Second Semester - 2013

Course	**:**	**Higher National Diploma in Information Technology**
Subject	**:**	**1 st year Computer Architecture (Old)**
Instructions	**:**	**Answer Five (04) Questions Only**
Duration	**:**	**03 Hours**

Model Answers

1. (a) Define computer architecture [5 Marks]

Information formats, the instruction set, and techniques for addressing memory of a computer system is concerned with the specifications of the various functional modules, such as processors and memories and structuring them together into a computer system.

(b) Explain following types of bus architecture used in a computer system:

(i) PCI bus
(ii) ISA bus
(iii) Universal serial bus (USB) [15 Marks]

PCI bus : PCI stands for peripheral component interconnect It was developed by Intel. Today it is a widely used bus architecture. The PCI bus can operate with either 32 bits or 64 bit data bus and a full 32-bit address bus.
ISA Bus: ISA stands for industry standard Architecture. Most Pcs contain ISA slot on the main board to connect either an 8—bit ISA card or a 16—bit ISA card.

USB : It is a high speed serial bus. It has higher data .transfer rate than that of a serial port fashion. Several devices can be connected to it in a daisy chain.

(C_) Discuss importance of scalability in Computer Architecture. [5 Marks]

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The scalability means that as the cost of multiprocessor increase, the performance should also increase in proportion. The size access time and speed of memories and buses play a major role in the performance of the system.

2. (a) Explain instruction pipelining [5 Marks]

Reads consecutive instruction from memory previous instructions are being executed in other segments Pipeline processing can occur not only in data stream but in the instruction stream

(b) Describe features of RISC [10 Marks]

It is used for reduced instruction set computing. RISC machine use the simple addressing mode. Logic for implementation of these instructions is simple because instruction set is small in RISC machine

(C) Discuss pipelining in CPU design [10 Marks]

Decomposing a sequential process into sub-operations, with each sub process being executed in a special dedicated segment that operates concurrently with all other segments

3. (a) Describe multiprocessor system [8 Marks]

It is consisted of two or more processors. So, multiprocessor is which execute more than of one and two processes. It is to share main memory or other resources by all processors.

(b) Explain about parallel computers [8 Marks]

provides parallelism in unprocessor or multiple processors can enhance the performance of computer. The concurrency in unprocessor or superscalar in terms of hardwares and software implementation can lead to faster execution of programs in computer.

(c) Explain functionality of a Distributed computer [9 Marks]

Communicate with each other using protocols. The methods for this communication include layered protocols, request/reply messing passing including (Remote procedure call) and group communication (i.e. multi-casting, broadcasting etc.).

