

Unit 2 - Week 1: Mathematical Logic

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Assignment 1

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2019-08-14, 23:59 IST.

1) Which of the following Boolean expressions is logically equivalent to $(x \rightarrow y)$? 1 point

- (A) $\overline{x\overline{y}}$
- (B) $(x + \overline{y})$
- (C) $(y \rightarrow x)$
- (D) $(\overline{y} \rightarrow x)$

No, the answer is incorrect.
Score: 0

Accepted Answers:

(A) $\overline{x\overline{y}}$

2) A three variable Boolean function evaluates to true precisely when the input variables x , y and z are assigned (0, 0 and 1 respectively) or (1, 0 and 0 respectively). Which of the following is a sum of products form for this Boolean function? 1 point

- (A) $xyz + \overline{x}\overline{y}\overline{z}$
- (B) $x\overline{y}z + \overline{x}yz$
- (C) $x\overline{y}\overline{z} + \overline{x}\overline{y}z$
- (D) $xy\overline{z} + \overline{x}\overline{y}z$

No, the answer is incorrect.
Score: 0

Accepted Answers:

(C) $x\overline{y}\overline{z} + \overline{x}\overline{y}z$

3) Which of the following is not a complete set of connectives? 1 point

- (A) $\{\neg, \rightarrow\}$
- (B) $\{\neg, XOR\}$
- (C) $\{NAND\}$
- (D) $\{NOR\}$

No, the answer is incorrect.
Score: 0

Accepted Answers:

(B) $\{\neg, XOR\}$

4) An island has two kinds of inhabitants, knights, who always tell the truth, and knaves, who always lie. You encounter three persons P, Q and R. Which of the following is true if P says, "Q says that both Q and R are knights. R says that both Q and R are knaves." 1 point

- (A) P, Q and R are all knights
- (B) P is a knight, Q and R are knaves
- (C) Either Q is a knight and R is a knave, or Q is a knave and R is a knight
- (D) P is a knave

No, the answer is incorrect.
Score: 0

Accepted Answers:

(D) P is a knave

5) Which of the following is the negation of $\forall x(\alpha \rightarrow \neg \beta)$? 1 point

- (A) $\forall x(\alpha\beta)$
- (B) $\exists x(\alpha\beta)$
- (C) $\exists x(\neg(\alpha\beta))$
- (D) $\exists x(\alpha \rightarrow \neg \beta)$

No, the answer is incorrect.
Score: 0

Accepted Answers:

(B) $\exists x(\alpha\beta)$

6) Determine the truth value of each of the following statements where $D = \{2, 3, 4\}$ is the domain of discourse. (p) $\exists x\forall y (x^2 < 2y)$ (q) $\forall y\exists x (x = y + 1 \text{ or } x = 2y)$. 1 point

- (A) p is false, q is false
- (B) p is false, q is true
- (C) p is true, q is false
- (D) p is true, q is true

No, the answer is incorrect.
Score: 0

Accepted Answers:

(B) p is false, q is true

7) Which of the following is true in Propositional Logic? 1 point

- (A) $p + 1 = p$
- (B) $p \cdot 0 = p$
- (C) $p + qr = (p + q)(p + r)$
- (D) $p + p = 1$

No, the answer is incorrect.
Score: 0

Accepted Answers:

(C) $p + qr = (p + q)(p + r)$

8) Pick the odd one out: 1 point

- (A) p
- (B) $pqr + p\overline{q}r + p\overline{q}\overline{r} + pq\overline{r}$
- (C) q
- (D) $pq + p\overline{q}$

No, the answer is incorrect.
Score: 0

Accepted Answers:

(C) q