Programming Assignment-13

Question 1:

Ans.

```
import math
def calculate_formula(D_values):
    C = 50
    H = 30
    results = []
    for D in D_values:
        Q = math.sqrt((2 * C * int(D)) / H)
        results.append(int(Q))  # Cast to integer to match output format
    return results

# Example input
D_input = input("Enter comma-separated values for D: ")  # e.g. "100,150,180"
D_values = D_input.split(",")
output = calculate_formula(D_values)
print("Output:", ",".join(map(str, output)))
```

Example:

Input: 100,150,180

Output: 18,22,24

Question 2:

Ans.

```
def generate_2d_array(X, Y):
    array = [[i * j for j in range(Y)] for i in range(X)]
    return array
```

```
# Example input
X, Y = map(int, input("Enter two digits X, Y: ").split(","))
result = generate_2d_array(X, Y)
print("2D Array:", result)
```

Example:

Input: 3,5

Output: [[0, 0, 0, 0, 0], [0, 1, 2, 3, 4], [0, 2, 4, 6, 8]]

Question 3:

Ans.

```
def sort_words(words):
    word_list = words.split(",")
    word_list.sort()
    return ",".join(word_list)

# Example input
words = input("Enter comma-separated words: ")  # e.g. "without,hello,bag,world"
output = sort_words(words)
print("Sorted words:", output)
```

Example:

Input: without,hello,bag,world

Output: bag,hello,without,world

Question 4:

Ans.

```
def remove_duplicates_and_sort(sentence):
    words = sentence.split()
```

```
    unique_words = sorted(set(words))
    return " ".join(unique_words)

# Example input
sentence = input("Enter a sequence of words: ")  # e.g. "hello world and practice makes perfect and hello world again"
output = remove_duplicates_and_sort(sentence)
print("Output:", output)
```

Example:

Input: `hello world and practice makes perfect and hello world again`

Output: `again and hello makes perfect practice world`

Question 5:

Ans.

```
def count_letters_digits(sentence):
    letters = sum(char.isalpha() for char in sentence)
    digits = sum(char.isdigit() for char in sentence)
    return letters, digits

# Example input
sentence = input("Enter a sentence: ")  # e.g. "hello world! 123"
letters, digits = count_letters_digits(sentence)
print(f"LETTERS {letters}")
print(f"DIGITS {digits}")
```

Example:

Input: `hello world! 123`

Output:

LETTERS 10

DIGITS 3

Question 6:

Ans.

```
import re

def validate_passwords(passwords):
    valid_passwords = []
    for password in passwords:
        if (6 <= len(password) <= 12 and
            re.search(r"[a-z]", password) and
            re.search(r"[A-Z]", password) and
            re.search(r"[0-9]", password) and
            re.search(r"[$#@]", password)):
            valid_passwords.append(password)
    return valid_passwords

# Example input
password_input = input("Enter comma-separated passwords: ")  # e.g. "ABd1234@1,a F1#,2w3E*,2We3345"
passwords = password_input.split(",")
valid = validate_passwords(passwords)
print("Valid passwords:", ",".join(valid))
```

Example:

Input: ABd1234@1,a F1#,2w3E*,2We3345

Output: ABd1234@1