

DSTL (UNIT-3)

2022-23

Section - A

J. Identify whether $(p \wedge q) \rightarrow (p \vee q)$ is tautology or contradiction with using Truth table.

Section - B

c. (i) Express Converse, Inverse and contrapositive of the following statement "If $x + 5 = 8$ then $x = 3$ " (ii) Show that the statements $P \leftrightarrow Q$ and $(P \wedge Q) \vee (\neg P \wedge \neg Q)$ are equivalent

Section - C

3. Attempt any one part of the following

(a) Prove the validity of the following argument. If Mary runs for office, She will be elected. If Mary attends the meeting, she will run for office. Either Mary will attend the meeting or she will go to India. But Mary cannot go to India. "Thus Mary will be elected".

(b) Convert the following two statements in quantified expressions of predicate logic

(i) For every number there is a number greater than that number.

(ii) Sum of every two integer is an integer.

(iii) Not Every man is perfect.

(iv) There is no student in the class who knows Spanish and German

DSTL (UNIT-3)

2021-22

Section - A

g. Translate the conditional statement "If it rains, then I will stay at home" into contrapositive, converse and inverse statement.

h. State Universal Modus Ponens and Universal Modus Tollens laws.

Section - B

d. Construct the truth table for the following statements: (i) $(P \rightarrow Q') \rightarrow P'$ (ii) $P (P' \vee Q')$.

Section - C

6. Attempt any one part of the following

(a) Use rules of inference to Justify that the three hypotheses (i) "If it does not rain or if it is not foggy, then the sailing race will be held and the life saving demonstration will go on. (ii) If the sailing race is held then the trophy will be awarded." (iii) The trophy was not awarded." imply the conclusion (iv) "It rained.

(b) Justify that the following premises are inconsistent. (i) If Nirmala misses many classes through illness then he fails high school. (ii) If Nirmala fails high school, then he is uneducated. (iii) If Nirmala reads a lot of books then he is not uneducated. (iv) Nirmala misses many classes through illness and reads a lot of books.

DSTL (UNIT-3)

2020-21

Section - A

- g. Write the negation of the following statement: "If I wake up early in the morning, then I will be healthy."
- h. Express the following statement in symbolic form: "All flowers are beautiful."

Section - B

- d. Prove the validity of the following argument "If I get the band work hard, then I will get promoted,
then I will be happy. I will not be happy. Therefore, either I will not get the job, or I will not work hard."

Section - C

6. Attempt any one part of the following
- (a) Define tautology, contradiction and contingency? Check whether $(p \vee q) \wedge (\sim p \vee r) \rightarrow (q \vee r)$ is a tautology, contradiction or contingency.
- (b) Translate the following statements in symbolic form
- (i) The sum of two positive integers is always positive.
- (ii) Everyone is loved by someone.
- (iii) Some people are not admired by everyone.
- (iv) If a person is female and is a parent, then this person is someone's mother.

DSTL (UNIT-3)

2019-20

Section-A

- f. Write the contra positive of the implication: "If it is Sunday then it is a holiday"
- g. Show that the propositions $p \rightarrow q$ and $p \vee q$ are logically equivalent.

Section - B

- d. Show that $((P \vee Q) (Q \vee R)) \vee (P \vee Q) \vee (P \vee R)$ is a tautology by using equivalences.

Section - C

- 6. Attempt any one part of the following
 - (a) Explain various Rules of Inference for Propositional Logic.
 - (b) Prove the validity of the following argument "if the races are fixed so the casinos are crooked, then the tourist trade will decline. If the tourist trade decreases, then the police will be happy. The police force is never happy. Therefore, the races are not fixed."