CE141 Example Questions

Question 1

Which of the following is not a proposition?

[A] All CE141 lectures take place in LTB7
[B] Is London East of Colchester?
[C] Colchester is the capital of the United Kingdom
[D] All cows eat grass

Question 2

Which of the following strings, involving propositions p, q and r, is a valid logical expression?

[A] $\vee (p \wedge q) \vee r$
[B] $(p\wedge)q \wedge r$
[C] $p \vee (q \wedge \neg r)$
[D] $p\neg \wedge q$

Question 3

The truth table for the compound proposition $\neg p \wedge q$ is:

[A]

p	q	$\neg p \wedge q$
F	F	F
F	T	F
T	F	T
T	T	F

[B]

p	q	$\neg p \wedge q$
F	F	F
F	T	T
T	F	F
T	T	F

[C]

p	q	$\neg p \wedge q$
F	F	T
F	T	T
T	F	F
T	T	T

[D]

p	q	$\neg p \wedge q$
F	F	T
F	T	F
T	F	T
T	T	T

Question 4

Which of the following partially completed truth tables is correct for the compound proposition $(p \wedge q) \vee r$?

[A]

p	q	r	$(p \wedge q) \vee r$
F	F	F	T
⋮	⋮	⋮	⋮

[B]

p	q	r	$(p \wedge q) \vee r$
⋮	⋮	⋮	⋮
F	T	F	T
⋮	⋮	⋮	⋮

[C]

p	q	r	$(p \wedge q) \vee r$
⋮	⋮	⋮	⋮
T	T	F	T
⋮	⋮	⋮	⋮

[D]

p	q	r	$(p \wedge q) \vee r$
⋮	⋮	⋮	⋮
F	T	T	F
⋮	⋮	⋮	⋮

Question 5

Consider the following propositions:

p := "John speaks English"
q := "John speaks French"
r := "Jane speaks English"
s := "Jane speaks French"

Neither John nor Jane speaks any other language. Which of the following is the most appropriate logical expression to represent the proposition: "John and Jane are able to communicate"?

[A] $(p \vee q) \wedge (r \vee s)$
[B] $(p \wedge q) \vee (r \wedge s)$
[C] $(p \vee r) \wedge (q \vee s)$
[D] $(p \wedge r) \vee (q \wedge s)$

Question 6

Which of the following compound propositions is equivalent to $\neg p \wedge \neg q$?

[A] $\neg(p \wedge q)$
[B] $\neg p \wedge \neg q$
[C] $\neg(p \vee q)$
[D] $p \wedge q$

Question 7

Which of the following is not a valid identity?

[A] $p \vee q \equiv q \vee p$
[B] $(p \wedge q) \wedge r \equiv p \wedge (q \wedge r)$
[C] $(p \vee q) \vee \neg r \equiv p \vee \neg(q \vee r)$
[D] $p \wedge (q \vee r) \equiv (p \wedge q) \vee (p \wedge r)$

Question 8

The truth table for the *conditional* proposition $p \to q$ is:

[A]

p	q	$p \to q$
F	F	F
F	T	T
T	F	T
T	T	F

[B]

p	q	$p \to q$
F	F	T
F	T	F
T	F	F
T	T	T

[C]

p	q	$p \to q$
F	F	T
F	T	T
T	F	F
T	T	T

[D]

p	q	$p \to q$
F	F	T
F	T	F
T	F	T
T	T	T

Question 9

Which of the following logical expressions is a tautology?

[A] $(p \wedge q) \vee \mathrm{T}$
[B] $(p \wedge q) \vee \mathrm{F}$
[C] $(p \vee q) \wedge \mathrm{T}$
[D] $(p \vee q) \wedge \mathrm{F}$

Question 10

Which of the following logical expressions is a contradiction?

[A] $(p \wedge q) \vee \mathrm{T}$
[B] $(p \wedge q) \vee \mathrm{F}$
[C] $(p \vee q) \wedge \mathrm{T}$
[D] $(p \vee q) \wedge \mathrm{F}$