**SECTION ONE**

**1a)**

New subnet mask: /26 (255.255.255.192)

Subnets: 4

Usable hosts per subnet: 62

**b)**

Fourth subnet: 192.168.50.192/26

Broadcast: 192.168.50.255

**2)**

Subnet mask: /27 (255.255.255.224)

Number of subnets: 8

Hosts per subnet: 30

First two subnets: 192.168.1.0/27, 192.168.1.32/27

**3)**

Subnet mask: 255.255.240.0 (/20)

Total subnets: 1 (given)

Hosts per subnet: 4094

Network ID: 172.16.0.0

Broadcast: 172.16.15.255

**4)**

New subnet mask: /17 (255.255.128.0)

Number of subnets: 512

Hosts per subnet: 32,766

**5)**

Subnet mask: /27 (255.255.255.224)

Number of subnets: 8

Hosts per subnet: 30

First three subnets:

1. 192.168.5.0/27

2. 192.168.5.32/27

3. 192.168.5.64/27

**SECTION TWO**

**1)**

New subnet mask: /26 (255.255.255.192)

Subnets: 4

Hosts per subnet: 62

Fourth subnet: 192.168.50.192/26, Broadcast: 192.168.50.255

**2)**

Network: 10.1.0.0/20

Each subnet supports 400 hosts → New mask: /23 (255.255.254.0)

Hosts per subnet: 510

**3)**

Network: 192.168.40.0/25

Divide into 4 equal subnets → /27 (255.255.255.224)

Subnets: 4

Hosts per subnet: 30

**4)**

Network: 172.20.0.0/16

Needs 1000 subnets → /26 (255.255.255.192)

Subnets: 1024

Hosts per subnet: 62

**5)**

Network: 192.168.8.0/23

Create 6 equal subnets → /26 (255.255.255.192)

Subnets: 8

Hosts per subnet: 62

**6)**

Network: 192.168.10.0/24

Create 4 equal subnets → /26 (255.255.255.192)

Subnets: 4

Hosts per subnet: 62

**7)**

Network: 192.168.1.0/24

Need at least 5 subnets → /27 (255.255.255.224)

Subnets: 8

Hosts per subnet: 30

**8)**

Network: 10.0.0.0/8

Need 512 equal subnets → /17 (255.255.128.0)

Subnets: 512

Hosts per subnet: 32,766

**9)**

Network: 172.16.0.0/16

Split into 16 subnets → /20 (255.255.240.0)

Subnets: 16

Hosts per subnet: 4094

**10)**

Network: 192.168.50.0/24

Must support ≥50 hosts → /26 (255.255.255.192)

Hosts per subnet: 62

**11)**

IP: 192.168.5.77/26

Network: 192.168.5.64/26

First host: 192.168.5.65

Last host: 192.168.5.126

Broadcast: 192.168.5.127

**12)**

IP: 172.16.9.130/20

Network: 172.16.0.0/20

First host: 172.16.0.1

Last host: 172.16.15.254

Broadcast: 172.16.15.255

**13)**

Subnet: /28 (255.255.255.240)

Usable hosts: 14

Block size: 16

**14)**

Network: 192.168.100.0/25

Two subnets:

1. 192.168.100.0/26 → 192.168.100.1–192.168.100.62

2. 192.168.100.64/26 → 192.168.100.65–192.168.100.126\*\*

**15)**

Prefix for exactly 2 usable hosts per subnet: /30 (255.255.255.252)

Usable hosts: 2

**16)**

Network: 10.10.0.0/16

New mask: /23 (255.255.254.0)

Subnets: 128

Hosts per subnet: 510

First three subnets:

1. 10.10.0.0/23

2. 10.10.2.0/23

3. 10.10.4.0/23

**17)**

Network: 192.168.30.0/24

New mask: /28 (255.255.255.240)

Hosts per subnet: 1

**18)**

Host: 10.0.5.200/19

Network ID: 10.0.0.0

Broadcast: 10.0.31.255

Usable range: 10.0.0.1 – 10.0.31.254

**19)**

Network: 172.31.64.0/19

Hosts required: ≥1000

/19 supports 8190 hosts → Sufficient

**20)**

Network: 192.168.200.0/23

Split into 8 equal subnets → /26 (255.255.255.192)

Hosts per subnet: 62

**21)**

IP: 172.20.50.129/26

Network: 172.20.50.128

Broadcast: 172.20.50.191

**22)**

Network: 192.168.7.0/24

Smallest prefix for ≥100 hosts → /25 (255.255.255.128)

Subnets: 2

Hosts per subnet: 126

**23)**

Network: 203.0.113.0/24

Need 6 subnets → /27 (255.255.255.224)

Subnets: 8

Hosts per subnet: 30

**24)**

Network: 10.10.10.0/24

Each subnet ≥2 hosts → /30 (255.255.255.252)

Subnets: 64

Hosts per subnet: 2

**25)**

IP: 192.168.88.201/27

Current subnet: 192.168.88.192/27

Usable range: 192.168.88.193 – 192.168.88.222

Next subnet: 192.168.88.224/27

**26)**

Network: 192.168.60.0/24

VLSM (largest-first):

Sales (60 hosts): 192.168.60.0/26

HR (28 hosts): 192.168.60.64/27

IT (12 hosts): 192.168.60.96/28

Admin (6 hosts): 192.168.60.112/29

**27)**

Network: 10.0.0.0/24

A = 100 hosts → 10.0.0.0/25

B = 50 hosts → 10.0.0.128/26

C = 20 hosts → 10.0.0.192/27

**28)**

Network: 172.18.0.0/20

Departments: 200, 60, 25, 10 →

200 → /24

60 → /26

25 → /27

10 → /28

**29)**

Combine 192.168.16.0/24 and 192.168.17.0/24 → 192.168.16.0/23

**30)**

Network: 192.0.2.0/24

10 point-to-point links (2 hosts each): use /30

One LAN (40 hosts): use /26

Subnets: /30 × 10, /26 × 1

Hosts: /30 → 2 each, /26 → 62

**31)**

Smallest prefix for ≥1000 hosts → /22 (255.255.252.0)

Usable hosts: 1022

**32.)**

Network: 198.51.100.0/24

Need 3 equal subnets, each ≥80 hosts → Not possible within a single /24

(A /25 gives 126 hosts but only 2 subnets; /26 gives 4 subnets but only 62 hosts.)

**33)**

Network: 2001:db8:acad::/48

Create 16 subnets → new prefix /52

First two /52 prefixes:

1. 2001:db8:acad::/52

2. 2001:db8:acad:1000::/52

**34)**

Network: 2001:db8:1234:5600::/56

Create 4 subnets → new prefix /58

Four /58 prefixes:

1. 2001:db8:1234:5600::/58

2. 2001:db8:1234:5640::/58

3. 2001:db8:1234:5680::/58

4. 2001:db8:1234:56c0::/58