Q1: Subnetting (24 x 0.2 = 4.8 Marks, if all correct then 5 Marks)
Provided Input(s):
Given Subnet Mask (GSM): 255.255.192.0
A given random host IP : 42.40.200.0

Find the following output(s):

i.	Class type of the network (Class)	: A
ii.	Number of bits borrowed (s)	: 10
iii.	Number of max subnets (S or S_{max})	: 1024
iv.	Number of host bits available (h)	: 14
v.	Number of usable host IPs (H_{IP}^{U})	: 16382
vi.	Default Subnet Mask $(DSM)_2$	: 11111111.00000000.00 000000.00000000
vii.	Default Subnet Mask $(DSM)_{10}$	: 255.0.0.0
viii.	Default Subnet Mask $(DSM)_{16}$	: ff.00.00.00
ix.	DSM in CIDR / notation	: /8
x.	Given Subnet Mask $(GSM)_2$	: 11111111.11111111.11 000000.00000000
xi.	Given Subnet Mask $(GSM)_{10}$	: 255.255.192.0
xii.	Given Subnet Mask $(GSM)_{16}$	: ff.ff.c0.00
xiii.	GSM in CIDR / notation	: /18
xiv.	Subnet number (S_i) to which this host belongs in binary	: 0010100011
xv.	Subnet number (S_i) to which this host belongs in decimal	: 163
xvi.	Network/Subnet ID (NID or SID) in binary dot format	: 00101010.00101000.11 000000.00000000
xvii.	Network/Subnet ID (NID or SID) in decimal dot format	: 42.40.192.0 /18
xviii.	Network/Subnet ID (NID or SID) in hex dot format	: 2a.28.c0.00
xix.	Broadcast Address $(BA)_2$	: 00101010.00101000.11 111111.11111111
xx.	Broadcast Address $(BA)_{10}$	: 42.40.255.255
xxi.	Broadcast Address $(BA)_{16}$	: 2a.28.ff.ff
xxii.	Useable Host IP Address range in dot decimal format	: 42.40.192.1 <<>> 42.40.255.254
xxiii.	3rd host IP address in dot decimal format	: 42.40.192.3
xxiv.	Last 3rd Host IP Address in dot decimal format	: 42.40.255.252

A1: Show your calculations and reasoning (if none then 0 marks):

Address: 42.40.200.0 00101010.00101000.11 001000.00000000
Netmask: 255.255.192.0 = 18 11111111.11111111.11 000000.00000000
Wildcard: 0.0.63.255 00000000.00000000.00 111111.11111111
Network: 42.40.192.0/18 00101010.00101000.11 000000.00000000 (Class A)
Broadcast: 42.40.255.255 00101010.00101000.11 111111.11111111
HostMin: 42.40.192.1 00101010.00101000.11 000000.00000001
HostMax: 42.40.255.254 00101010.00101000.11 111111.11111110
Hosts/Net: 16382

Q2: Subnetting (24 x 0.2 = 4.8 Marks, if all correct then 5 Marks)
Provided Input(s):

A given random IP address from a network	: 190.100.0.0
Number of Subnets Created (S_C)	: 1022
Subnet number (S_i) to which an IP belongs in decimal	: $(100)_{10}$

Find the following output(s):

i.	Class type of the network (Class)	: B
ii.	Least Number of bits borrowed (s)	: 10
iii.	Number of max subnets (S or S_{max})	: 1024
iv.	Number of host bits available (h)	: 6
v.	Number of usable host IPs (H_{IP}^U)	: 62
vi.	Default Subnet Mask $(DSM)_2$	: 11111111.11111111.00000000.00 000000
vii.	Default Subnet Mask $(DSM)_{10}$	: 255.255.0.0
viii.	Default Subnet Mask $(DSM)_{16}$	: ff.ff.00.00
ix.	DSM in CIDR / notation	: /16
x.	Given Subnet Mask $(GSM)_2$	: 11111111.11111111.11111111.11 000000
xi.	Given Subnet Mask $(GSM)_{10}$	: 255.255.255.192.0
xii.	Given Subnet Mask $(GSM)_{16}$	: ff.ff.ff.c0.00
xiii.	GSM in CIDR / notation	: /26
xiv.	Subnet number (S_i) to which an IP belongs in binary	: 01100100
xv.	Subnet number (S_i) to which an IP belongs in decimal	: 100
xvi.	Network/Subnet ID (NID or SID) in binary dot format	: 10111110.01100100. 00011001.00000000
xvii.	Network/Subnet ID (NID or SID) in decimal dot format	: 190.100.25.0
xviii.	Network/Subnet ID (NID or SID) in hex dot format	: be.64.19.00
xix.	Broadcast Address $(BA)_2$	: 10111110.01100100. 00011001.00111111
xx.	Broadcast Address $(BA)_{10}$	: 190.100.25.63
xxi.	Broadcast Address $(BA)_{16}$	: be.64.19.3f
xxii.	Useable Host IP Address range in dot decimal format	: 190.100.25.1 <<>> 190.100.25.62
xxiii.	3rd host IP address in dot decimal format	: 190.100.25.3
xxiv.	Last 3rd Host IP Address in dot decimal format	: 190.100.25.60

A2: Show your calculations and reasoning (if none, then 0 marks):

Address: 190.100.0.0 10111110.01100100.00000000.00 000000
Netmask: 255.255.255.192 = 26 11111111.11111111.11111111.11 000000
Wildcard: 0.0.0.63 00000000.00000000.00000000.00 111111
Network: 190.100.0.0/26 10111110.01100100.00000000.00 000000 (Class B)
Broadcast: 190.100.0.63 10111110.01100100.00000000.00 111111
HostMin: 190.100.0.1 10111110.01100100.00000000.00 000001
HostMax: 190.100.0.62 10111110.01100100.00000000.00 111110
Hosts/Net: 62

$(100)_{10} = 110\ 0100$

10111110.01100100.00011001.00000000 190.100.25.0

PS: I also accepted if you solve the questions based on $(0)_{10} = (0)_2$

Bonus: Subnetting (1 Mark, if Q1 and Q2 total passes 7 marks)
Provided Inputs:
For any class B IP address, your company's IT department has the following requirements
Requirement Spec 1: 32 Computer Hosts Per Subnet
Requirement Spec 2: Maximize the creation of subnets for future use
PS: Use static length subnet masking concepts as we did in class.

Find the following output(s):

i.	Number of bits borrowed (s)	: 10
ii.	Number of max subnets (S or S_{max})	: 1024 (0..1023)
iii.	Default Subnet Mask $(DSM)_2$	: 11111111.11111111.00000000.00000000
iv.	DSM in CIDR / notation	: /16
v.	Given Subnet Mask $(GSM)_2$	: 11111111.11111111.11111111.11000000
vi.	GSM in CIDR / notation	: /26

Bonus: Show your calculations and reasoning (if none then 0 marks):

11111111.11111111. 00000000.00 000000 /16
11111111.11111111. 11111111.11 000000 /26

(2^h -2)>=32
2^h >= 34
Therefore h must be minimum 6
Therefore s=10