SQL Server DBA/Developer Assignment

Task 1: Database Design and Modelling

You are tasked with designing a database for a basic online e-commerce platform. The system should manage products, customers, orders, and shipments. Design the necessary tables with appropriate relationships and attributes. Provide a script to create these tables along with any necessary constraints.

Task 2: Data Manipulation

a) Populate the tables created in Task 1 with some sample data.

b) Write SQL queries to perform the following tasks:

- Retrieve the top 5 customers who have made the most orders.
- Display the total revenue generated by each product category.
- Find the number of orders placed in the last month, broken down by day.
- Calculate the average order value for each customer.

Task 3: Database Administration

You have a SQL Server instance running with multiple databases. Perform the following tasks:

a) Write SQL commands to make a FULL backup of the "ShopDB" database and store a compressed backup file in a designated location on disk.

b) Give example of what could be used to find the most long-running queries.

c) Discuss some common performance tuning techniques in SQL Server. How would you identify and address performance bottlenecks?

Task 4: Performance Tuning

Identify what could be done to optimize the following stored procedure:

```
CREATE PROCEDURE GetOrderDetails
    @OrderID INT
AS
BEGIN
    DECLARE @TotalAmount MONEY;

    SELECT
        OD.ProductID,
        P.ProductName,
        OD.UnitPrice,
        OD.Quantity,
        OD.UnitPrice * OD.Quantity AS LineTotal
    INTO #TempOrderDetails
    FROM
        OrderDetails OD
    JOIN
        Products P ON OD.ProductID = P.ProductID
    WHERE
        OD.OrderID = @OrderID;

    SELECT @TotalAmount = SUM(LineTotal) FROM #TempOrderDetails;

    SELECT
        ProductID,
        ProductName,
        UnitPrice,
        Quantity,
        LineTotal,
        @TotalAmount AS TotalAmount
    FROM
        #TempOrderDetails;

    DROP TABLE #TempOrderDetails;
END
```