

PRACTICE QUESTIONS

IABAC

Certified Computer Vision Expert

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EDITION Free Set 2

QUESTIONS 10

SHARED October 15, 2026

EXAM IABAC Certified Computer Vision Expert

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1. What is the main purpose of applying a Gaussian blur before running a Canny edge detector?
 - A To convert the image into the HSV color space so that hue can be measured for every edge candidate in the frame
 - B To increase the resolution of the image before detection begins so that finer edges can be located accurately
 - C To normalize each channel to zero mean and unit variance across the full training dataset before any edges are found
 - D To suppress noise so that spurious gradients do not produce false edges while strong edges remain detectable

Answer: D

Canny computes image gradients, which amplify pixel noise, so a Gaussian blur smooths the image first. Converting to HSV is a color change that Canny does not need, and that is the tempting distractor. Upscaling adds no information, and per-channel normalization is a separate preprocessing step.

2. The Sobel operator approximates image gradients using small convolution kernels.
 - A True
 - B False

Answer: A (True)

Sobel kernels are 3x3 filters with smoothing along one axis and differencing along the other, giving approximate horizontal and vertical derivatives. They are cheap to compute and form the first step of many edge detectors. The statement is true as written.

3. ORB combines a FAST-based keypoint detector with orientation assignment and which binary descriptor?
 - A Gabor filter bank
 - B Local binary patterns with a 256-bin histogram
 - C Rotated BRIEF
 - D Hu moments

Answer: C

ORB adds an intensity-centroid orientation to FAST corners and steers BRIEF accordingly, producing a rotated BRIEF binary descriptor that is fast to match with Hamming distance. Gabor filter banks produce real-valued responses, not binary strings, which makes them a tempting distractor. Local binary patterns are texture codes, and Hu moments are shape statistics.

4. The 3x3 matrix that holds focal length and principal point is called the camera _____ matrix.

Answer: intrinsic (also accepted: calibration)

The intrinsic or calibration matrix K contains the focal lengths and principal point offsets. The extrinsic matrix holds the rotation and translation, which is the tempting alternative. The projection matrix combines both.

5. Which two components are part of a standard two-stage detector such as Faster R-CNN? (Choose two.)

- A** A single global softmax over every pixel of the image
- B** A dedicated depth estimation branch for the scene
- C** A vector quantization codebook for compressing features
- D** A region proposal network that suggests candidate object regions
- E** A bounding box regression head that refines each proposal

Answer: D, E

Faster R-CNN generates proposals with a region proposal network and then refines each one with a box regression head before classification. A global pixel softmax is the tempting distractor, since it resembles segmentation rather than detection. Depth branches and codebooks belong to other models.

6. For a rectified stereo pair with fixed focal length and baseline, depth is inversely proportional to which quantity?
- A** Image resolution
 - B** Number of color channels
 - C** Feature descriptor length
 - D** Disparity

Answer: D

Depth equals focal length times baseline divided by disparity, so depth falls as disparity grows. Image resolution changes disparity values but is not the divisor in the depth formula, which makes it a tempting distractor. Color channels and descriptor length do not appear in stereo geometry.

7. Why do residual connections help train very deep CNNs such as ResNet?
- A They reduce the parameter count below that of a plain network of equal depth by replacing dense weight matrices with identity matrices
 - B They give gradients an identity path and make it easier for layers to learn residual mappings
 - C They replace every pooling layer in the network with a strided convolution so that spatial size shrinks more gradually
 - D They force every layer to output a single channel, so the network keeps one feature map for each spatial position

Answer: B

A skip connection adds the input to the block output, so gradients can flow past weight layers and degradation is reduced. Residual blocks do not inherently reduce parameters, which is the tempting distractor. Replacing pooling and forcing single-channel outputs are not the mechanism.

8. Global average pooling reduces each feature map to a single value and keeps the full spatial layout intact.
- A True
 - B False

Answer: B (False)

Global average pooling averages each channel over all its spatial positions, so the spatial layout is discarded and only one value per channel remains. Some models pair it with a classifier head precisely because it removes spatial position. The statement describes flattening, not pooling.

9. What is the receptive field of a neuron in a deeper layer of a CNN?
- A The number of weights in that layer's kernel, counted across all of the filters that the layer contains in total
 - B The largest activation value the neuron can output once the network has been trained to convergence on the data
 - C The region of the input image that can influence that neuron's activation, which grows as layers are stacked
 - D The batch of images that are processed together in one forward pass through the network during training

Answer: C

The receptive field grows with depth, stride and kernel size, and it defines which input pixels contribute to a unit. Kernel weight count is the tempting distractor, but it measures parameters rather than spatial coverage. Activation range and batch size are unrelated.

10. Which metric is the standard summary for object detection benchmarks such as COCO, averaging precision over IoU thresholds and classes?
- A Top-5 accuracy of the classifier on the held-out images
 - B Perplexity of the language model on the evaluation set
 - C Peak signal-to-noise ratio of the reconstructed image
 - D Mean average precision of the detector on the test set

Answer: D

Mean average precision (mAP) averages the area under each class's precision-recall curve, and COCO further averages over IoU thresholds from 0.5 to 0.95. Top-5 accuracy is the tempting distractor, but it belongs to classification. Perplexity is a language model metric, and PSNR measures reconstruction quality.