MILITARY COLLEGE OF SIGNALS
MID-TERM EXAM
BESE 15 (A)
COMPUTER ORGANIZATION AND ARCHITECTURE

INSTRUCTOR/FM **TIME: 90 Mins**
Dr. Hammad Afzal **Max Marks: 30**

Note:
- Attempt all parts and all 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.

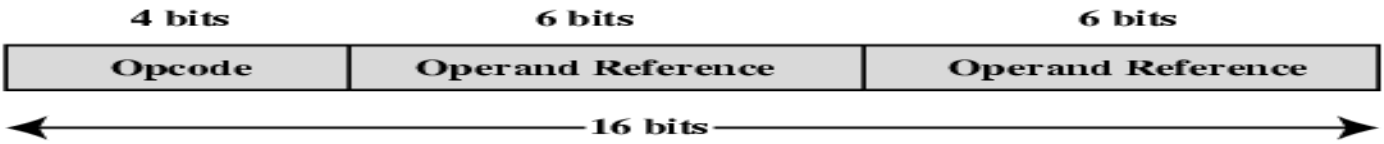
Part 1 (5 Marks)

1. Transistors were used by First Generation electronic computers (True/False)? **(1)**
2. The architecture of machines with stored-program concept is generally referred after the name of the scientist that introduced the idea for the first time. Name the architecture. **(1)**
3. What do IR and PC stand for? Write a brief description of their functionality? **(2)**
4. State Moore's Law. **(1)**

Part 2 (15 Marks)

1. Interrupt Handler routine is part of user program. True/False? **(1)**
2. Write a short description of DMA (Direct Memory Access), mentioning its utility **(2)**
3. What is an interrupt? Classify interrupts (according to the reasons of their occurrence-only give names of classes). **(1+2)**
4. Consider a hypothetical machine having 32 bit instructions composed of two fields: the first byte contains the opcode and the remainder the immediate operand or an operand address.
   a) What is the maximum directly addressable memory capacity? **(1)**
   b) How many (minimum) bits are needed for program counter and instruction register? **(2)**
5. Draw the diagram of a multi-bus architecture that has special mechanism for high speed peripherals **(3)** **(Only Diagram)**
6. What is Bus Arbitration? Name its types and describe them briefly? **(1+2)**

Part 3 (10 Marks)



1. How many distinct operations can be supported using the instruction format in above diagram? **(1)**
2. In context of conditional jump, describe BRP X **(1)**
3. Given the following memory values and a <u>one-address machine</u> with an accumulator, what values do the following instructions load into the accumulator? **(4 Marks)**

ADDRESS	CONTENTS
20	40
30	50
40	60
50	70

LOAD IMMEDIATE 20
LOAD DIRECT 20
LOAD INDIRECT 20
LOAD INDIRECT 30

4. a)What is “Register Indirect Addressing Mode”? Illustrate with help of a diagram. (**2)**
   b)Describe its advantages and disadvantages over “Register Direct Addressing Mode” and “Indirect Addressing Mode”. **(2)**