential to estimate ..... .
- (A) Polarization  
 (B) Magnetic field  
 (C) Height of transmitter  
 (D) Signal attenuation

4. Four alternative answers are mentioned for each question as—A, B, C & D in the booklet. The candidate has to choose the correct answer and mark the same in the OMR Answer-Sheet as per the direction :

**Example :**

**Question :**

Q. 1 (A) ● (C) (D)

Q. 2 (A) (B) ● (D)

Q. 3 (A) ● (C) (D)

Illegible answers with cutting and over-writing or half filled circle will be cancelled.

5. Each question carries equal marks. Marks will be awarded according to the number of correct answers you have.
6. All answers are to be given on OMR Answer sheet only. Answers given anywhere other than the place specified in the answer sheet will not be considered valid.
7. Before writing anything on the OMR Answer Sheet, all the instructions given in it should be read carefully.
8. After the completion of the examination candidates should leave the examination hall only after providing their OMR Answer Sheet to the invigilator. Candidate can carry their Question Booklet.
9. There will be no negative marking.
10. Rough work, if any, should be done on the blank pages provided for the purpose in the booklet.
11. To bring and use of log-book, calculator, pager and cellular phone in examination hall is prohibited.
12. In case of any difference found in English and Hindi version of the question, the English version of the question will be held authentic.

**Impt. :** On opening the question booklet, first check that all the pages of the question booklet are printed properly. If there is any discrepancy in the question Booklet, then after showing it to the invigilator, get another question Booklet of the same series.

4. प्रश्न-पुस्तिका में प्रत्येक प्रश्न के चार सम्भावित उत्तर—A, B, C एवं D हैं। परीक्षार्थी को उन चारों विकल्पों में से सही उत्तर छँटना है। उत्तर को OMR आन्सर-शीट में सम्बन्धित प्रश्न संख्या में निम्न प्रकार भरना है :

उदाहरण :

प्रश्न :

प्रश्न 1 (A) ● (C) (D)

प्रश्न 2 (A) (B) ● (D)

प्रश्न 3 (A) ● (C) (D)

अपठनीय उत्तर या ऐसे उत्तर जिन्हें काटा या बदला गया है, या गोले में आधा भरकर दिया गया, उन्हें निरस्त कर दिया जाएगा।

5. प्रत्येक प्रश्न के अंक समान हैं। आपके जितने उत्तर सही होंगे, उन्हीं के अनुसार अंक प्रदान किये जायेंगे।
6. सभी उत्तर केवल ओ. एम. आर. उत्तर-पत्रक (OMR Answer Sheet) पर ही दिये जाने हैं। उत्तर-पत्रक में निर्धारित स्थान के अलावा अन्यत्र कहीं पर दिया गया उत्तर मान्य नहीं होगा।
7. ओ. एम. आर. उत्तर-पत्रक (OMR Answer Sheet) पर कुछ भी लिखने से पूर्व उसमें दिये गये सभी अनुदेशों को सावधानीपूर्वक पढ़ लिया जाये।
8. परीक्षा समाप्ति के उपरान्त परीक्षार्थी कक्ष निरीक्षक को अपनी OMR Answer Sheet उपलब्ध कराने के बाद ही परीक्षा कक्ष से प्रस्थान करें। परीक्षार्थी अपने साथ प्रश्न-पुस्तिका ले जा सकते हैं।
9. निगेटिव मार्किंग नहीं है।
10. कोई भी रफ कार्य, प्रश्न-पुस्तिका के अन्त में, रफ-कार्य के लिए दिए खाली पेज पर ही किया जाना चाहिए।
11. परीक्षा-कक्ष में लॉग-बुक, कैलकुलेटर, पेजर तथा सेल्युलर फोन ले जाना तथा उसका उपयोग करना वर्जित है।
12. प्रश्न के हिन्दी एवं अंग्रेजी रूपान्तरण में भिन्नता होने की दशा में प्रश्न का अंग्रेजी रूपान्तरण ही मान्य होगा।

**महत्वपूर्ण :** प्रश्नपुस्तिका खोलने पर प्रथमतः जाँच कर देख लें कि प्रश्न-पुस्तिका के सभी पृष्ठ भलीभाँति छपे हुए हैं। यदि प्रश्नपुस्तिका में कोई कमी हो, तो कक्षनिरीक्षक को दिखाकर उसी सिरीज की दूसरी प्रश्न-पुस्तिका प्राप्त कर लें।