weights = kernel size x image depth

bias = 1 x no of kernels

output width = $\frac{\text{width} - \text{filter size} + 2(\text{padding})}{\text{Strides}} + 1$

Q1.

Kernel Size	Input Size	No of Kernels	Calculations	Output Size	Parameters
3x3 x150x3	150	32	W: 3x3x3 = 27 27x32 = 864 B: 1x32 = 32	150x150 x32 $\left(\frac{150-3+2(1)}{1}+1 = 150\right)$	896
2x2 x150x32	150		$\left(\frac{150-2+2(0)}{2}+1 = 75\right)$	75x75 x32	
3x3 x32	75x75	64	W: 3x3x32 = 288 288x64 = 18432 B: 1x64 = 64	75x75 x64 $\left(\frac{75-3+2(1)}{1}+1 = 75\right)$	18496
2x2 x64	75x75		$\left(\frac{75-2+2(0)}{2}+1 = 37\right)$	37x37 x64	
3x3 x64	37x37	128	W: 3x3x64 = 576 576x128 = 73728 B: 1x128 = 128	37x37x128 $\left(\frac{37}{128}-3+2(1)+1 = 37\right)$	73856
2x2 x128	37x37		$\left(\frac{37-2+2(0)}{2}+1 = 18\right)$	18x18x128	
			18x18x128 = 41472	41472	
FOR ANN:					
w= nodes of current layer x nodes of prev layer			W: 64x41472 = 2654208 B: 1x64 = 64	64	2654272
			W: 1x64 = 64 B: 1x1 = 1	1	65

∴ TOTAL = 2747585

Q2.

Kernel Size	Input Size	No of Kernels	Calculations	Output Size	Parameters
3x3	150 x150x3	25	W: 3x3x3 = 27 27x25 = 675 B: 1x25 = 25	74x74 x25 $\left(\frac{150-3+2(0)}{2}+1=74\right)$	700
2x2	74x74 x25		$\left(\frac{74-2+2(0)}{2}+1=37\right)$	37x37 x25	
3x3	37x37 x25	35	W: 3x3x25 = 225 225x35 = 7875 B: 1x35 = 35	18x18 x35 $\left(\frac{37-3+2(0)}{2}+1=18\right)$	7910
2x2	18x18 x35		$\left(\frac{18-2+2(0)}{2}+1=9\right)$	9x9 x35	
3x3	9x9 x35	50	W: 3x3x35 = 315 315x50 = 15750 B: 1x50 = 50	7x7 x50 $\left(\frac{9-3+2(0)}{1}+1=7\right)$	15800
2x2	7x7 x50		$\left(\frac{7-2+2(0)}{2}+1=3\right)$	3x3 x50	
			3 x 3 x 50 = 450	450	
			W: 1024x450 = 460800 B: 1x1024 = 1024	1024	461824
			W: 100x1024 = 102400 B: 1x100 = 100	100	102500

TOTAL = 588734

Q3.

Kernel Size	Input Size	No of Kernels	Calculations	Output Size	Parameters
7x7 x224x3	224	32	W: 7x7x3 = 147 147x32 = 4704 B: 1x32	55x55 x32 $\left(\frac{224-7}{4}+2(0)+1=55\right)$	4736
3x3 x32	55x55		$\left(\frac{55-3+2(0)}{2}+1=27\right)$	27x27 x32	
3x3 x64	27x27 x32	64	W: 3x3x32 = 288 288x64 = 18432 B: 1x64 = 64	25x25 x64 $\left(\frac{27-3+2(0)}{1}+1=25\right)$	18496
3x3 x64	25x25		$\left(\frac{25-3+2(0)}{2}+1=12\right)$	12x12 x64	
3x3 x128	12x12 x64	128	W: 3x3x64 = 576 576x128 = 73728 B: 1x128 = 128	10x10 x128 $\left(\frac{12-3+2(0)}{1}+1=10\right)$	73856
3x3 x128	10x10		$\left(\frac{10-3+2(0)}{2}+1=4\right)$ 4x4x128 = 2048	4x4 x128 2048	
			W: 512x2048 = 104857 B: 1x512 = 512	512	1049088
			W: 100x512 = 51200 B: 1x100 = 100	100	51300
			TOTAL: 1197476		

Q4.

