ELECTRONICS & COMMUNICATION ENGINEERING
WIRELESS COMMUNICATION
Question Bank

1. What are the types of Services?
2. What are the Requirements for the services?
3. What is a page?
4. What are the basic units of a Cellular system?
5. What is base station?
6. What is MSC?
7. What do you mean by forward and reverse channel?
8. Define cell
9. What is foot print?
10. What is channel assignment? What are the types?
11. What are the techniques used to expand the capacity of cellularsystem?
12. What is meant by frequency reuse?
13. What is co channel interference?
14. Define adjacent channel interference.
15. Define Grade of service.
16. What is blocked call clear system (BCC)?
17. What is blocked call delay system?
18. Define cell splitting.
19. What is sectoring?
20. Differentiate Cellular telephony and Cordless telephony.
21. When does a WLAN become a personal Area Network (PAN)?
22. Define signal to interference ratio.
23. Define flat fading.
24. What is a multiple accessing technique?
25. What are the three most important effects of small signal fading?
26. Define the frequency reuse concept.
27. What is the cellular principle?
28. State the operating principle of adhoc networks.
29. What is coherence time and coherence bandwidth?
30. Differentiate flat fading and frequency selective fading.
31. State some of the features of CDMA.

32. What is Random Access?

33. What is FDMA?

34. What is multiple access?

35. What is TDMA?

36. What is CDMA?

37. What is SDMA?

38. What is the advantage of TDMA?

39. State some of the features of CDMA.

40. Define efficiency of TDMA.

41. What are the features of TDMA?

42. What is time division multiplexing?

43. What are the features of FDMA?

44. Discuss on various types of wireless services and its requirements.

45. Explain in detail the evolution of wireless communication?

46. Write short notes on different trends in cellular radio & personal communication.

47. Enumerate on spectrum limitation.

48. Explain about noise and interference limited system.

49. Briefly explain the principle of cellular networks.

50. Compare FDMA, TDMA & CDMA.

51. Discuss and explain the multipath propagation.

52. Describe in detail about the history of development of Paging and the future trends of paging systems.

53. Explain in detail the different techniques used to improve coverage & capacity of cellular system.

54. Describe in detail about the Wireless Services and it types.

55. Write short notes on frequency reuse & channel assignment.

56. Explain the Multiple Access methods with neat diagrams.

57. Explain the cellular system architecture in detail.

58. Explain frequency reuse in detail.

59. Explain the various types of Handoff processes available

60. Compare and contrast Wired and Wireless communication

61. State the difference between small scale and large scale fading.

62. Define large scale propagation model.

63. What is scattering?

64. What is the function of outdoor propagation model?

65. Define coherence time and coherence bandwidth

66. What is link budget calculation?

67. What is small scale model?

68. Name some of the outdoor propagation models.

69. What is flat fading?

70. What are the two modes in Longley Rice model?

71. Name the three basic reflection types.

72. What is Huygen's principle?

73. Define EIRP.

74. What is knife edge diffraction?

75. Define fast fading channel?

76. Define slow fading channel?

77. Define Doppler shift?

78. List the advantages and disadvantage of Hata model?

79. What is Brewster angle?

80. What do you mean by WSSUS channels?

81. Write a note on Reflecting from a ground plane.

82. What is meant by slow fading channel?

83. What is meant by Doppler spread?

84. Distinguish between flat fading and frequency selective fading.

85. What is flat fading?

86. What is the relationship between Doppler spread and Coherence time?

87. What are the propagation mechanisms of EM waves?

88. Explain in detail the three significant wave propagation mechanisms that affect the propagation of EM waves.

89. Explain in detail about time selective channels and WSSUS channels.

90. Explain the propagation effects with Mobile Radio.

91. Explain in detail about Link power budget Analysis.

92. Explain in detail about Narrowband models.

93. Compare the two widely used sophisticated models.

94. Explain the various types of outdoor propagation model.

95. Explain in detail about frequency selective channels and Non-stationary channels.

96. Explain about the properties of Nakagamai distribution.

97. Explain about the properties of Rayleigh Distribution

98. Explain Shadowing Distribution.

99. Explain HATA model and its COST 231 extension.

100.　Explain the NLOS Multipath fading model.

101.　Explain the three basic reflection types with neat diagram.

102.　Explain the two important theories related to scattering by rough surfaces.

103. What is meant by Time Invariant and Time Variant Channels? Explain.

104. Enumerate of propagation mechanism.

