112-1 Discrete Mathematics Charpter 1-2

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2. $m \to (e \vee p)$, because the statement "$p\ only\ if\ q$" means the proposition $p \to q$

8.

a) $r \wedge - p$

b) $(r \wedge p) \to q$

c) $-r \to -q$

d) $(-p \vee r) \to q$

12. $Let\ p = \text{"The file system is locked"},\ q = \text{"New messages will be queued"},$
$r = \text{"The system is functioning normally"},$
$s = \text{"New messages will be sent to the message buffer"}$

Sentence 5 means the proposition $-s$, but its value must be True, so the value of s is **False**. Sentence 4 means the proposition $-p \to s$, but its value must be True, so the value of p is **True**. Samely, Sentence 3 means the proposition $-q \to s$, and it implies the value of q is **True**. Sentence 2 means the proposition $-p \leftrightarrow r$, and it implies the value of r is **False**.
Finally, Sentence 1 means the proposition $-p \to q$, and its value is **True** without conflict, so these system specifications are **consistent**.

p	q	r	s
T	T	F	F

17. $Let\ P_i$, $treasure\ is\ in\ Trunk\ i,\ i = 1, 2, 3.$
$1.\ P_3 \quad 2.\ P_1 \quad 3. -P_3$

a) $-P_3 \wedge - P_1 \wedge - (-P_3) \implies False$

b) $(P_3 \wedge - P_1 \wedge - (-P_3)) \vee (-P_3 \wedge P_1 \wedge - (-P_3)) \vee (-P_3 \wedge - P_1 \wedge - P_3)$
$= True \vee False \vee True \implies True$

c) $(-P_3 \wedge P_1 \wedge - P_3) \vee (P_3 \wedge - P_1 \wedge - P_3) \vee (P_3 \wedge P_1 \wedge - (-P_3))$
$= True \vee False \vee False \implies True$

d) $P_3 \wedge P_1 \wedge - P_3 \implies False$

26. $Let\ K = Knight\ (tells\ truth),\ N = Knave\ (tells\ lie).$

$A: \ A = K$

$B: \ B = K$

Assumption			Conclusion	
A	B		A	B
K	K	$\equiv$	K	K
K	N	$\equiv$	K	N
N	K	$\equiv$	N	K
N	N	$\equiv$	N	N

$It\ is\ possible\ for\ either\ A\ or\ B\ to\ be\ either\ a\ Knight\ or\ a\ Knave.$