Q.2   **a.** **Describe the characteristics of various generations of computer?**

Answer: Page Number 19 of Text Book.

      b. **What are the commonly flags used by the processor to keep track the information about the results of various operations?**

Answer: Page Number 2.1.1- 2.1.5 of Text Book.

      c. **Consider the following instruction:**
         $C \leftarrow [A] + [B]$
      Explain the two-phase execution procedure of the statement?

Answer: Page Number 42, 44 of Text Book.

Q.3   **a.** **Explain the following addressing modes with examples:**

      (i)   **Immediate mode**
      (ii)   **Relative mode**
      (iii)   **Auto increment**

Answer: Page Number48-56 of Text Book.

      b. **The memory unit of a computer has 256K words of 32 bits each. The computer has an instruction format with four fields: an operation code field, a mode field to specify one of the seven addressing modes, a register address field to specify one of 60 processor registers, and a memory address. Specify the instruction format and number of bits in each field if the instruction is in one word memory.**

Answer: Page Number 86, 94 of Text Book.

Q.4   **a.** **What is the disadvantage of transferring data through strobe control method? How handshaking overcomes this disadvantage? Explain.**

Answer: 4.2.1 - 4.2.3 of Text Book.

      b. **Define exception? Explain the different kinds of exceptions.**

Answer: Page Number 218 of Text Book.

Q.5   **a.** **Describe the main phases involved in the operation of the SCSI bus.**

Answer: Page Number 266 of Text Book.

      b. **Draw and explain USB packet formats and frames.**

Answer: Page Number 272 of Text Book.

Q.6 **a. Consider a memory consisting of 64K words of 8 bits each. Give the organization to implement this memory using 16K X 1 static memory chips.**

Answer: 5.2.2 of Text Book.

b. Explain the need of memory hierarchy with the help of a block diagram? What is the reason for not having one large memory unit for storing all information at one place?

Answer: 5.2, 5.3, 5.4 of Text Book.

Q.7 **a. Define and draw the logic diagram of n-bit ripple-carry adder.**

Answer: 6.1, 6.2 of Text Book.

b. Why page-table is required in a virtual memory system. Explain different ways of organizing a page table.

Answer: 6.7 of Text Book.

c. Write short notes on DVD Technology?

Answer:
The success of CD technology and the continuing quest for greater storage capability has led to the development of DVD (Digital Versatile Disk) technology. The objective is be able to store a full-length movie on one side of a DVD disk.
The physical size of a DVD disk is the same as for CDs. The disk is 1.2 mm thick, and it is 120 mm in diameter. Its storage capacity is made much larger than that of CDs by several design changes:

1) A red light laser with a wavelength of 635 nm is used instead of the infrared light laser used in CDs, which has a wavelength of 780 nm, The shorter wavelength makes it possible to focus the light to a smaller spot.

2) Pits are smaller, having a minimum length of 0.4 micron.

3) Tracks are placed closer together; the distance between tracks is 0.74 micron.

4) Using these improvements leads to a DVD capacity of 4.7 G bytes.
Further increases in capacity have been achieved by going to two-layered and two sided disks.

The single-layered single-sided disk, defined in the standard as DVD-5, has a structure that is almost the same as the CD. A double-layered disk makes use of two layers on which tracks are implemented on top of each layer. The first layer is the clear base, as in CD disks. But, instead of using reflecting aluminium, the lands and pits of this layer are covered by a translucent material that acts as a semi reflector.

A rewritable version of DVD devices, known as DVD-RAM, has also been developed. IT provides a large storage capacity. Its only disadvantages are higher price and relatively slow writing speed. To ensure that the data have been recorded correctly on the disk, a process known as write verification is performed. This is done by the DVD-RAM drive, which reads the stored contents and checks them against the original data.

Q.8   **a. Multiply the following pairs of signed 2's-complement numbers using:**
         (i) Booth algorithm
         (ii) Bit-pairing of the multiplier

         A = 010111 and B = 110110 Assume A is the multiplicand and B is the multiplier.

Answer: 6.4 of Text Book.

       b. Discuss any two IEEE standard floating point formats. Explain Add/Subtract and multiply rules on floating point numbers.

Answer: Page Number 394 - 398 of Text Book.

Q.9   **a. Consider the statement ADD (R2), R1.**
         (i) Write the steps required for execution of above instruction?
         (ii) Write the sequence of control steps required to perform the execution of above instruction for single bus architecture?

Answer: 7.5.2 of Text Book.

       b. With the help of block diagram, describe the complete processor?

Answer: 7.2 of Text Book.

       c. Compare and contrast between horizontal and vertical approach of microinstruction?

Answer: 7.5 of Text Book.

Text Book

Computer Organization, Carl Hamacher, Zvonko Vranesic, Safwat Zaky, 5th Edition, TMH, 2002