PreLab:-

1.What is the primary purpose of a convolutional layer in a ConvNet, and how does it contribute to feature extraction?
The primary purpose is to apply filters to input images to detect features like edges and textures, contributing to feature extraction by creating feature maps.

2.Briefly explain the role of pooling layers in ConvNets. How do they contribute to spatial downsampling?
Pooling layers reduce the spatial dimensions of feature maps by aggregating values, contributing to spatial downsampling and reducing computational complexity.

3.What is the role of fully connected layers in ConvNets, and how do they contribute to the final classification decision?
Fully connected layers aggregate features learned by convolutional layers to produce class scores, contributing to the final classification decision.

4.How is backpropagation applied in ConvNets during the training process, considering both convolutional and fully connected layers?
Backpropagation computes gradients for both convolutional and fully connected layers, updating weights to minimize the loss function through gradient descent.

VIVA:-

1.How does data augmentation contribute to improving the robustness of a ConvNet for image classification tasks?
Data augmentation increases dataset diversity by applying transformations like rotation and scaling, helping the ConvNet generalize better and become more robust to variations.

2.How does the choice of stride size in convolutional layers impact the spatial dimensions of the feature maps and, consequently, the model's receptive field?
Larger stride sizes reduce the spatial dimensions of feature maps and increase the receptive field, leading to more abstract and global feature extraction.

3.What is the role of batch normalization in ConvNets, and how does it contribute to training stability and faster convergence?
Batch normalization normalizes activations, reducing internal covariate shift and allowing higher learning rates, which improves training stability and speeds up convergence.

4.Can you discuss other applications where ConvNets have demonstrated success, such as object detection or segmentation?
ConvNets excel in object detection (e.g., with R-CNN and YOLO) and segmentation (e.g., with U-Net and Mask R-CNN) by accurately identifying and delineating objects within images.