

MAR ELIAS COLLEGE, KOTTAPPADY

BCA DEGREE (C.B.C.S) MODEL QUESTIONS

FIRST SEMESTER

CA1CRT01: Computer Fundamentals and Digital Principles (Core)

2 Mark questions

1. List the four parts of a complete computer system.
2. What are the four phases of the information processing cycle?
3. Identify four categories of computer hardware.
4. List four units of measure for computer memory and storage, not including the byte.
5. What are the two most common input and output devices?
6. Name and differentiate the two main categories of storage devices.
7. Name and differentiate the two main categories of computer software.
8. What is the difference between data and information?
9. What is a fundamental difference between data and programs?
10. List five tasks a user may be responsible for, when working with a personal computer.
11. What is Hardware? Give examples.
12. What is Software? Give examples.
13. Write down the units of measure for computer memory and storage.
14. Explain the terms "hard copy" and "soft copy".
15. What is an Operating System? Give examples.
16. What is a computer?
17. Explain a few of the different ways in which computers can be categorized.
18. List six types of computers that are designed for use by a single person.
19. Describe the two common designs for desktop computers.
20. How much do notebook computers typically weigh?
21. List four types of computers that are designed for use by organizations, and are commonly used by multiple people at the same time.
22. Why are mainframe systems usually limited in the number of tasks they perform?
23. What is the most popular use for home computers?

24. How are computer technologies used by the military?
25. How are computer technologies being used to train surgeons?
26. How are analog computers different from digital computers?
27. What is a work station? Write down its features.
28. How does a dumb terminal differ from an intelligent terminal?
28. What is a midrange computer? Why is it called so
29. In your own words, briefly answer the following questions.
30. Most standard keyboards include five major groups of keys. List them.
31. Why are most standard keyboards called "QWERTY keyboards"?
32. What does the CTRL key do?
33. What is the purpose of the START key, which appears on many IBM-compatible keyboards?
34. What happens when you press a key on the computer's keyboard?
35. What is the purpose of the mouse pointer?
36. How does a mechanical mouse work?
37. Describe two benefits of using a mouse.
38. What does the term dragging mean and how do you do it?
39. Describe the cause and effect of carpal tunnel syndrome.
40. What are Function keys?
41. What are Modifier keys?
42. Explain a non-mechanical mouse with an example.
43. State the difference between trackball and touchpad.
44. What are the steps that you will take to avoid RSI while working with the keyboard and mouse?
45. In your own words, briefly answer the following questions.
 - a. There are two basic types of monitors used with PCs. List them.
 - b. How does a color CRT monitor produce images on the screen?
 - c. What are two disadvantages of CRT monitors, compared to flat-panel displays?
 - d. What are two disadvantages of LCD monitors, compared to CRT monitors?
 - e. How does a plasma display monitor work
 - f. List the four factors you should consider when comparing monitors.
 - g. As it relates to monitors, what does the term "resolution" refer to?
 - h. What is dot pitch?
 - i. How should you position your monitor, if you want to avoid eyestrain?
 - j. How does digital light processing (DLP) technology work?
 - k. How are monitors categorized based on the color features?

- l. Z is a pixel? Explain.
 - m. What is LCD? Expand and explain.
 - n. Explain the term "submarining".
 - o. What is VRAM?
46. Briefly answer the following questions
- a. List four types of magnetic storage media commonly used with PCs.
 - b. List seven types of optical storage devices that can be used with PCs.
 - c. Name three types of solid-state storage devices.
 - d. Why is a hard disk called a random access storage device?
 - e. Describe how a magnetic disk drive's read/write head can pass data to and from the surface of a disk
 - f. What is the purpose of formatting a magnetic disk?
 - g. What is the storage capacity of a standard floppy disk?
 - h. Although magnetic tape can store a large quantity of data, it has one drawback when compared to other storage media, such as hard disks. Describe that drawback.
 - i. Describe the function of lands and pits on the surface of a compact disc.
 - j. How does a solid-state disk store data
 - k. How do magnetic storage devices store data?
 - l. What is FAT32? Expand and explain.
 - m. What is a tape drive? What is its memory capacity?
 - n. Write a short note on the speed of a CD-ROM drive.
 - o. What is Flash memory?
47. In your own words, briefly answer the following questions.
- a. List four benefits that networks provide to their users
 - b. . b. How can a network help a small business save money
48. List four types of network topologies used in wire-based networks.
49. 5 Name three common LAN protocols.
50. A network is a set of technologies that can be used to connect computers together. What three general components are needed to set up a network?
51. What are packets and how do they work?
52. Companies use their own Web sites to support operations. What is the distinction between an intranet and an extranet?
53. Companies are attempting to save telephone communication costs by implementing this technology. What is the technology called?
54. Explain the following terms-Network servers, file server and print server.