105. Discuss about propagation effects with mobile radio

106. Explain Rayleigh and Ricean fading.

107. Explain about channel classification.

108. Explain Time selective and frequency selective channels.

109. Brief notes about link calculations for various applications

110. What are Narrow band models, explain the significance of each model

111. Explain free space link budget.

112. Discuss Terrestrial link budget with suitable example.

113. Discuss on wide band models.

114. Write short notes on diffraction and scattering.
115. Write the advantages of MSK over QPSK.

116. Define M-ary transmission system?

117. What is quadrature modulation?

118. What is QAM?

119. Define QPSK?

120. What is linear and non- linear modulation?

121. What is the need of Gaussian filter?

122. Mention some merits of MSK

123. Give some examples of linear modulation?

124. Define slow and fast fading channel

125. List the advantages of digital modulation technique?

126. Define digital modulation?

127. What are the types of digital modulation technique?

128. Define Power efficiency?

129. Define constellation diagram? What do you infer from it?

130. Define offset QPSK, Differential QPSK.

131. List the salient features of MSK scheme.

132. Why GMSK is preferred for multiuser, cellular communications?

133. Define the term Bandwidth efficiency

134. What is up converter?
135. Draw and explain the structure of wireless communication link

136. Explain the generation, detection and bit error probability of QPSK technique.

137. What are the salient features of Offset QPSK?

138. Explain the principle and operation of Differential QPSK transmission and reception.

139. What is BFSK? Derive the bit error probability of BFSK and also explain the

constellation diagram of it.

140. Explain the generation, detection and constellation diagram of MSK scheme.

141. Enumerate on Gaussian MSK. Why we prefer it for wireless communication?

142. Discuss about the error performance of various modulation techniques in fading channels.

143. Describe in detail about the Digital modulation schemes DPSK and QPSK

144. Describe in detail about the Digital modulation schemes BPSK.

145. Explain in detail Error probability in flat fading channels

146. Explain in detail Error probability in delay and frequency-dispersive fading channels.

Explain in detail about optimum receiver structure for Non-coherent detection

147. Explain the principle and operation of $\pi/4$ Differential QPSK transmission and reception

148. Drive an expression for M-ary Phase shift Keying and QAM and also drive their BER What is threshold combining? Explain.

149. What are Smart Antennas?

150. State the principle of diversity.

151. Define channel Inversion.

152. Define space diversity.

153. Give the advantage of receiver diversity.

154. What is frequency diversity?

155. What is time diversity?

156. What is polarization diversity?

157. What are the techniques used to improve the received signal quality?

158. What is the need for diversity reception?

159. List the different methods of space diversity.

160. What is the concept of maximal ratio combining?

161. Mention the merits and demerits of Alamouti scheme.

162. What is meant by outage probability?

163. How does the diversity technique combat ISI in the mobile radio propagation?

164. In what ways macroscopic diversity different from microscopic diversity technique to present deep fades.

165. What is the need of equalization?

166. What is diversity?

167. What is Macro and Micro Diversity?

168. Define adaptive equalization?

169. Define training mode& tracking mode in an adaptive equalizer?

170. Write a short note on linear equalizers and non linear equalizers?

171. Why non linear equalizers are preferred?

172. What are nonlinear equalization methods?

173. What are the factors used in adaptive algorithms?

174. Write the advantages of LMS algorithm.

175. What are the advantages of RLS algorithm?

176. Define STCM

177. What are the two types of linear predictive coders?

178. What is the criterion for the selection of speech coders for mobile communication?

179. Explain Maximum Ratio Combining and Equal Gain Combining Technique iid diversity.

180. Explain the different ways of achieving independent fading paths in a wireless System.

181. Explain the Receiver diversity Techniques: a) Selection Combining b) Threshold Combining

182. Explain the Signal Combining Techniques in diversity.

183. What do you understand by equal gain combining? Explain.

184. With suitable block diagram explain system model transmitter and receiver CSI along with Shannon capacity.

185. Explain linear combiner along with selection combining and threshold combining.

186. Explain equal gain combining, Transmitter diversity along with channel known at transmitter.

187. Write short notes on Selection Diversity, Feedback Diversity, Threshold Diversity, Maximal Ratio Combining and Equal Gain Diversity.

