

$$a.) F = \underline{A.B} + \underline{\bar{A}.B.\bar{C}.D} + \underline{\bar{A}.B.C.D} + \underline{A.\bar{B}.\bar{C}.\bar{D}}$$

| CD \ AB | 00 | 01 | 11 | 10 |
|---------|----|----|----|----|
| 00      |    |    |    |    |
| 01      |    | 1  | 1  |    |
| 11      | 1  | 1  | 1  | 1  |
| 10      | 1  |    |    |    |

| CD \ AB | 00 | 01 | 11 | 10 |
|---------|----|----|----|----|
| 00      |    |    |    |    |
| 01      |    | 1  | 1  |    |
| 11      | 1  | 1  | 1  | 1  |
| 10      | 1  |    |    |    |

$$\text{so } F = A.\bar{C}.\bar{D} + A.B + B.D$$

$$b.) F = A.B + \bar{A}.B.\bar{C}.D + \bar{A}.B.C.D + A.\bar{B}.\bar{C}.\bar{D}$$

$$= \bar{A}(B.\bar{C}.D + B.C.D) + A(B + \bar{B}.\bar{C}.\bar{D})$$

$$= \bar{A}(B.D.(C + \bar{C})) + A(B + \bar{B}.\bar{C}.\bar{D})$$

$$= \bar{A}(B.D) + A(B + \bar{B}.\bar{C}.\bar{D})$$

$$= \bar{A}.B.D + A.B + A.\bar{B}.\bar{C}.\bar{D}$$

$$= A.B + \bar{A}.B.D + A.\bar{B}.\bar{C}.\bar{D}$$

$$= B(A + \bar{A}.D) + A.\bar{B}.\bar{C}.\bar{D}$$

$$= A.B + B.D + A.\bar{C}.\bar{D}$$

by absorption