



**NATIONAL SCHOOL OF BUSINESS MANAGEMENT**

**BSc (Hons) Software Engineering (PU) – 20.1**

**BSc (Hons) Computer Networks (PU) – 20.1**

**BSc (Hons) Computer Security (PU) – 20.1**

**Bachelor of Information Technology (VU)- 20.1**

**Year 01 Semester 02 Examination**

**05 January 2021**

**CS104.3- Computer Architecture**

**Instructions to Candidates**

- 1) Answer ALL questions.
- 2) Time allocated for the examination is three (03) hours and 30 minutes (Including downloading and uploading time)
- 3) Weightage of Examination: 60% out of final grade.
- 4) Download the paper, provide answers to the selected questions in a word document.
- 5) Please upload the document with answers (Answer Script) to the submission link before the submission link expires.
- 6) Answer script should be uploaded in PDF Format.
- 7) Under any circumstances E-mail submissions would not be taken into consideration for marking. Incomplete attempt would be counted as a MISSED ATTEMPT.
- 8) The Naming convention of the answer script – Module Code Subject Name\_Index No
- 10) You must adhere to the online examination guidelines when submitting the answer script to N-Learn.
- 11) Your answers will be subjected to Turnitin similarity check, hence, direct copying and pasting from internet sources, friend's answers etc. will be penalized.

1. Logic Gates and Binary Arithmetic

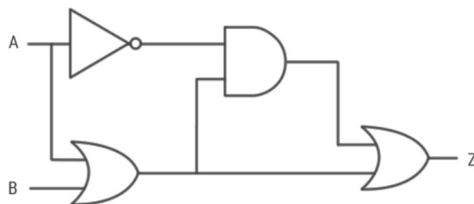
(25 Marks)

- a. Convert following numbers into binary and represent them in 8-bit format (Hint – using eight binary digits).
  - i. 23
  - ii. 14
  - iii. 36
  - iv. 67
  - v. 133
  - vi. 204
- b. Convert following binary numbers into decimal numbers.
  - i. 00101001
  - ii. 11111111
  - iii. 10000001
  - iv. 01010101
  - v. 10011100
- c. Convert (or Use) following decimal numbers into binary do following arithmetic present the results in binary format and convert them into the decimal values.
  - i.  $23 + 14$
  - ii.  $36 + 14$
  - iii.  $67 + 133$
  - iv.  $133 + 204$
  - v.  $36 + 67$
- d. Draw the circuits of logic gates NOT, AND, OR, XOR gates and truth tables.
  - i. Discuss and compare the output of the above gates
  - ii. Give possible example where each gate can be used for general application.

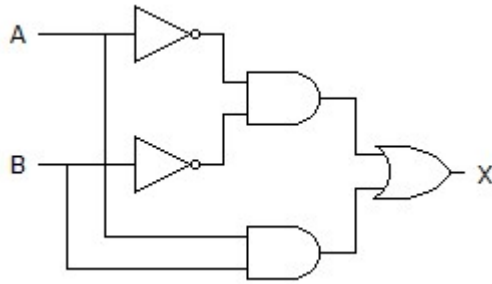
2. Write expressions for following logic circuits and draw the truth table for each circuit.

(25 Marks)

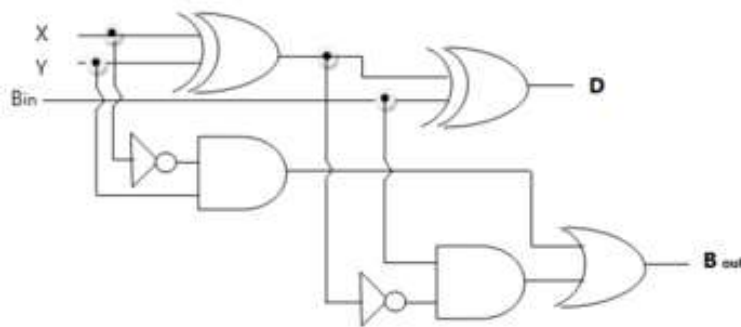
- a. Write expression for Z using A and B, then write the truth table for the following circuit.



b. Write an expression and truth table for the following circuit.



c. Write logic expression and truth table for following logic circuit.

