

## Workshop Lab 1: Propositional Logic

### Tautology Tests

1.

<b>A</b>	<b>B</b>	<b>P</b>	<b>Q</b>
T	T	T	T
T	F	F	F
F	T	T	T
F	F	T	T

- No outcome where  $P=T$  and  $Q=F$ ; therefore it is a tautology.

2.

<b>A</b>	<b>B</b>	<b>P</b>	<b>Q</b>
T	T	T	T
T	F	F	F
F	T	F	F
F	F	T	T

- No outcome where  $P=T$  and  $Q=F$ ; therefore it is a tautology.

3.

<b>A</b>	<b>B</b>	<b>C</b>	<b>P</b>	<b>Q</b>
T	T	T	T	T
T	T	F	F	F
T	F	T	T	T
T	F	F	F	F
F	T	T	T	T
F	T	F	F	F
F	F	T	T	T
F	T	F	T	T

- No outcome where  $P=T$  and  $Q=F$ ; therefore it is a tautology.

4.

<b>A</b>	<b>B</b>	<b>C</b>	<b>P</b>	<b>Q</b>
T	T	T	F	F
T	T	F	F	F
T	F	T	F	F
T	F	F	F	F
F	T	T	F	T
F	T	F	T	T
F	F	T	F	T
F	T	F	T	T

- No outcome where  $P=T$  and  $Q=F$ ; therefore it is a tautology.

5.

<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>P</b>	<b>Q</b>
T	T	T	T	T	T
T	T	T	F	F	T
T	T	F	T	F	F
T	T	F	F	F	F
T	F	T	T	F	T
T	F	T	F	F	T
T	F	F	T	F	F
T	F	F	F	F	F
F	T	T	T	T	T
F	T	T	F	F	T
F	T	F	T	F	T
F	T	F	F	T	T
F	F	T	T	T	T
F	F	T	F	T	T
F	F	F	T	F	T
F	F	F	F	T	T

- No outcome where  $P=T$  and  $Q=F$ ; therefore it is a tautology.