Numerical Question

Input   (16, 16, 4)   ← no. of channels

      Shape = (16, 16, 4)

      Size = $16 \times 16 \times 4 = 1024$

      No. of Parameters = 0

Pooling, Input layer k, Number of parameters always zero (0)

Convolution Layer1 — Conv2D (Number of filters = 16, filter size = 4, stride = 1, Padding = Yes).

      Shape = (16, 16, 16) ← No. of filters

      Size = $16 \times 16 \times 16 = 4096$

      No. of parameters = $(4 \times 4 \times 4 + 1) \times 16$

               $= 1040$

16 ka half 4 hai

$4 \times 4 \times 4$

$$\frac{(input - filter\ size + 2p)}{s} + 1$$

: padding Yes ho to as it is pechay wala likhna hai

no. of channels   Pechlay Ka

$+1 \to$ bias

$16 \to$ filter

Pooling Layer1 (filter size = 2, stride = 2, Padding = Null).

      Shape = (8, 8, 16)

      Size = $8 \times 8 \times 16 = 1024$

No. of parameters = 0

∴ Pooling layers do not have trainable parameters

16 ka half 8

$$\frac{(input - filter\ size + 2p)}{s} + 1$$

: padding Null ho to using formula

$$\left(\frac{16 - 2 + 2(0)}{2}\right) + 1$$

$$\left(\frac{14}{2}\right) + 1$$

$7 + 1 \Rightarrow 8$

Convolution layer 2 - Seperable Con 2D
(Number of filters = 32, filter size = 3, stride = 1, padding = Null)

Shape = (6, 6, 32) → No. of filters

Size = $6 \times 6 \times 32 = 1152$

No. of Parameters = $(3 \times 3 + 1) \times 32$

6 ka half	
3 or	
+1 → bias	
32 → filters	

$$\left(\frac{\text{input} - \text{filter size} + 2p}{s} \right) + 1$$

$$\left(\frac{8 - 3 + 2(0)}{1} \right) + 1$$

$$\left(\frac{5}{1} \right) + 1 \Rightarrow 5 + 1$$

$$= 6$$

Pooling Layer 2 (filter size = 2, Stride = 2, padding = Null).

Shape = (3, 3, 32)

Size = $3 \times 3 \times 32 = 288$

No. of Parameters = 0

$$\left(\frac{input - filter\,size + 2p}{S}\right) + 1$$

$$\left(\frac{6 - 2 + 2(0)}{2}\right) + 1$$

$$\left(\frac{4^2}{2}\right) + 1$$

$$2 + 1 \Rightarrow 3$$

Fully Connected Layer 3 (Number of Neurons = 100)

Shape = (100, 1) → neurons

Size = 100×1 = 100

No. of Parameters = (288 + 1) × 100
= 28900

| 288 pichlay ka size
+1 → bias
100 →
No. of neurons

Fully Connected Layer 4 (number of neurons = 10)

Shape = (10, 1) → neurons

Size = 10×1 = 10

No. of Parameters = (100 + 1) × 10
= 1010

| 100 pichlay ka size
+1 → bias
→10 no. of neurons.

Output Layer (Number of Neurons = 5,
Activation function Softmax)

Shape = (5, 1) → neurons

Size = 5×1 = 5

No. of Parameters = (10 + 1) × 5
= 55

| 10 pichlay ka size
→ 1 bias
5 no. of neurons.