Q1

1. Objects => Train, Ladder, Building
2. Properties of objects => Clothing, age, color
3. Interaction of objects => Train on the rails
4. Scene Settings => outdoor scene, scenery

Q2  
Syntax: It is limited and directly available from the image. E.g. Black train went off the rails  
Semantics: It is unlimited and requires prior knowledge. Semantics may not be available in the image directly. E.g. A train accident occurred when train was late so driver drove the train faster then the train went off the rails.

Q3  
Content words: Words that name objects of reality and their qualities. What, where, why, who, when are five w’s.  
Other W’s: Which, How. ‘Which’ is already covered in what and who.  
SDLC Definition: The process of planning, Creating, testing and deploying an information system.  
SDLC Content Words: Process, Plan, Create, Test, Deploy, Information, System.

Q4  
Pixel: Concatenation of 1 row and 1 Column of an image. It is the basic unit of an image.  
Properties of Pixel:

1. Location => Coordinates of pixel in 2d plane.
2. Size => Size of each pixel i.e. width and height
3. Color => Intensity levels of specific color
4. Opacity => Transparency of pixel

Q5  
Digital Image Processing: Application of computer algorithms on digital images to perform image processing. Known for Image in and image out.  
Digital Image Processing Goals:

1. Improvement of pictorial information for human interpretation.
2. Processing of image data for storage, transmission and representation for autonomous machine perception

Q6  
Application of computer Vision:

1. Agriculture drone for soil and field analysis, seed planting and drop spraying
2. Surveillance and security, autonomous vehicles, landmine removal.
3. TMS tumor detection and segmentation, element level detection, segmentation and classification.
4. Sportsman activity tracker, activity classifier and player energy level approximation.
5. Visual navigation in robotics, unmanned guided vehicles.

Q7  
Low level: Input is image and output is image. It includes preprocessing of the image such as noise reduction, sharpening.  
Mid level: Input is image and output is attributes such as object recognition, segmentation.  
High level: Input is attributes of image and output is understanding such as scene understanding, autonomous navigation.  
Image segmentation: Process of partitioning a digital image into multiple segments, such as human segment, chair segment.

Q8  
There is not a single and exact answer to that what vision system is better.  
Aspects of image in which human vision is better are:

1. Large number of semantics and syntax.
2. Relatively complex images in terms of number of objects.
3. Relatively large variety of objects

Aspects of image in which human vision is better are:

1. Small number of semantics and syntax.
2. Relatively simple images in terms of object count.
3. Relatively low number of variant objects.

Q9  
Image noise: Random variation in the gray level or color information of an image.  
Causes of image noise:

1. Conversion of one color-space or format into another.
2. Information loss while transmission of image data on cheaper data carrier.
3. Low quality capture hardware.

Avoiding Image noise:

1. Shoot in raw or native format.
2. Shoot in low exposure settings.
3. Shoot multiple times at higher framerate.

Q10  
Image Enhancement: Process of adjusting the interested segment of the image for batter perception. It is the procedure of improving the quality and the information content of original data before processing. E.g. noise removal, color-space conversion, size conversion, image warping.

Q11  
Image Acquisition: Acquiring digital image of the real world from a hardware source such as camera.  
We compare the images to check

1. Whether images are same or not.
2. Whether the images are in sequence or not.
3. The quality and performance before and after some image process.