IOE ICT building has six computer labs each having 30 computers. Two labs are located at first floor and four labs are located at second floor. Each computer has redundant network connection via dual ports CAT6 information outlet connected directly from Network Control Room (NCR) located at ground floor. Prepare the Bill of Quantity (BoQ) with necessary network resources required in quantity for the complete networking. Your BoQ should include estimation of information outlet (Faceplate), wireless AP, CAT6 Cables, patch cords, 24 ports Patch Panels and 48 port Switches.

Solution,

Number of labs =6 (2 at 1^{st} floor and 4 at 2^{nd} floor)

Computers =30 per lab, so Total computer =6*30 =180

Device and Equipments

Wireless AP

48 port Switch

24 port patch panel

Patch cords

Faceplate

Cat6 Cables

To find bill of Quantity:

Faceplate

Since 180 computers and 3 wireless access point, number of faceplate=180+3=183

CAT6 Cable

From NCR to first floor

Let us assume 12 meter from NCR to first floor

Since 60 computer in first floor (2 labs) and 1 wireless access point

60*12*2+15*2 = 1470

Let us assume 25 meters from NCR to second floor (2 WAP and 120 computers for 4 labs each with 30 computers)

120*25*2+25*2*2 = 6100

Total = 1470+6100 =7570

Switch and patch panel

180 computers and 3 access point with dual connection, since switch is 48 ports

180*2+3*2=366/48 = 8

Similarly, since patch panel is 24 ports, so 16 patch panel

Patch cord

366 between switch and patch panel for computer and WAP, 180 for computers

366+180 = 546

Bill of Quantity

S. No.	Devices	Unit	Quantity
1	Faceplates	Numbers	183
2	Wireless AP	Numbers	3
3	CAT6 Cables	Meters	7570
4	Patch Cords	Numbers/meters	546 (different lengths)
5	24 port Patch Panels	Numbers	16
6	48 port Switches	Numbers	8

Logical Design

192.168.1.0/24

For 6 labs, 3 bits will be required as we have equal number of host in each lab

For lab1

192.168.1.00000000/27 =192.168.1.0/27

For lab 2

192.168.1.00100000/27 =192.168.1.32/27

For lab 3

192.168.1.01000000/27 =192.168.1.64/27

For lab 4

192.168.1.01100000/27 = 192.168.1.96/27

For lab 5

192.168.1.10000000/27 =192.168.1.128/27

For lab 6

192.168.1.10100000/27 =192.168.1.160/27