55. What is teleconferencing?
56. What is data conferencing?
57. Differentiate between the characteristics of primary and secondary storage of a computer system
58. What are the five basic operations performed by any computer system?
59. What are the basic components of the CPU of a computer system? Describe the roles of each of the components in the functioning of a computer system.
60. Draw a block diagram to illustrate the basic organization of a computer system, and explain the functions of the various units.
61. What is an input interface? How does it differ from an output interface?
62. List out the logical steps taken by a computer system, along with the roles of its main units in each step, while transforming input data to useful information, for presentation to the user.
63. What is a system? Why is a computer often referred to as a computer system?
66. What are logic gates?
67. Distinguish between AND and OR gates.
68. Define truth table.
69. Differences between NOT, NAND and NOR gates.
70. Draw truth table of AND gate.
71. Draw truth table of OR gate.
72. Draw truth table of NOT gate.
73. Draw truth table of NAND gate.
74. Draw truth table of NOR gate.
75. Define Associative law.
76. Define commutative law.
77. What is dual expression?
78. What are canonical expressions?
79. Define min terms?
80. Define max terms.
81. What are SOP Expressions?
82. What are POS Expressions?
83. What is parity bit
84. Which are different types of parity bit?
85. Draw the logic diagram for expression $Y=(A'+B')(C+D)$?

86. What are Don't care conditions?
87. Draw the logic diagram for expression $Y=(A+B')(+D')$?
88. Explain XOR gate.
89. Explain applications of XOR gate.
90. What is flip-flop?
91. Define a latch.
92. What are sequential circuits?
93. What are combinational circuits?
94. Define multiplexer.
95. Define full adder.
96. What are half adders?
97. What are encoders?
98. Define decoder.
99. Define demultiplexers.
100. What are master slave flip-flop?
101. What are A-D converters?
102. What are D-A converters?
103. Why flip-flop considered to be the building block of memory?
104. What are registers?
105. What are the different types of flip-flop?
106. Differentiate between latch and flip-flop.
107. Draw the circuit diagram of S-R flip-flop.
108. What is the operation of RS flip-flop?
109. What is the operation of D flip-flop?
110. What is the operation of JK flip-flop?
111. What is the operation of T flip-flop?
112. Define race around condition.
113. What is edge-triggered flip-flop?
114. Define shift registers.
115. What are the different types of shift type?
116. What do you mean by present state of a flip-flop?

117. What do you mean by next state of a flip-flop?
118. Draw the truth table of S-R flip-flop.
119. Draw the truth table of D flip-flop.
120. Draw the truth table of T flip-flop.
121. Draw the truth table of J-K flip-flop.
122. Draw the truth table of master-slave flip-flop.
123. Draw a 2 to 1 multiplexer circuit

5 Mark questions

125. How many types of storage are normally there in the storage unit of a computer system? Justify the need for each storage type.
126. What is the difference between positional and non positional number systems? Give examples of both types of number systems
127. What is meant by the base of a number system? Give examples to illustrate the role of base in positional number systems
128. What is the value of the base for decimal hexadecimal, binary and octal number systems?
129. Give an example for octal number system to show that the same digit may signify different values, depending on the position it occupies in the number.
130. What will be the total number of different symbols or digits, and the maximum value of a single digit for the following number systems:
- (a) Number system with base 5
 - (b) Number system with base 20
 - (c) Number system with base 9
 - (d) Number system with base 12
131. What is bit in computer terminology? How many different patterns of bits are possible with (a) 6bits (b) 7bits (c) 8 bits
132. Explain the meaning of the term "memory dump".
133. Find out decimal equivalent of the following

- (a) 1110101
- (b) 11010
- (c) 10110011
- (d) 11011101
- (e) 10110001100
- (f) 1000
- (g) 111

134. Find out the octal equivalent of the binary numbers of the following

- (h) 1110101
- (i) 11010
- (j) 10110011
- (k) 11011101
- (l) 10110001100
- (m) 1000
- (n) 111

135. Find out the hexadecimal equivalent of the binary

- (o) 1110101
- (p) 11010
- (q) 10110011
- (r) 11011101
- (s) 10110001100
- (t) 1000
- (u) 111

