**In order to achieve the assessment criteria (P1) you must answer the following task:**

**Task 1**

1. Convert the following binary numbers to decimal and Hexadecimal:
* 10101010
* 00111100
1. Solve the following problems :
2. (01110011)2 $+$ (01100111)2
3. (110)10 $-$ (00101111)2

**(P1)**

**In order to achieve the assessment criteria (P2) you must answer the following task:**

**Task 2**

1. For the following diagram show in fig (1):



Fig (1)

1. Derive the truth table including (f1, f2, f3, f4 & F).
2. Find the Boolean function (Total output).

**(P2)**

**In order to achieve the assessment criteria (P3, M1.2) you must answer the following task:**

**Task 3**

1. Proof the following Boolean rules
2. A+AB = A
3. (A+B)(A+C) = A+BC.
4. Simplify the following Boolean function using the Karnaugh mapping :
5. F( A , B , C ) = ∑ ( 1, 2 , 3 , 5 , 7 )
6. F( A , B , C , D ) = ∑ (1, 2 , 3 ,5, 12 , 13 , 14 , 15 )

**(P3)**

**In order to achieve the assessment criteria (P4) you must answer the following task:**

**Task 4**

For the following circuits choose two circuits one of them combinational circuit and the other one is sequential and then compare between combinational and sequential circuits:

* Counter.
* Encoder.
* Multiplexer.
* Shift Register.
* Full adder.

**(P4)**

**In order to achieve the assessment criteria (P5) you must answer the following tasks:**

**Task 5**

Describe all combinational circuits in (task 4).

**(P5)**