1. Implement Three nodes point – to – point network with duplex links between them for different topologies. Set the queue size, vary the bandwidth, and find the number of packets dropped for various iterations.

```
set ns [ new Simulator ]
set tf [ open lab1.tr w ]
$ns trace-all $tf
Set nf [ open lab1.nam w ]
$ns namtrace-all $nf

set n0 [$ns node]
set n1 [$ns node]
set n2 [$ns node]
set n3 [$ns node]

$ns color 1 "red"
$ns color 2 "blue"
$n0 label "Source/udp0"
$n1 label "Source/udp1"
$n2 label "Router"
$n3 label "Destination/Null"

$ns duplex-link $n0 $n2 10Mb 300ms DropTail
$ns duplex-link $n1 $n2 10Mb 300ms DropTail
$ns duplex-link $n2 $n3 1Mb 300ms DropTail

$ns set queue-limit $n0 $n2 10
$ns set queue-limit $n1 $n2 10
$ns set queue-limit $n2 $n3 5

set udp0 [new Agent/UDP]
$ns attach-agent $n0 $udp0
set cbr0 [new Application/Traffic/CBR]
$cbr0 attach-agent $udp0
set null3 [new Agent/Null]
$ns attach-agent $n3 $null3
set udp1 [new Agent/UDP]
$ns attach-agent $n1 $udp1
set cbr1 [new Application/Traffic/CBR]
$cbr1 attach-agent $udp1

$udp0 set class_ 1
$udp1 set class_ 2

$ns connect $udp0 $null3
$ns connect $udp1 $null3

$cbr1 set packetSize_ 500Mb
$cbr1 set interval_ 0.005
```

```
proc finish {} {
global ns nftf
$ns flush-trace
exec nam lab1.nam &
close $tf
close $nf
exit 0
}
$ns at 0.1 "$cbr0 start"
$ns at 0.1 "$cbr1 start"
$ns at 10.0 "finish"
$ns run
```

AWK Script:

```
BEGIN{
#include<stdio.h>
count=0;
}
{
if($1=="d") #d stands for the packets drops.
count++
}
END{
printf("The Total no of Packets Dropped due to Congestion :
%d\n\n", count)
}
```

Output:

ns lab1.tcl
awk –f lab1.awk lab1.tr
The Total no of packets Dropped due to congestion:4560

Snapshot: