Python Programming Lab Assignment-3

Part A: Dictionary Basics (Q1–Q10)

**1. Write a program to create a dictionary of 5 students with their names as keys and marks as values. Print the dictionary.**

Answer 1:  
students = {'Alice': 85, 'Bob': 78, 'Charlie': 92, 'David': 67, 'Eva': 90}  
print(students)

Output:  
{'Alice': 85, 'Bob': 78, 'Charlie': 92, 'David': 67, 'Eva': 90}

**2. Write a function that takes a dictionary and prints all its keys and values separately.**

Answer 2:  
def print\_dict(d):  
 for k, v in d.items():  
 print(f"Key: {k}, Value: {v}")

**3. Write a function to find the length (number of items) of a dictionary without using len().**

Answer 3:  
def dict\_length(d):  
 count = 0  
 for \_ in d:  
 count += 1  
 return count

**4. Write a program to check whether a given key exists in a dictionary or not.**

Answer 4:  
def check\_key(d, key):  
 return key in d

**5. Write a program to update the marks of a specific student in a dictionary using a function.**

Answer 5:  
def update\_marks(d, name, new\_marks):  
 if name in d:  
 d[name] = new\_marks  
 return d

**6. Write a function to merge two dictionaries into one.**

Answer 6:  
def merge\_dicts(d1, d2):  
 d = d1.copy()  
 d.update(d2)  
 return d

**7. Write a program to sort a dictionary by its values (ascending and descending).**

Answer 7:  
def sort\_dict\_by\_values(d):  
 asc = dict(sorted(d.items(), key=lambda x: x[1]))  
 desc = dict(sorted(d.items(), key=lambda x: x[1], reverse=True))  
 return asc, desc

Output:  
Ascending: {'David': 67, 'Bob': 78, 'Alice': 85, 'Eva': 90, 'Charlie': 92}  
Descending: {'Charlie': 92, 'Eva': 90, 'Alice': 85, 'Bob': 78, 'David': 67}

**8. Write a function that takes a dictionary and returns the key with the maximum value.**

Answer 8:  
def max\_value\_key(d):  
 return max(d, key=d.get)

**9. Write a program to remove a given key from a dictionary using a function.**

Answer 9:  
def remove\_key(d, key):  
 if key in d:  
 del d[key]  
 return d

**10. Write a function that counts how many times each character appears in a given string using a dictionary.**

Answer 10:  
def char\_count(s):  
 d = {}  
 for ch in s:  
 d[ch] = d.get(ch, 0) + 1  
 return d

Example Input: 'hello'  
Output: {'h':1, 'e':1, 'l':2, 'o':1}

Part B: Functions with Dictionary Applications (Q11–Q20)

**11. Write a function that accepts a dictionary of students with marks and returns the average marks.**

Answer 11:  
def avg\_marks(d):  
 return sum(d.values()) / len(d)

**12. Write a function to invert a dictionary (swap keys and values).**

Answer 12:  
def invert\_dict(d):  
 return {v: k for k, v in d.items()}

**13. Write a function that takes a dictionary and returns a new dictionary with only those items where the value is greater than 50.**

Answer 13:  
def filter\_values(d):  
 return {k: v for k, v in d.items() if v > 50}

**14. Write a program to create a dictionary of squares of numbers from 1 to n, where n is input from the user.**

Answer 14:  
n = int(input("Enter n: "))  
squares = {i: i\*\*2 for i in range(1, n+1)}  
print(squares)

Example Input: n=5  
Output: {1:1, 2:4, 3:9, 4:16, 5:25}

**15. Write a function to count the frequency of words in a given sentence using a dictionary.**

Answer 15:  
def word\_freq(sentence):  
 words = sentence.split()  
 d = {}  
 for word in words:  
 d[word] = d.get(word, 0) + 1  
 return d

Example Input: 'this is a test this'  
Output: {'this':2, 'is':1, 'a':1, 'test':1}

**16. Write a function to combine two dictionaries by adding values of common keys. Example: d1 = {'a':10, 'b':20}, d2 = {'a':30, 'c':40} → Output: {'a':40, 'b':20, 'c':40}**

Answer 16:  
def combine\_dicts(d1, d2):  
 d = d1.copy()  
 for k, v in d2.items():  
 d[k] = d.get(k, 0) + v  
 return d

Example Input: d1={'a':10,'b':20}, d2={'a':30,'c':40}  
Output: {'a':40,'b':20,'c':40}

**17. Write a program to create a nested dictionary to store employee details (id, name, salary) and print them neatly using a function.**

Answer 17:  
employees = {  
 1: {'name': 'Alice', 'salary': 50000},  
 2: {'name': 'Bob', 'salary': 60000},  
 3: {'name': 'Charlie', 'salary': 55000}  
}  
  
def print\_employees(emp):  
 for id, details in emp.items():  
 print(f"ID: {id}, Name: {details['name']}, Salary: {details['salary']}")

Output:  
ID:1, Name: Alice, Salary: 50000  
ID:2, Name: Bob, Salary: 60000  
ID:3, Name: Charlie, Salary: 55000

**18. Write a function to check if two dictionaries are equal (same keys and values).**

Answer 18:  
def dicts\_equal(d1, d2):  
 return d1 == d2

**19. Write a function that takes a dictionary of items with prices and returns the total bill amount.**

Answer 19:  
def total\_bill(d):  
 return sum(d.values())

Example Input: {'apple':50,'banana':30,'milk':20}  
Output: 100

**20. Write a program to create a dictionary from two lists: one containing keys and the other containing values.**

Answer 20:  
keys = ['a', 'b', 'c']  
values = [1, 2, 3]  
d = dict(zip(keys, values))  
print(d)

Output:  
{'a':1,'b':2,'c':3}