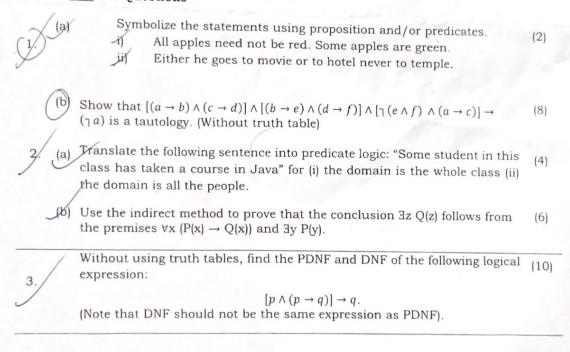


CAT- I May 2023

Programme		Semester	FALL Inter Semester 2022 -
Course	Discrete Mathematics and Graph Theory	Code	BMAT205L
	Dr. Kalyan Manna, Dr. Avinash Kumar Mittal, Dr. Durga Nagrajan, Dr. Vidhya V, Dr. Devi Yamini S, Dr. Om Namah Shivay, Dr. Uma Maheswari S, Dr. Rajesh Kumar Mohapatra, Dr. Manigandla Prasannalakshmi, Dr. Sandip Dalui, Dr. Pulak Konar, Dr. Surath Ghosh, Dr. Lakshmanan S	Class No.	CH2022232500280 - CH2022232500287, CH2022232500292 - CH2022232500297
Time	90 Mins	Max. Marks	50

Answer ALL the Questions



If $S = \{1,2,3,6\}$ and * is defined by a * b = lcm(a,b), where $a,b \in S$. Show that $\{S,*\}$ is a monoid.

(b) Prove that $Z_6 = \{0,1,2,3,4,5\}$ is a group under addition modulo 6. Find all the subgroups of Z6.

(6) $\begin{pmatrix} 1 & 1 & 0 & 1 & 0 & 0 \\ 1 & 0 & 1 & 0 & 1 & 0 \end{pmatrix}$ be the parity check matrix corresponding to the (3+2)

encoding function $e: B^3 \to B^6$.

Find the code words generated by H.

Decode the received words (a) 111000 and (b) 001110.

(b) Let (R, +) and (R^+, \times) be two groups. Show that the mapping $f: R \to R^+$ (5)defined by $f(x) = 2^x \forall x \in R$ is a homomorphism.

e:8m -> 8 Generales Motive=[Im | Amx (n-m)]

Party duk H = [AT | I(n-m)]

D= 2 Www...] e(w)= w. h

H.xrT = [o] take first m dysto oo bear r
HxrT = [senerals]. Clerk vale is H