Kernel Size	Input Size	Noof Kernels	Calculations	Output Size	Parameters
11x11	224x224x3	64	W: 11x11x3 = 363 363 x 64 = 23232 B: 1x64 = 64	107x107x64 $\left(\frac{224-11+2(0)}{2}+1=107\right)$	23296
3x3	107x107x64		$\left(\frac{107-3+2(0)}{2}+1=53\right)$	53x53x64	
5x5	53x53x64	128	W: 5x5x64 = 1600 1600x128 = 204800 B: 1x128 = 128	53x53x128 $\left(\frac{53-5+2(2)}{1}+1=53\right)$	204928
3x3	53x53x128		$\left(\frac{53-3+2(0)}{2}+1=26\right)$	26x26x128	
3x3	26x26x128	256	W: 3x3x128 = 1152 1152x256 = 294912 B: 1x256	26x26x256 $\left(\frac{26-3+2(1)}{1}+1=26\right)$	295168
3x3	26x26x256	256	W: 3x3x256 = 2304 2304x256 = 589824 B: 1x256 = 256	26x26x256 $\left(\frac{26-3+2(1)}{1}+1=26\right)$	590080

3×3 26×26 512 W: 3×3×256 = 2304 26×26 1180160

×256 2304×512 = 1179648 ×512

B: 1×512 $\left(\frac{26-3+2(1)}{1}+1\right)$

3×3 26×26 $\left(\frac{26-3+2(0)}{2}+1 = 12\right)$ 12×12

×512 ×512

12×12×512 = 73728 73728

W: 2048×73728 = 150994944 2048 ~~150996992~~ 15099692

B: 1×2048 = 2048

W: 1024×2048 = 2097152 1024 ~~2098176~~ 2098176

B: 1024×1 = 1024

W: 10×1024 = 10240 10 ~~10250~~ 10250

B: 1×10 = 10

TOTAL = 155399050

Q5.

Kernel Size	Input Size	No of Kernels	Calculations	Output Size	Parameters
7x7	224 x 224 x 3	32	W: 7x7x3 = 147 147 x 32 = 4704 B: 1 x 32 = 32	109 x 109 x 32 $\left(\frac{224-7+2(0)}{2}+1 = 109\right)$	4736
2x2	109 x 109 x 32		$\left(\frac{109-2+2(0)}{2}+1 = 54\right)$	54 x 54 x 32	
5x5	54 x 54 x 32	32	W: 5x5x32 = 800 800 x 32 = 25600 B: 1 x 32 = 32	54 x 54 x 32 $\left(\frac{54-5+2(2)}{1}+1 = 54\right)$	25632
2x2	54 x 54 x 32		$\left(\frac{54-2+2(0)}{2}+1 = 27\right)$	27 x 27 x 32	
~~3x3~~	~~27x27~~ x ~~32~~	~~32~~	$\left(\frac{27-3+2(1)}{1}\right)$		
3x3	27 x 27 x 32	32	W: 3x3x32 = 288 288 x 32 = 9216 B: 1 x 32 = 32	27 x 27 x 32 $\left(\frac{27-3+2(1)}{1}+1 = 27\right)$	9248
2x2	27x27 x32		$\left(\frac{27-2+2(0)}{2}+1 = 13\right)$	13x13 x32	
3x3	13x13 x32	32	W: 3x3x32 = 288 288 x 32 = 9216 B: 1x32 = 32	13x13 x32 $\left(\frac{13-3+2(1)}{1}+1 = 13\right)$	9248

2X2 13X13 $\left(\frac{13-2+2(0)}{2}+1=6\right)$ 6X6

X32 X32

6 X 6 X 32 = 1152 1152

W: 1024X 1152 = 1179648 1024 1180672

B: 1X1024 = 1024

W: 10X1024 = 10240 10 10250

B: 1X10 = 10

TOTAL = 1239786