22MAT121-Discrete Mathematics
AIE-C

SET-A

1. prove that $\neg(p \leftrightarrow q) \equiv p \leftrightarrow \neg q$. [2 Marks]

2. Let $P(x)$ and $Q(x)$ be the statements "x is a superhero" and "x has a good heart" respectively. Express each of the following quantification's in English.
   a) $\exists x\ \neg Q(x)$, b) $\neg\ \forall x\ (P(x) \vee Q(x))$ and c) $\forall x\ (P(x) \rightarrow Q(x))$ [4 Marks]

3. Show that following argument is valid:
   "Every student who studies Discrete mathematics will also studies Mathematics for computing and Computer science. Every student studies Discrete mathematics and English. Therefore, Every students Studies English and Computer science." [4 Marks]

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SET-B

1. Show that following argument is valid:
   "Every superheros are good hearted and logical. Every superheros who are good hearted will also prevent evil and fight villains. Therefore Every superheros are logical and fight villains. " [4 Marks]

2. prove that $p \leftrightarrow q \equiv \neg p \leftrightarrow \neg q$. [2 Marks]

3. Let $P(x)$ and $Q(x)$ be the statements "x is a teacher" and "x is logical" respectively. Express each of the following quantification's in English.
   a) $\forall x\ \neg P(x)$, b)$\forall x\ (Q(x) \rightarrow P(x))$, and c)$\neg\ \exists x\ (Q(x) \wedge P(x))$ [4 Marks]

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SET-C

1. Let $P(x)$ and $Q(x)$ be the statements "x is superman " and "x is impotent" respectively. Express each of the following quantification's in English.
   a) $\neg\ \forall x\ Q(x)$, b) $\neg\ \exists x\ (P(x) \rightarrow Q(x))$, c) $\exists x\ (Q(x) \wedge \neg P(x))$ [4 Marks]

2. Show that the premises "Every cricketers who scored a century will get man of the match award and get fame.",and "Every cricketer will score a century and will help the team to win" leads to the conclusion "Every cricketer will help the team to win the matcha and will get the fame". [4 Marks]

3. prove that $(\neg p \wedge (p \rightarrow q)) \rightarrow \neg q \equiv q \rightarrow p$. [2 Marks]