# Military College of Signals
## Final Exam
## BESE 15 (A)
## COMPUTER ORGANIZATION AND ARCHITECTURE

**Faculty Member:** Dr. Hammad Afzal **Time:** 150 Mins
**Max Marks:** 50

**Note:**
- Attempt all questions and all sub questions.
- Declare your assumptions clearly, where necessary.
- Do not make false or erroneous assumptions; it may have a negative impact.
- Return the question paper with the answer sheet.

## Part 1 (10)

**1.** True or False. Control Unit, Arithmetic and Logic Unit, and Main Memory module constitute the Central Processing Unit. **(1)**

**2.** What are the two approaches that can be used to handle multiple interrupts? Describe these approaches and also state their merits/demerits. **(3)**

**3.** What is Program Interrupt? Give at least 3 examples of conditions where it can occur. **(2)**

**4.** Some registers in a microprocessor are part of its architecture that is visible to the programmer, whereas other registers belong to the processor's organization and are invisible to the programmer. Explain what this statement means. Give examples of each type. **(2)**

**5.** Why do computers use *families* of buses rather than a single bus? **(2)**

## Part 2 (17)

**6.** Why is main memory required in Computer system? **(1)**

**7.** Briefly describe the following terms associated with memory technology. **(4)**
1. Random Access
2. Non-volatile
3. Access Time
4. EPROM

**8**. A computer has a 64-bit data bus. If a memory access takes 10 ns, what is the bandwidth of the memory system? **(2)**

**9**. All semi-conductor ROM are RAM but not all semiconductor RAM are ROM. Explain. **(2)**

**10.** What is flash memory? Comment on its "Volatility". Also explain if the characteristics of Flash memory make it more similar to EEPROM or PROM? **(3)**

**11**. How is data written on the CD-ROM & CD-WR. How is it read? **(2)**

**12.** What is the minimum number of bits required to generate the Hamming Code for a 12 bit word **(1)**

**13**. In the context of "Disk Performance", explain the concept of "Rotational Position Sensing" (RPS). Also describe the RPS miss. **(2)**

**Part 3 (10)**

**14.** In the context of multi-tasking system describe the meanings of following states of a process: Running, Ready, Blocked **(2)**

**15.** What is Process Control Block? Describe at least 3 of its constituents **(2)**

**16.** What is the difference between physical address and logical address? Explain with an example **(2)**

**17.** What is Virtual Memory and why it is called Virtual? **(2)**

**18.** Define what is meant by a page, a frame and a page-fault. **(2)**

**Part 4 (13)**

**19.** Describe the locality of reference. **(2)**

**20.** For the hexadecimal main memory addresses 666666 and BBBBBB, show the following information in hexadecimal format. **(3)**

(i) Tag, Line and Word values for a direct mapped cache.
(ii) Tag and Word values for an associative cache.

**21.** Draw the flow chart for a read operation performed by a system that has cache between CPU and main memory **(4)**

**22.** In the context of Write Policy in Cache, describe Write Through technique. **(2)**

**23.** What is difference between Unified and Split cache? **(2)**