WS 2019-20

Digital Assignment 2

Course: MAT1014 (DMGT)

Answer all the questions

Guidelines for Submission:

- Download the questions. Write your answers in A4 size sheet neatly, in detail **without any corrections**. Draw the borders for each page.
- Write your **name** and do the **signature** on the top of every page
- Take the snap shot of your filled-in answer sheet carefully which should be clearly visible, and make a **single pdf** file only.
- Then upload it through the student log-in portal. Uploading of answers in any other format is not acceptable.
- Do not send different **image files** or zipped files. **Do not send** the answer sheet to **my mail address**
- The portal will not receive the files after the due date, and the marks awarded will be automatically zero for those who do not submit in time. Do not postpone your task until the last date of submission. **Please note it**
- **Do not forget to submit the hard copy** in person
- **Follow the guidelines strictly. Any deviation from the above instructions will lead to the reduction in marks**

Questions:

1	a)	What is the condition for a code to correct 'k' or fewer errors. Generate a single error correcting code with m = 4 and n = 7.
	b)	Obtain the Hasse diagrams of the lattices $\langle S_n, D \rangle$ when $n = 30, 45$. Which of these are complemented? Are these lattices distributive? Explain.
2	a)	Prove that every chain is a distributive lattice.
	b)	Show that in a complemented distributive lattice $a \leq b \Leftrightarrow a * b' = 0 \Leftrightarrow a' \oplus b = 1 \Leftrightarrow b' \leq a'$.
	c)	In any Boolean Algebra, show that $a \leq b \Rightarrow a + bc = b(a + c)$.

3	a) Let $(L,\leq)$ be a lattice in which $*$, $\oplus$ denote the operations of meet and join respectively. For any $a,b \in L$, prove that $a \leq b \Leftrightarrow a*b=a \Leftrightarrow a \oplus b = b$. b) Find the code generated by the given parity matrix 'H' when the encoding function is $e:\mathrm{B}^3 \rightarrow B^6$ $H=\begin{bmatrix}1&1&0&1&0&0\\1&0&1&0&1&0\\0&1&1&0&0&1\end{bmatrix}$
4	a) Obtain the product of sums canonical form in three variables of the Boolean expression $\mathrm{x}_1 * \mathrm{x}_2$ b) In any Boolean algebra prove that $(a+b')(b+c')(c+a')=(a'+b)(b'+c)(c'+a)$ c) Simplify the following Boolean function by using Quine- McCluskey method $f(w,x,y,z)=wxyz+wxy\bar{z}+w\bar{x}yz+wx\bar{y}z+w\bar{x}\bar{y}z+\bar{w}xyz+\bar{w}xy\bar{z}+\bar{w}\bar{x}yz$