

$$13. (P \supset Q) \cdot \neg(Q \supset P) \\ R \supset S \\ P \vee R \\ \therefore Q \vee S$$

$$*15. (Z \cdot A) \supset B \\ B \supset A \\ (B \cdot A) \supset (A \cdot B) \\ \therefore (Z \cdot A) \supset (A \cdot B)$$

$$14. (T \supset U) \cdot (V \supset W) \\ (U \supset X) \cdot (W \supset Y) \\ T \\ \therefore X \vee Y$$

V. Construct a formal proof of validity for each of the following arguments

$$*1. A \supset B \\ A \vee (C \cdot D) \\ \sim B \cdot \sim E \\ \therefore C$$

$$3. (\sim M \cdot \sim N) \supset (O \supset N) \\ N \supset M \\ \sim M \\ \therefore \sim O$$

$$*5. (Q \supset R) \cdot (S \supset T) \\ (U \supset V) \cdot (W \supset X) \\ Q \vee U \\ \therefore R \vee V$$

$$7. A \supset B \\ C \supset D \\ A \vee C \\ \therefore (A \cdot B) \vee (C \cdot D)$$

$$9. J \supset K \\ K \vee L \\ (L \cdot \sim J) \supset (M \cdot \sim J) \\ \sim K \\ \therefore M$$

$$2. (F \supset G) \cdot (H \supset I) \\ J \supset K \\ (F \vee J) \cdot (H \vee L) \\ \therefore G \vee K$$

$$4. (K \vee L) \supset (M \vee N) \\ (M \vee N) \supset (O \cdot P) \\ K \\ \therefore O$$

$$6. W \supset X \\ (W \cdot X) \supset Y \\ (W \cdot Y) \supset Z \\ \therefore W \supset Z$$

$$8. (E \vee F) \supset (G \cdot H) \\ (G \vee H) \supset I \\ E \\ \therefore I$$

$$*10. (N \vee O) \supset P \\ (P \vee Q) \supset R \\ Q \vee N \\ \sim Q \\ \therefore R$$

VI. Construct a formal proof of validity for each of the following arguments, using the abbreviations suggested.

- *1. If either Gertrude or Herbert wins, then both Jane and Kenneth lose. Gertrude wins. Therefore Jane loses. (G—Gertrude wins; H—Herbert wins; J—Jane loses; K—Kenneth loses.)
2. If Adams joins, then the club's social prestige will rise and Baker joins, then the club's financial prestige will rise. Either Adams or Baker joins. Therefore the club's social prestige will rise and its financial prestige will rise.