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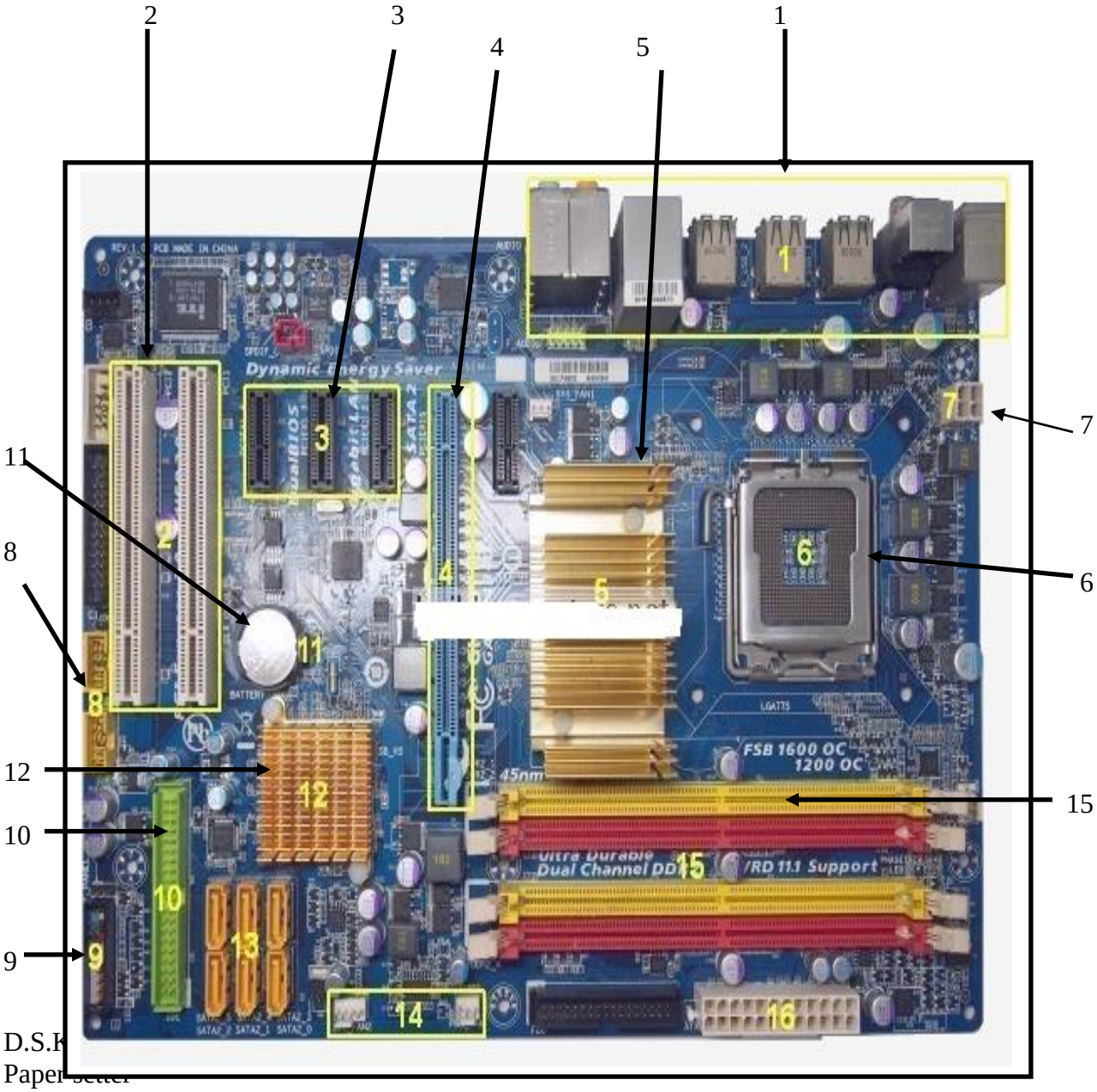
4. (a) Names parts numbered from 1 to 16 for diagram of a mother board as given below:
[16 Marks]



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1. Back panel connectors & Ports

2. PCI Slots

3. PCI Express x1 Slots

4. PCI Express x16 Slot

5. Northbridge

6. CPU Socket

7. ATX 12V Power Connector

8. Front Panel USB 2.0 Connectors

9. Front Panel Connectors

10. IDE Connector

11. CMOS Battery

12. Southbridge

13. SATA Connectors

14. Fan Headers

15. RAM Slots

16. ATX Power Connector

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(b) What Is the Function of the Motherboard? [6 Marks]

The motherboard is actually the logical foundation of a computer. Every component that makes a computer system must be attached to it, from the CPU to the storage devices, and from RAM to printer ports. The motherboard offers the connections that help all the components of a computer work together.

(c) List 3 Different names of motherboard types [3 Marks]

AT
ATX
Mini-ATX
Micro-ATX
LPX
NLX
BTX

5. (a) Explain primary functions of a CPU [12 Marks]

Fetch

All the instructions are stored in memory. Each instruction has is address. The processor takes this address number from the program counter. Program counter is responsible for tracking what instructions CPU should execute next. So fetching basically means taking the instruction from the memory.

Decode

CPU understands instructions that are written in Assembly programming language.. All the programs, that must be executed, are translated to Assembly instructions. Different CPUs understand different instructions, so Assembly code must be decoded into binary instructions which are understandable to your CPU. This step is called decoding.

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Execute

During the procedure of instruction execution. tree things can be done. Firstly, CPU can do some calculations. To execute calculations ALU is used. Secondly, CPU can move data from one memory location to another. And thirdly, CPU can jump to different address if it is needed. So basically, one of those three options is executed during this step.

Store

CPU must give some feedback after executing the instruction. The output data is written to the memory. In this phase program counter is incremented.

(b) Assume a 2^{20} byte memory

(i) What are the lowest and highest addresses if memory is byte addressable? [6 Marks]

There are 2^{20} bytes, which can all be addressed using addresses 0 through $2^{20} - 1$, with 20 bit addresses.

(ii) What are the lowest and highest address if memory is word addressable, assuming a 16 bit word? [7 Marks]

There are only 2^{19} words and addressing and requires using addresses 0 through 2^{19} -1.

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