

King Saud University

College of Applied Medical Science

Radiology department

Rad 454

2nd mid term exam

Day: Sunday

Date: / / 2012

*Student Name:……………………………. ID #:…………………………Level:…4…*

Model answer

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| --- | --- |
| Totalmark |  |
| 15 |

**First question: choose the correct answer : (4 marks)**

1- The measurement of the brightness of each pixel in the entire image.

A. sampling

B. resolution

C. scanning

2-Poor images can be filtered to remove unwanted “noise” and also unnecessary fine detail in the image-a technique known as:

 A. capturing.

B. erasing .

C. smoothing.

3- It includes a file format definition and a network communications protocol.

 A. HL7

B. DICOM

C. ADC

4- Internal image processor : It is responsible for **-------** processing of the input digital data.

A. high speed

B. intermediate speed

C. low speed

**Second question: True or False statement : (2 marks)**

1- However, because monitors work with digital signals, it is necessary to convert the analog data to digital signals with DAC ( F )

2- As the number of pixel in the image matrix increases, the image become more recognizable and better perception of image details. ( T )

3- The more samples taken, the less accurate representation of the digital image. ( F )

4- The future of digital imaging is promising in that a wide variety of applications have received increasing attention such as 3D imaging.( T )

**Third question: Fill the blanks with appropriate word/s:**

**(3 marks)**

1. In digital image processing, the ---host----- computer is a primary component capable of performing several functions.
2. The objective of ---DSA---- is display of subtraction images, evaluation of perfusion and/or blood flow, removal of artefacts arising from patient movement and contrast enhancement.
3. Image types are ---analog------and ------digital-----.
4. The total number of grey levels is called the ----***grey scale---***, which is composed of any number of grey levels.
5. Bit ADC result in two integers (0 and 1), which are represented as -----black-- and --white-- .
6. Two types of digital radiography --direct---and --Indirect--capture .

**Fourth question: List three of : (3 marks)**

1- **Image digitization steps and define one of them :**

**-** Scanning: It is the division of the picture into small regions. Each small region of the picture is a picture element or ***Pixel***

 -Sampling: The measurement of the brightness of each pixel in the entire image.

 -quantization**:** The brightness value of each sampled pixel is assigned an integer (0, or a positive or negative number) called a grey level.

**2- PACS uses** :

* + - Reading stations - Physician review stations
	+ Web access - Technologist quality control stations
	+ Administrative stations - Archive systems
	+ Multiple interfaces to other - hospital and radiology systems

**Fifth question: Answer the following : (2 marks)**

 **Why digitize images? (list the advantages and explain one of them)**

* **Image enhancement:** The image can be made to look moor pleasing to the observer by improving the overall quality of the image.
* **Image restoration:** Poor images can be filtered to remove unwanted “noise” and also unnecessary fine detail in the image-a technique known as smoothing.
* **Image analysis**
* **Image detection:** Allows the observer to look for specific shapes, contours, or textures while disregarding the other features in the image.
* **Pattern recognition:** The computer can see structures and identify patterns.
* **Geometric transformation:** Image can be rotated or scaled by changing the position of the pixel.
* **Data compression:** The compression of digital images reduces the amount of data that comprise the image, which is important in data storage and transmission.

**Sixth question: Define 1 only : (1 marks)**

**-Image digitization :**

 It is to convert an analog image into numeric data for processing by the computer.

**- PACS :** picture archiving and communication systems , are computers or networks dedicated to the storage, retrieval, distribution and presentation of images.

**Good luck ...**

**Alanoud Al Saleh**