

S.B.B alias Appasaheb Jedhe College, Pune

F.Y. B.Sc. (Computer Science)

Internal Examination, 2016

Subject: Algebra and Calculus (M-II)

Time: 1 hour

Marks: 20

Q.1] Attempt the following questions.(Any two)

[2*2]

1) Reflexive relation and Equivalence relation (Define)

2) If $A=\{1,2,3\}$ and $R=\{(1,1),(1,2),(2,1),(2,2),(2,3),(3,1),(3,3)\}$

Find $M(R)$ and $[M(R)]^2$.

3) Abelian group and Semigroup. (Define)

Q.2] Attempt any four of the following.

[4*4]

1) Let R be a relation on Z defined as aRb iff $3a+4b$ is divisible by 7. Show that R

is an equivalence relation on Z , $\forall a, b \in Z$.

2) Let, $R=\{(1,1),(1,2),(2,3),(3,1),(3,2)\}$ on Set $A=\{1,2,3\}$. Draw the digraph of R . Find

Transitive closure of R . Find transitive closure of R using Warshall's Algorithm.

3) Let, $A= \{1, 2, 3, 4, 5\}$. Define a relation R on A by xRy iff $x+1=y$. Find the relation

R and write down its adjacency matrix. Also draw digraph of R .

4) Let Q^+ be the set of all positive rational numbers, Define the operation $*$ as,

$a*b= ab/7$, for all $a, b \in Z^+$. Show that $(Q^+, *)$ is an abelian group.

5) Draw digraph of the relation R given by aRb iff $a+b \leq 5$, $a, b \in Z$ where

$A= \{1, 2, 3, 4, 8\}$. Also find $M(R)$.