QUIZ

(1) Let K and L be algebraic field extensions of F such that both are contained in a common field E. Then the following is true
  (a) if K/F and L/F are both separable then so is KL/F, but not conversely.
  (b) if KL is separable over F, then so are K/F and L/F, but not conversely.
  (c) K/F and L/F are separable, if and only if, KL/F is separable.
  (d) none of the above.
  Answer: (c)

(2) Let K and L be algebraic field extensions of F such that both are contained in a common field E. Then the following is true
  (a) if K/F and L/F are both normal then so is KL/F, but not conversely.
  (b) if KL is normal over F, then so are K/F and L/F, but not conversely.
  (c) K/F and L/F are normal, if and only if, KL/F is normal.
  (d) none of the above.
  Answer: (a)

(3) Let K and L be algebraic field extensions of F such that both are contained in a common field E. Then the following is true
  (a) if K/F and L/F are both purely inseparable then so is KL/F, but not conversely.
  (b) if KL is purely inseparable over F, then so are K/F and L/F, but not conversely.
  (c) K/F and L/F are purely inseparable, if and only if, KL/F is purely inseparable.
  (d) none of the above.
  Answer: (c)

(4) Let K and L be algebraic field extensions of F such that both are contained in a common field E. Then the following is true
  (a) if K/F and L/F are both Galois then so is KL/F, but not conversely.
  (b) if KL is Galois over F, then so are K/F and L/F, but not conversely.
  (c) K/F and L/F are Galois, if and only if, KL/F is Galois.
  (d) none of the above.
  Answer: (a)

(5) Let p be a prime number and consider the finite extension $\mathbb{Q}(\omega)/\mathbb{Q}$ where $\omega = e^{2i\pi/p}$. Then,
  (a) $\mathbb{Q}(\omega)/\mathbb{Q}$ is a Galois extension of order p with cyclic Galois group,
  (b) $\mathbb{Q}(\omega)/\mathbb{Q}$ is a Galois extension of order $p-1$ with cyclic Galois group,
  (c) $\mathbb{Q}(\omega)/\mathbb{Q}$ is an extension of order p which is not Galois with trivial Galois group
  (d) $\mathbb{Q}(\omega)/\mathbb{Q}$ is a Galois extension with abelian but not cyclic Galois group
  Answer: (b)

(6) Let t be a variable, and consider the two field extensions $\mathbb{F}_2(t)/\mathbb{F}_2(t^2+t)$ and $\mathbb{R}(t)/\mathbb{R}(t^4)$. Then,

(a) both extensions are Galois.
(b) neither is Galois.
(c) the first is not Galois but the second is Galois.
(d) the first is Galois but the second is not Galois.

Answer: (d)