TFCS

Tut:- 6

KANISHK BHAT – 20103233 – B8

1. Closure
Associativity
Identity
Inverse
i.e. y exists if and only if x6 = −1. Since −1 doesn't have an inverse under *, (R, *) is not a group.

2. (A). $a \odot b \in G \ \forall a, b \in G$
(b). $(a \odot b) \odot c = a \odot (b \odot c) \ \forall a, b \in G$
(C). $a \odot 1 = a \ \forall a \in G$
(d). The inverse elements of 1, 3, 7, 9 are 1, 7, 3, 9 respectively.

3. $abab = (a^2 b^2)$ apply a^{-1} from left & b^{-1} from right, we obtain $ba = ab$ for all $a, b \in G$, Hence G is abelian.

4. $(A, +, \cdot)$ is a ring
(A). Let 0 be the adjective identity.
Then $a \cdot 0 = 0 \cdot a = 0$ for all a is A. $(a+a) \cdot a = a \cdot a + a \cdot a = a + a = a \cdot (a+a)$ hence $a + a = 0$.

(B). $(a+b) \cdot (a+b) = a+b$
$a \cdot a + a \cdot b + b \cdot a + b \cdot b = a+b$
$a + b \cdot a + a \cdot b + b = a+b$
Hence $a \cdot b + b \cdot a = 0$
Hence Commutative.

5. (A). $xyz + xy\bar{z} + x\bar{y}z + \bar{x}yz + x\bar{y}\bar{z} + \bar{x}y\bar{z} + \bar{x}\bar{y}z$.

(B). $xyz + xy\bar{z} + x\bar{y}z$

(C). $xyz + xy\bar{z} + x\bar{y}z + x\bar{y}\bar{z}$

(D). $x\bar{y}z + x\bar{y}\bar{z}$

6.