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3(a)-No. of windows (W) = 4

total no. of register in each window = 56

common register to all procedure (G) = 12there are 12 high overlapping register and 12 low overlapping register so, (C) = 12.now, $\boxed{\text{Window size} = 2C + L + G}$ (we, know)

here,

 C = common register (to a procedure) G = global register L = local registerhence, $56 - 2C - G = L$

$$L = 56 - 2(12) - 12 = 20$$

$$\therefore \boxed{L = 20}$$

now, for total register,

$$\text{Total register} = (L + C)W + G$$

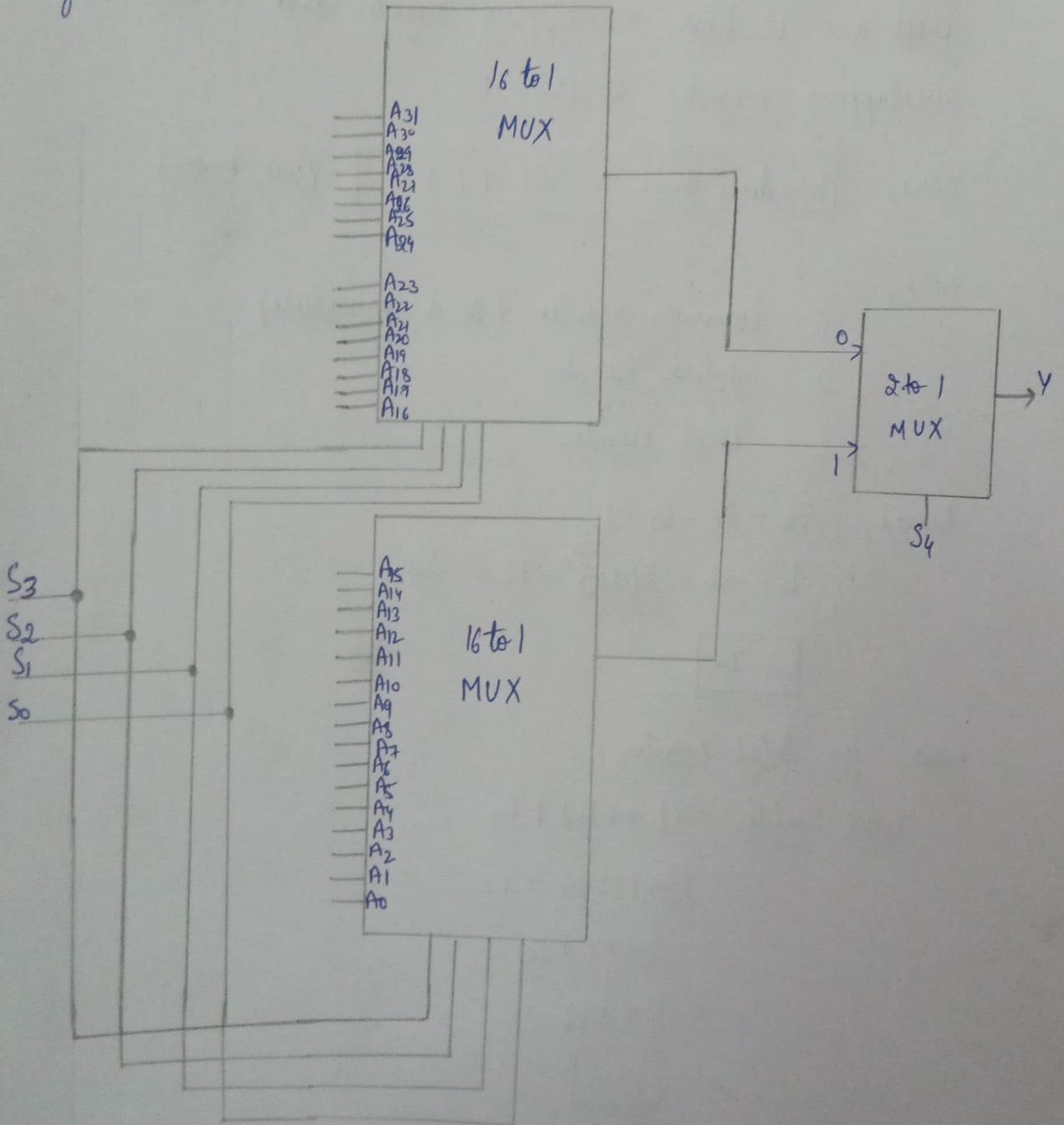
$$= (20 + 12)4 + 12$$

$$= 32 \times 4 + 12$$

$$= 128 + 12$$

$$= \boxed{140}$$

Question 3b): To implement a 32 to 1 MUX, five selected lines are needed. So, S_0, S_1, S_2, S_3, S_4 in which S_4 is connected to 2 to 1 MUX, where each 16 to 1 MUX is having selection lines; each 16 to 1 MUX will give one output and as there will 2 output from the two 16-1 MUX then they go as input in 2 to 1 MUX which gives single output.



32 to 1 MUX using 16 to 1 MUX