188. With relevant example illustrate Almouti Scheme, Explain Polarization Diversity.

189. In diversity scheme why do you prefer RAKE receiver? Explain.

190. Explain the function of Transmit diversity for known and unknown channel

191. Explain in detail the channel coding techniques.

192. Explain in detail the speech coding techniques.

193. Draw the block diagram of a LPC coding system & explain the different types of LPC used for wireless systems.

194. With neat diagram explain RAKE receiver.

195. With an example describe the steps involved in channel encoding and decoding process

196. Explain the basic idea about linear and DFE and drive an expression for its MMSE

197. Explain in detail about the Linear and Non Linear Equalizer

198. Explain the following diversity technique 1.Spatial, 2.Temporal, 3.Frequency, 4.Angular, 5.Polarization

199. What is UMTS?

200. What are the three main entities of the UMTS network?

201. What is IEEE 802.11b?

202. What are the three basic topologies supported by IEEE802.11 for WLAN.

203. What is the signal field in DSSS PHY?

204. List some of the new technologies that will be used in the 4G system.

205. What are the three channel types that are used in the UMTS?

206. What is the two network architecture for the WLAN defined in the IEEE802.11 standard?

207. What are the three physical layers in IEEE802.11WLAN?

208. What are the three levels of functionality provided by 802.11 PhysicalLayer?

209. Why data whitening is used for the PSDU?

210. Who authorizes each user's access to a WLAN?

211. What is OFDM? (Dec.2011)

212. Write advantages 2G over 1G.

213. What are services offered by GSM?

214. What is the function of NSS in GSM?

215. What is the function of VLR?

216. What is IS – 95?

217. Why we go for 3G?

218. Define Power control in CDMA.

219. List the types of Frequency Hopping.

220. What is the purpose of SIM?

221. What are the benefits of WLL?

222. What is frequency specification of Bluetooth?

223. Enumerate the different types of common controlchannels

224. Give three important functional block of GSM system

225. Explain in detail about a broadcast channel and a multiple access channel.

226. Compare SDMA and FDMA with suitable applications. ii. Explain scheduling and power control.

227. Explain the technique in which the information signals of different users are modulated by orthogonal or non-orthogonal codes.

228. The original GSM design uses 25 MHz of bandwidth for the uplink and for the downlink. This bandwidth is divided into 125 TDMA channels of 200 KHz each. Each TDMA channel consists of 8 user timeslots: the 8 timeslots along with a preamble and trailing bits form a frame, which is cyclically repeated in time. Find the total number of users that can be supported in the GSM system and the channel bandwidth of each user.

229. Explain with necessary diagrams the multiuser channels.

230. Explain in detail about CDMA with neat diagrams

231. Explain in detail about SDMA with neat diagrams

232. Write short notes on: i) Multiuser Diversity and ii) MIMO multiuser systems.

233. Explain the DSSS system model and synchronization loop for DSSS.

234. What is a RAKE receiver? Explain in detail.

235. Discuss the concept of FHSS system model.

236. Explain the operation of multiuser FHSS Technique with relevant block diagram.

237. Discuss the 3G overview and UMTS Basics

238. With a neat diagram explain the 3GPP Network Architecture.

239. Draw the OSI model for IEEE 802.11 and explain DSSS Physical Layer.

240. Explain FHSS PHY transmitter and receiver with a neat block diagram.

241. Draw the 4G visions and give the comparison of key parameters of 4G with 3G.

242. Explain 4G Key challenges and their proposed solutions.

243. Explain IEEE 802.11 MAC frame format.

244. Explain BSS and ESS configuration of IEEE 802.11 WLAN.

245. Explain the Smart Antenna Techniques with a neat diagram.

246. With a neat diagram explain IEEE802.11 Architecture

247. Discuss the role of three channel types that are used in UMTS.

248. Discuss the roles of 3G systems

249. Explain forward & reverse channel parameters of IS-95 CDMA

250. Explain in detail the 1G, 2G, 3G generation systems & their standards

251. List out the benefits of cyclic prefix in OFDM

252. Explain about CDMA principle, power control

253. Explain with necessary diagram, the operation of OFDM transceiver