

$$1. \{x \mid x \in \mathbb{Z}^{\geq}, x < 16, x^2 = 2k \text{ for some } k \in \mathbb{Z}\} \quad (1)$$

$$2. \{x \mid x \in \mathbb{Z}, 0 \leq x < 8\} \cap \{x \mid x \in \mathbb{R}, 4 \leq x < 16\}$$

$$= \{0, 1, 2, 3, 4, 5, 6, 7\} \cap \{4, 5, 6, 7, \dots, 15\}$$

$$= \{4, 5, 6, 7\} \quad (4)$$

$$3. A \cup B = \{1, 2, \{1\}\} \cup \{\{1\}, \{1, 2\}\}$$

$$= \{1, 2, \{1\}, \{1, 2\}\} \quad (1)$$

$$4. A \cap C = \{1, 2, \{1\}\} \cap \{2, \{1\}, \{2\}\}$$

$$= \{2, \{1\}\} \quad (4)$$

$$5. A - B = \{1, 2, \{1\}\} - \{\{1\}, \{1, 2\}\}$$

$$= \{1, 2\} \quad (1)$$

$$6. B + C = \{\{1\}, \{1, 2\}\} + \{2, \{1\}, \{2\}\}$$

$$= \{2, \{2\}, \{1, 2\}\} \quad (3)$$

$$7. P(A) = \{\emptyset, \{1\}, \{2\}, \{1, \{1\}\}, \{2, \{1\}\}, \{1, 2\}, \{\{1\}\}, \{1, 2, \{1\}\}\}$$

No option

$$8. \{\{\{1\}\}\} \quad (3)$$

$$9. P(B) = \{\emptyset, \{\{1\}\}, \{\{1, 2\}\}, \{\{1\}, \{1, 2\}\}\}$$

$$P(A) \cap P(B) = \{\emptyset, \{\{1\}\}\}$$

$$A \cap B = \{\{1\}\}$$

$$P(A \cap B) = \{\emptyset, \{\{1\}\}\} \quad (2)$$

$$10. B \cup C = \{\{1\}, \{1, 2\}\} \cup \{2, \{1\}, \{2\}\}$$

$$= \{2, \{1\}, \{2\}, \{1, 2\}\}$$

$$U - (B \cup C) = \{1, 2, \{1\}, \{2\}, \{1, 2\}\} - \{2, \{1\}, \{2\}, \{1, 2\}\} = \{1\} \quad (1)$$