136. Convert the following number to decimal

- b. 110110_2
- c. $2A3B_{16}$
- d. 1234_9

137. Convert the following decimal numbers to binary numbers

- e. 435_{10}

- f. 1694_{10}
- g. 32_{10}
- h. 135_{10}

138. Convert the decimal numbers to octal numbers

- i. 435_{10}
- j. 1694_{10}
- k. 32_{10}
- l. 135_{10}

139. Convert the decimal numbers to hexadecimal numbers

- m. 435_{10}
- n. 1694_{10}
- o. 32_{10}
- p. 135_{10}

140. Carry out the following conversions (a) 125_6 (b) 24_9

141. Convert the following numbers to their binary equivalent

- a. $2AC_{16}$
- b. FAB_{16}
- c. 2614_8
- d. 562_8

142. Find the decimal equivalent of the following numbers

- 11101_2
- 1001.011_2
- 247.65_8
- $A2B.D4_{16}$

143. Why are octal and/or hexadecimal number systems used as shortcut notations?

144. Find out the decimal equivalent of the following binary numbers

- (a) 1101011
- (b) 11010
- (c) 10110011
- (d) 11011101

145. Define the term 'byte'. What is the difference between a bit and a byte?

146. Write the 4-bit BCD code for the following

1280

147. Using binary notation, show the BCD coding for the following words.

- a. BIT
- b. CODE
- c. ZERO
- d. BYTE

148. Using octal notation, show the BCD coding for the following

- a. COMPUTER
- b. INPUT
- c. VIDEO
- d. OUTPUT

149. Why was BCD code extended to EBCDIC?

150. How many different characters are possible for the following codes?

- a) BCD
- b) EBCDIC
- c) ASCII-7
- d) ASCII-8

151. Why are octal and hexadecimal shortcut notations used? Identify the shortcut notations used for each of these computer codes:

- (a) BCD
- (b) EBCDIC
- (c) ASCII-7
- (d) ASCII-8

152. Why do we have a packed decimal format? How does it differ from a zoned decimal format?

153. A new computer code is designed, which uses 9 bits. How many different characters are possible in this code?

154. Using binary notation, write the EBCDIC coding for the following words:

(e) SUN

(f) CAT

(g) MOON

(h) DOG

How many bytes are required for each of these representations?

155. Using hexadecimal notation, write the EBCDIC coding for the following words:

PROGRAM

BYTE

OCTAL

How many bytes are required for each of these representations?

156. Using hexadecimal notation, write the zoned decimal coding for the following numbers:

a. 1256

b. -63

c. +439

d. -786

How many bytes are required for each of these representations?

157. Using hexadecimal notation, write the packed decimal coding for the following numbers:

(a)12915 (b) +9876 (c)872 (d) -256

How many bytes are required for each of these representations?

158. List out the similarities and differences between 7 bit and 8-bit ASCII.

159. Using binary notation, write the ASCII-7 and ASCII-8 codes for the following words:

- a.DRY
- b.DAMP
- c.WET
- d.TERM

How many bytes are required for each of these representations?

160. Using hexadecimal notation, write the ASCII-7 and ASCII-8 codes for the following words:

(a)PRINT (b) TYPE (c)RUB (d)GIVE

How many bytes are required for each of these representations?

161.What are truth tables . Explain its graphical representation.

162.What are logic gates? Explain.

163.Explain basic laws of Boolean algebra.

164. What are the universal gates and explain them?

165. Prove the De Morgan's theorem with logic diagrams

166.Distinguish between dual and canonical expression.

167. Distinguish between min terms and max terms.

168. Distinguish between SOP and POS.

169. Simplify the expression $Y(A,B,C,D)=\sum(0,2,4,6,8,10,12,14,15)$ using K- map.

170. Simplify the Expression $Y(A,B,C,D)=\sum(0,1,2,3,6,7,15)$

171.Define XOR . Explain its applications.

