Answer in the table provided below: [10 points, each question is one point]

A. Matlab:

```
>> Y = [0 1 1 0; 0 2 2 3; 0 1 1 3; 0 2 3 3];
   [r c] = find(Y ==2)
```

Q.1 Output of Matlab command **(Y<=3)** is .....

Q.2 Output of Matlab command **length(r)** is .....

B. Intensity models:

For designing a specific classifier, a training data was composed from a grey scale image Y that has 4 grey levels $Q = \{0,1,2,3\}$. The image Y was classified into one of two lables $L = \{0,1\}$ to produce a labeled image X. If the joint probability $P(Y,X)$ for each class is

$$P(Y,X=0) = [0.25 \quad 0.20 \quad 0.10 \quad 0.05], \text{and } P(Y,X=1) = [0.05 \quad 0.05 \quad 0.10 \quad 0.20]$$

Answer the following:

Q.3 Compute the prior probabilities

Q.4 Compute the number of occurrence of the grey level q=1 in the training image Y, using one image of size 2x4

Q.5 State the Bayes classifier rule for classification

C. Medical Image modalities:

Q.6 If someone has a dental problem, what will be the best modality to scan it?

(a) X-ray (b) MRI (c) Ultrasound (d) Nuclear imaging

Q.7 The most safe medical image modality is .....

(a) X-ray (b) MRI (c) Ultrasound (d) Nuclear imaging

Q.8 If someone has a tumor in his/her lung, what will be the best modality to follow it

(a) X-ray (b) MRI (c) Ultrasound (d) PET/CT

Q.9 X-ray image measure the ..... of x-rays through body tissue

(a) attenuation (b) reflection (c) scattering (d) Nuclear imaging

Q.10 For a row composed of two pixels: if the row projection is 0.4 cm^{-1} and the Hounsfield unit of first pixel is 500 and water attenuation coefficient is 0.2 cm^{-1}. Then the second pixel attenuation coefficient is...

(a) 0.2 cm^{-1} (b) 0.3 cm^{-1} (c) 0.1 cm^{-1} (d) 0.2 cm^{-1}

الاسم:		الفصل:							
Q.1	[1 1 1 1;1 1 1 1;1 1 1 1;1 1 1 1]								
Q.2	3								
Q.3	$p(x=0) = 0.6; p(x=1) = 0.4$								
Q.4	2 *pixels out of* 8								
Q.5	At y=q: if $p(x=0\|y=q) >= (x=1\|y=q)$ then decide class x=0; otherwise decide class x=1								
Q.6	**a**	Q.7	**c**	Q.8	**d**	Q.9	**a**	Q.10	**b**

Answer in the table provided below: [10 points, each question is one point]

A. Matlab:

```
>> Y = [0 1 1 0; 0 2 2 3; 0 1 1 3; 0 2 3 3];
   [r c] = find(Y ==2)
```

Q.1 Output of Matlab command **(Y>2).*Y** is .....

Q.2 Output of Matlab command **length(c)** is .....

B. Intensity models:

For designing a specific classifier, a training data was composed from a grey scale image Y that has 4 grey levels Q={0,1,2,3}. The image Y was classified into one of two lables L={0,1} to produce a labeled image X. If the joint probability P(Y,X) for each class is

P(Y,X=0)= [0.25 0.20 0.10 0.05],and P(Y,X=1)= [0.05 0.05 0.10 0.20]

Answer the following:

Q.3 Compute the prior probabilities

Q.4 Compute the number of occurrence of the grey level q=1 in the training image Y, using one image of size 2x4

Q.5 Compute the Bayes classifier grey level threshold for classification

C. Medical Image modalities:

Q.6 .....appears bright

(a) X-ray bone (b) X-ray lung (c) MRI grey matter (d) X-ray teeth root

Q.7 The most harmful modality of the following is ...

(a) X-ray (b) MRI (c) Ultrasound (d) Computed tomography

Q.8 If someone has a tumor in her breast, what will be the best modality to follow it

(a) X-ray (b) MRI (c) Ultrasound (d) Nuclear imaging

Q.9 The collimator job in x-ray device is

(a) to direct the rays to patient (b) filtration (c) receptor (d) both (a) and (b)

Q.10 For a column composed of two pixels: if the column projection is 0.5 cm^{-1} and the Hounsfield unit of first pixel is 1000 and water attenuation coefficient is 0.2 cm^{-1}. Then the second pixel attenuation coefficient is...

(a) 0.2 cm^{-1} (b) 0.3 cm^{-1} (c) 0.1 cm^{-1} (d) 0.4 cm^{-1}

الاسم:				الفصل:					
Q.1	[0 0 0 0;0 0 0 3;0 0 0 3;0 0 3 3]								
Q.2	3								
Q.3	p(x=0) = 0.6; p(x=1) = 0.4								
Q.4	2 pixels out of 8								
Q.5	threshold=2								
Q.6	a	Q.7	d	Q.8	a	Q.9	d	Q.10	c