VLSM

Given : 171.0.0.0 /22
Needed Subnets : 8
No. of Hosts : (1) 500, (2) 200, (3) 100, (4) 40, (5) 20, (6) 12, (7) 6, (8) 2 already done

(1) For 500 hosts,
No. of hosts = $2^9 - 2 = 510$ per subnet
∴ 9 host bits are needed.
Subnet bits = 32 - 9 = 23
∴ Need to borrow 1 bit.

Required = 171.0.0.0 /23
Host bit in 3rd octet = 24 - 23 = 1
∴ Magic no = $2^1 = 2$

1st Host = 171.0.0.1
Last Host = 171.0.1.254
Broadcast = 171.0.1.255

For 2 hosts, Box

171.0.3.128 /30
171.0.3.129 (1st)
171.0.3.130 (Last)
171.0.3.131 (Broad)

(b) For 200 hosts, Start IP = 171.0.2.0/23
No. of hosts = $2^8 - 2 = 254$ per subnet
∴ 8 host bits are needed.
Subnet bits = 32 - 8 = 24
Need to borrow another 1 bit.

Required = 171.0.2.0 /24
1st Host = 171.0.2.1
Last Host = 171.0.2.254
Broadcast = 171.0.2.255

(c) For 100 hosts, Start IP = 171.0.3.0 /24
No. of hosts = $2^7 - 2 = 126$ per subnet

∴ 7 host bits are needed.
Subnet bits = 32 - 7 = 25
Need to borrow another 1 bit.

Required = 171.0.3.0 / 25
1st Host = 171.0.3.1
Last Host = 171.0.3.126
Broadcast = 171.0.3.127

Recall Box

(d) For 40 hosts, Start IP = 171.0.3.132 / 30
No. of hosts = $2^6 - 2 = 62$ per subnet
∴ 6 host bits are needed.
Subnet bits = 32 - 6 = 26
Need to borrow another 1 bit.

Required = 171.0.3.132 / 26
1st Host = 171.0.3.133
Last Host = 171.0.3.194
Broadcast = 171.0.3.195

(e) For 20 hosts, Start IP = 171.0.3.196 / 26
No. of hosts = $2^5 - 2 = 30$ per subnet
∴ 5 host bits are needed.
Subnet bits = 32 - 5 = 27
∴ Need to borrow another 1 bit.

Required = 171.0.3.196 / 27
1st Host = 171.0.3.197
Last Host = 171.0.3.226
Broadcast = 171.0.3.227

(f) For 12 hosts, Start IP = 171.0.3.228 / 27
No. of hosts = $2^4 - 2 = 14$ per subnet
∴ 4 host bits are needed.

Subnet bits = 32 − 4 = 28
Need to borrow another 1 bit.

Required = 171.0.3.228 /28
1st Host = 171.0.3.229
last Host = 171.0.3.242
Broadcast = 171.0.3.243

(g) For 6 hosts, Start IP = 171.0.3.244 /28
No. of hosts = $2^3 - 2 = 6$ per subnet
∴ 3 host bits are needed.
Subnet bits = 32 − 3 = 29
∴ Need to borrow another 1 bit.

Required = 171.0.3.244 /29
1st Host = 171.0.3.245
Last Host = 171.0.3.250
Broadcast = 171.0.3.251