172. Express the Boolean function $F(p, q, r) = (pq+r)(q+pr)$ in a sum of min terms and a product of max terms.

173. Simplify the following Boolean expressions by manipulation of Boolean algebra.

1. $F(x,y,z) = xy + xyz + xyz' + x'yz$

2. $F(A,B,C,D) = A'C(A'BD)' + A'BC'D' + AB'C$

174. Why are NAND and NOR gates known as universal gates? Explain in detail.

175. What is don't care condition in map simplification, explain it with example.

176. Simplify the Boolean function: $F(x,y,z) = \Sigma(2,3,4,5)$ using Kmap method

177. Draw K-map for 3-variables

178. Convert to the canonical form $F(x,y,z) = \Sigma(1,3,7)$

179. Explain the karnaugh map method

180. Simplify the Boolean function $F(A,B,C,D) = \Sigma(0,1,2,5,8,9,10)$ as

i. Sum of products

ii. Product of sum

181. Simplify $F(W,X,Y,Z) = \Sigma(1,3,7,11,15)$ with don't care function $d(w,x,y,z) = \Sigma(0,2,5)$

182. Simplify the following using K-map $f(x,y,z) = \Sigma(0,2,4,5,6)$

183. Explain Pos method with example?

184. Simplify the following using K-map $f(x,y,z) = \Sigma(0,2,4,5,6)$

185. Distinguish between sequential circuit and combinational circuits.

186. Explain the working of S-R flip-flop with neat diagram .

187. Explain the working of D flip-flop with neat diagram.

188. Explain the working of T flip-flop with neat diagram.

189. Explain the working of J-K flip-flop with neat diagram.

190. Explain the working of J-K master slave flip-flop with neat diagram.

191. Discuss briefly the Full adder with the truth table and circuit .

192. Explain half adder adder with block diagram and truth table.

193. Explain the working of encoders with block diagram.

194. Draw the truth table and circuit diagram of 4 to 2 encoder.

195. Explain the working of decoders with block diagram.

196. Compare the working of half adder and full adder.

197. Compare the working of half encoder and decoder.

198. Explain the working of multiplexers with diagram.
199. Explain the working of demultiplexers with diagram.
200. Compare the working of multiplexer and demultiplexer.
201. Explain the working of A-D converter with diagram
202. Explain the working of D-A converter with diagram
203. Compare the working of A-D and D-A converters.
204. Explain the working of shift registers.
205. Compare the working of SISO and SIPO with diagram.
206. Compare the working of PISO and PIPO with diagram.

15 marks questions

207. A computer uses EBCDIC as its internal representation of characters. In which order will this computer sort the following strings?

- q. ABC
- r. 245
- s. 123
- t. ADD

208. A computer uses ASCII. In which order will this computer sort the following strings?

- a. BED
- b. BAD
- c. 512
- d. ADD

209. Give the full form of the following abbreviations:

- a. BCD
- b. EBCDI
- c. ASCII

210. Why have computers been designed to use the binary number system?

211. Add the binary numbers 1011 and 101 in both decimal and binary forms.

212. Add the binary numbers 1010110 and 1011010.

213. Add the binary numbers 10111 and 1011.

214. Find the complement of the following numbers:

- a. C_{16} .
- b. 495_{10}
- c. 29_{10}
- d. 4_8
- e. 32_8

215. Find the complement of the following binary numbers:

- (a) 10
- (b) 101
- (c) 011011
- (d) 10110001
- (e) 001101001110
- (f) 101101

216. Subtract 0110111_2 from 1101110_2 .

217. Subtract 01010_{10} from 10000_{10} .

218. Subtract 011011_2 from 110111_2 .

219. Subtract 25_{10} from 50_{10} using complementary method.

220. Subtract 25_{10} from 20_{10} using complementary method.

222. Subtract 234_{10} from 588_{10} using complementary method.

223. Subtract 216_{10} from 172_{10} using complementary method.

224. Subtract 01010_2 from 10000_2 using complementary method.

225. Subtract 110111_2 from 101110_2 using complementary method.

226. Subtract 011011_2 from 110111_2 using complementary method.

227. Subtract 1111_2 from 1100_2 using complementary method.

228. Multiply the binary numbers 1100 and 1010.

229. Multiply the binary numbers 01101 and 1001.

230. Multiply the binary numbers 101111 and 111. 21. Divide 110012 by 1012.

231. Divide 0110111, by 01112.

232. Briefly, explain how multiplication and division operations are performed within a computer by using additive approach.