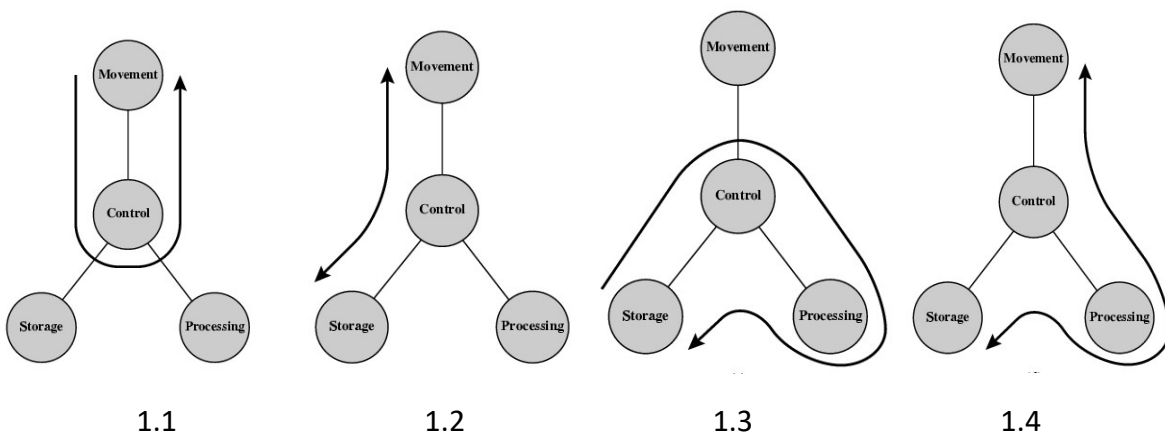


- Design the half adder circuit by derive the expression for half adder circuit using logic expression and truth table
- Design full adder circuit deriving the expression for full adder circuit.

3. Answer following questions related to computer systems.

(25 Marks)

- Following function or operations are related to computer systems. Identify and explain the operation using real world scenario.

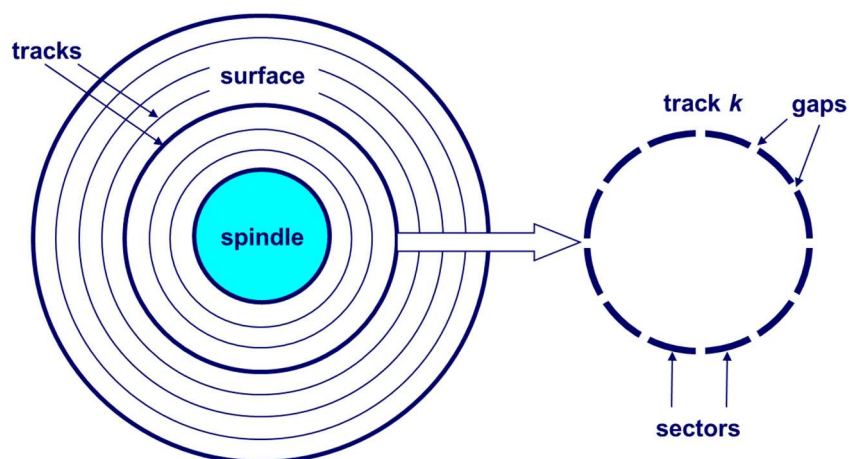


- b. Explain how the Hard Drive (Storage Devices), Memory and Processor has integrated together physically and how each module will work together to process the assign task by the user.
- c. Draw the structure of the processor (CPU) and its internal modules of the CPU and their task separately.
- d. Explain multi-threading technology and how it can help to increase the performance of the computer.
- e. Explain what is the hyper-threading technology which the i7 Processor has and how it differs from the multi-threading technology and explain how it enhance the processing power of the computer.

#### 4. Memory & Storage Devices

(25 Marks)

- a. Draw the memory hierarchy and explain their properties and usage in the computer.
- b. Explain how the cost, size the speed varies related to each component.
- c. Structure of the hard disk drive is shown in the bellow. Explain it define the capacity of the hard drives and how we can expand the capacity of the hard drive by keeping the same volume of the hard disk drive.



- d. Discuss about the followings
  - i. SSD (Solid State Storage Devices)
  - ii. Hybrid storage devices
  - iii. SRAM
  - iv. DRAM

**END OF THE PAPER**