Here are answers to your questions:

**Q1: PMF and PDF**

* **PMF (Probability Mass Function):**
  + Describes the probability distribution of a discrete random variable.
  + Each possible outcome has a specific probability.
  + **Example:** Tossing a coin: Let XX be the random variable for "heads" (1) or "tails" (0). The PMF is: P(X=1)=0.5,P(X=0)=0.5P(X=1) = 0.5, \quad P(X=0) = 0.5
* **PDF (Probability Density Function):**
  + Represents the probability distribution of a continuous random variable.
  + The probability of a single exact value is zero; probabilities are calculated over intervals.
  + **Example:** Heights of individuals in a population: If height XX is normally distributed, the PDF gives the relative likelihood of XX within a range.

**Q2: CDF (Cumulative Density Function)**

* **Definition:**  
  The CDF of a random variable XX gives the probability that XX will take a value less than or equal to xx:

F(x)=P(X≤x)F(x) = P(X \leq x)

* **Why it’s used:**
  + To determine probabilities for ranges or thresholds.
  + Helps visualize the cumulative probability distribution.
* **Example:**  
  Suppose XX represents scores in an exam with a maximum score of 100. If F(70)=0.85F(70) = 0.85, it means 85% of students scored 70 or below.

**Q3: Examples and Parameters of Normal Distribution**

* **Situations where normal distribution applies:**
  + Heights of individuals.
  + Test scores.
  + Measurement errors.
* **Parameters and Shape:**
  + **Mean (μ\mu):** Determines the center of the distribution.
  + **Standard deviation (σ\sigma):** Controls the spread. Larger σ\sigma leads to a flatter curve, while smaller σ\sigma leads to a narrower peak.

**Q4: Importance of Normal Distribution**

* **Importance:**
  + Many natural phenomena follow it.
  + Central to inferential statistics (e.g., hypothesis testing).
  + Basis for the Central Limit Theorem.
* **Real-life examples:**
  + IQ scores.
  + Blood pressure readings.
  + Measurement errors in scientific experiments.

**Q5: Bernoulli Distribution**

* **Definition:**  
  Represents a single trial with two outcomes: success (pp) or failure (1−p1-p).
* **Example:**  
  Tossing a coin: P(Head)=0.5,P(Tail)=0.5P(\text{Head}) = 0.5, P(\text{Tail}) = 0.5.
* **Difference between Bernoulli and Binomial:**
  + **Bernoulli:** Single trial.
  + **Binomial:** Multiple independent Bernoulli trials (nn) with probability pp.

**Q6: Probability Greater than 60**

* **Given:** μ=50,σ=10,X>60\mu = 50, \sigma = 10, X > 60.
* **Steps:**
  1. Compute the z-score: z=X−μσ=60−5010=1z = \frac{X - \mu}{\sigma} = \frac{60 - 50}{10} = 1
  2. Use the standard normal table to find P(Z>1)P(Z > 1). P(Z>1)=1−P(Z≤1)=1−0.8413=0.1587P(Z > 1) = 1 - P(Z \leq 1) = 1 - 0.8413 = 0.1587
  3. **Answer:** The probability is 0.15870.1587 or 15.87%.

**Q7: Uniform Distribution**

* **Definition:**  
  All outcomes in a range are equally likely.
* **Example:**  
  Rolling a fair die: Each outcome {1,2,3,4,5,6}\{1, 2, 3, 4, 5, 6\} has equal probability 16\frac{1}{6}.

**Q8: Z-Score**

* **Definition:**  
  Measures how many standard deviations an observation is from the mean:

z=X−μσz = \frac{X - \mu}{\sigma}

* **Importance:**
  + Standardizes data.
  + Allows comparison across different datasets.
  + Used in hypothesis testing and confidence intervals.

**Q9: Central Limit Theorem (CLT)**

* **Definition:**  
  For a sufficiently large sample size, the sampling distribution of the sample mean approaches a normal distribution, regardless of the population's original distribution.
* **Significance:**
  + Enables inferential statistics.
  + Justifies using normal distribution in hypothesis testing.

**Q10: Assumptions of CLT**

1. Samples are independent.
2. Sample size is sufficiently large.
3. Population has a finite variance.