233. What is the primary advantage of performing subtraction by the complementary method in digital computers?

234. Discuss the advantages and disadvantages of performing the various arithmetic operations by additive method in a digital computer.
235. What is a computer network? How is it useful?
236. Identify the basic elements of a communication system and the purpose of each. Differentiate among simplex, half duplex, and full duplex modes of data transmission.
237. Which mode of data transmission is suitable for communication between computer and a terminal ?
238. "A full duplex line is faster since it avoids the delay that occurs in a half duplex circuit." Explain.
239. Explain the terms "bandwidth" and "baud".
240. Differentiate among narrowband, voice band, and broadband communication channels. Give a practical application of each.
241. What is a wire pair? In what situations are they suitable for use in data transmission?
242. What is a coaxial cable? Give some of its practical uses.
243. Explain how microwave systems can be used for communication between two distant stations. How are communications satellites used?
244. What are the possible advantages and limitations of using communications satellite?
245. What is an optical fiber? How is it used for data communications? What are its advantages?
246. Differentiate between analog and digital transmission of data. Give their advantages and disadvantages.
247. What do you understand by modulation and demodulation? Why is modulation used in signal transmission?
248. Describe the three different forms of modulation
249. What are modems? What purpose do they serve in data communication systems?
250. Describe some of the common factors to be considered while selecting a modem.
251. What is a repeater? How is it different from an amplifier?
252. When are public telephone lines used to connect a terminal to a computer? Are modems required for this purpose? Why?
253. Explain about the following types of services offered by the common carriers:
- u. Dial-up line
 - v. Leased line
 - w. Integrated Services Digital Network (ISDN) (d) Value Added Network (VAN)
254. What is ISDN? Differentiate between narrowband and broadband ISDN
255. What is a Value Added Network (VAN)?
256. What is a multiplexer? Explain its function with the help of a diagram
257. Describe the two basic methods of multiplexing Give uses of both the methods.

258. List out the differences between FDM and TDM. Which method is suitable for communication between computers and why?
259. What is a concentrator? Justify its use in a datacommunication system. What is FEP? Illustrate its use.
260. Describe the asynchronous and synchronous modes of data transmission.
261. List out the relative advantages and disadvantages of asynchronous and synchronous modes of data transmission
262. Explain how circuit switching is used to link the sender and receiver in a communication network. What are the advantages and disadvantages of this method of switching?
263. Explain the store-and-forward method of message switching. Give the advantages and disadvantages of this message switching technique.
264. What is packet switching? Why is this method used for digital data communication between computers?
265. What is routing? Differentiate between source routing and hop-by-hop routing methods.
266. What is meant by network topology? Describe three commonly used network topologies with their relative advantages and disadvantages
267. What is a hybrid network? Why are they used?"
268. Write a short note on multi-access bus network
269. topologies with their relative advantages and disadvantages.
270. What is a hybrid network? Why are they used?
271. Write a short note on multi-access bus network.
272. What is a LAN? What are its main objectives?
273. What is WAN? What is a MAN?
274. Differentiate between a LAN and a WAN. Give one example of each.
275. What is a communication protocol? What are the normal functions performed by these protocols?
276. Why are communication protocols needed in a computer network?
277. What is a network interface card? Explain its usage in a computer system. Why is layering used in the design of communication networks?
278. Describe the layering concepts in the OSI model of network architecture with the functions of each layer.
279. What is meant by internetworking? What are the main issues in internetworking? Explain the difference among the following terms:
- x. Bridge
 - y. Router
 - z. Gateway
280. What is a wireless computing system? How is it useful?

281. Differentiate between fixed wireless systems and mobile wireless systems

282. What is a distributed computing system? Why are distributed computing systems gaining popularity?

283. List out the advantages and limitations of a distributed computing system.

284. Write short notes on:

- a) Data transmission modes
- (b) Data transmission speed
- c) Data transmission media
- d) Data transmission services

285. Write short notes on:

- Microwave system
- Communications satellite
- Optical fibers

286. Write short notes on

- Network interface card
- ISDN
- Value Added Network (VAN)
- Dial-up line
- Leased line

287. Write short notes on:

- Modem
- Multiplexer
- Concentrator
- Front-end processor

288. Write short notes on:

- Switching techniques
- Routing techniques
- Network topologies
- Asynchronous and synchronous transmission

289. Write short notes on:

- LAN versus WAN
- Communication protocols
- Ethernet

290. Write short notes on:

The OSI model

Internetworking tools

Distributed computing system

291. Define the term logic gates. Explain the various basic gates with their symbols and truth table.

292. Explain the steps involved in 4-variable k-map simplification?

293. Find using K-map $F(W,X,Y,Z) = \sum(0,1,2,4,5,6,8,9,12,13,14)$

294. Write down the steps to convert Boolean functions into sum of minterms and product of max terms with suitable example.

295. What are sequential circuits? Explain with examples.

296. What are combinational circuits? Explain with examples.

297. Define flip-flop. Explain different types with circuit diagram.

298. Compare the working of J-K and master slave flip-flops.

299. Compare

i) Full adder and Half adder

ii) Encoder and Decoder

300. Compare

i) Multiplexer and demultiplexer

ii) A-D converter and D-A converter

301. What are shift registers? Explain different types with diagram.