10. **Set up a wireless network with mobile nodes, induce 1 to 10% error to the network using a uniform error model. Plot the congestion window for TCP connections.Write your observation on TCP performance as error increases in the network.**

Save this file as p10.tcl :-

```
set val(chan) Channel/WirelessChannel
set val(prop) Propagation/TwoRayGround
set val(netif) Phy/WirelessPhy
set val(mac) Mac/802_11
set val(ifq) Queue/DropTail/PriQueue
set val(ll) LL
set val(ant) Antenna/OmniAntenna
set val(x) 500
set val(y) 500
set val(ifqlen) 50
set val(nn) 5
set val(stop) 50.0
set val(rp) AODV
set ns_ [new Simulator]
set tracefd [open 006.tr w]
$ns_ trace-all $tracefd
set namtrace [open 006.nam w]
$ns_ namtrace-all-wireless $namtrace $val(x) $val(y)
set prop [new $val(prop)]
set topo [new Topography]
$topo load_flatgrid $val(x) $val(y)
create-god $val(nn)
#Node Configuration
$ns_ node-config -adhocRouting $val(rp) \
-llType $val(ll) \
-macType $val(mac) \
-ifqType $val(ifq) \
-ifqLen $val(ifqlen) \
-antType $val(ant) \
-propType $val(prop) \
-phyType $val(netif) \
-channelType $val(chan) \
-topoInstance $topo \
-agentTrace ON \
-routerTrace ON \
-macTrace ON \
-IncomingErrProc "uniformErr" \
-OutgoingErrProc "uniformErr"
proc uniformErr {} {
set err [new ErrorModel]
$err unit pkt
$err set rate_ 0.01
return $err
```

```
}
#Creating Nodes
for {set i 0} {$i < $val(nn) } {incr i} {
set node_($i) [$ns_ node]
$node_($i) random-motion 0
}
#Initial Positions of Nodes
for {set i 0} {$i < $val(nn)} {incr i} {
$ns_ initial_node_pos $node_($i) 40
}
#Topology Design
$ns_ at 1.0 "$node_(0) setdest 10.0 10.0 50.0"
$ns_ at 1.0 "$node_(1) setdest 10.0 100.0 50.0"
$ns_ at 1.0 "$node_(4) setdest 50.0 50.0 50.0"
$ns_ at 1.0 "$node_(2) setdest 100.0 100.0 50.0"
$ns_ at 1.0 "$node_(3) setdest 100.0 10.0 50.0"
#Generating Traffic
set tcp0 [new Agent/TCP]
set sink0 [new Agent/TCPSink]
$ns_ attach-agent $node_(0) $tcp0
$ns_ attach-agent $node_(2) $sink0
$ns_ connect $tcp0 $sink0
set ftp0 [new Application/FTP]
$ftp0 attach-agent $tcp0
$ns_ at 1.0 "$ftp0 start"
$ns_ at 50.0 "$ftp0 stop"
set tcp1 [new Agent/TCP]
set sink1 [new Agent/TCPSink]
$ns_ attach-agent $node_(1) $tcp1
$ns_ attach-agent $node_(2) $sink1
$ns_ connect $tcp1 $sink1
set ftp1 [new Application/FTP]
$ftp1 attach-agent $tcp1
$ns_ at 1.0 "$ftp1 start"
$ns_ at 50.0 "$ftp1 stop"
#Simulation Termination
for {set i 0} {$i < $val(nn) } {incr i} {
$ns_ at $val(stop) "$node_($i) reset";
}
$ns_ at $val(stop) "puts \"NS EXITING...\" ; $ns_ halt"
puts "Starting Simulation..."
$ns_ run
```

Execution Commands:-

1) ns p10.tcl
2) nam 006.nam

Output:-