

CODED INEQUALITIES

Directions(1-5): In the following questions, the symbols @, #, %, \$ and * are used with the following meaning as illustrated below.

'A @ B' means 'A Is not smaller than B'

'A # B' means 'A is neither smaller than nor equal to B'

'A % B' means 'A is neither smaller than nor greater than B'

'A \$ B' means 'A is not greater than B'

'A * B' means 'A is neither greater than nor equal to B'

1) **Statements** : T @ V, V # M, M % F

Conclusions : a) T # M

b) T @ F

2) **Statements** : L \$ N, N * F, R % L

Conclusions : a) F # R

b) R \$ N

3) **Statements** : H # I, I @ J, J \$ P

Conclusions : a) H # J

b) H # P

4) **Statements** : L * D, D # K, K \$ J

Conclusions : a) L * K

b) D \$ J

5) **Statements** : Q \$ W, W % E, E @ K

Conclusions : a) Q \$ K

b) W @ K

Now in each of the following the questions assuming the given statements to be true, find which of the two conclusions a and b given below is/are definitely true?

Give answer a) : If only conclusion a is true

Give answer b) : If only conclusion b is true

Give answer c) : If either conclusion a or b is true

Give answer d) : If neither conclusion a nor b is true

Give answer e) : If both conclusions a and b are true (Options are same for all questions (1-15))

Explanation :

'A @ B' means 'A Is not smaller than B' $\rightarrow A \geq B$

'A # B' means 'A is neither smaller than nor equal to B' $\rightarrow A > B$

'A % B' means 'A is neither smaller than nor greater than B' $\rightarrow A = B$

'A \$ B' means 'A is not greater than B' $\rightarrow A \leq B$

'A * B' means 'A is neither greater than nor equal to B' $\rightarrow A < B$

1) Answer : a) : If only conclusion a is true

Explanation : $T @ V, V \# M, M \% F \rightarrow T \geq V, V > M, M = F \rightarrow T \geq V > M = F$

Conclusion a $\rightarrow T \# M \rightarrow T > M$

The relation between T and M in the statement $T \geq V > M = F$: $T > M$. So, it is true.

Conclusion b $\rightarrow T @ F \rightarrow T \geq F$

The relation between T and F in the statement $T \geq V > M = F$: $T > F$. So, it is not true.

($T > M = F \rightarrow T > F$)

2) Answer : e) : If both conclusions a and b are true

Explanation : $L \$ N, N * F, R \% L \rightarrow L \leq N, N < F, R = L \rightarrow R = L \leq N < F$

Conclusion a $\rightarrow F \# R \rightarrow F > R$

The relation between F and R in the statement $R = L \leq N < F$: $R < F$. So, it is true.

($R \leq N < F \rightarrow R < F$)

Conclusion b $\rightarrow R \$ N \rightarrow R \leq N$

The relation between R and N in the statement $R = L \leq N < F$: $R \leq N$. So, it is true.

3) Answer : a) : If only conclusion a is true .

Explanation : $H \# I, I @ J, J \$ P \rightarrow H > I, I \geq J, J \leq P \rightarrow H > I \geq J \leq P$

Conclusion a $\rightarrow H \# J \rightarrow H > J$

The relation between H and J in the statement $H > I \geq J \leq P$: $H > J$. So, it is true.

Conclusion b $\rightarrow H \# P \rightarrow H > P$

The relation between H and P in the statement $H > I \geq J \leq P$: $H > P$ or $H < P$ or $H = P$. So, it is not true

4) Answer : d) : If neither conclusion a nor b is true .

Explanation : $L * D, D \# K, K \$ J \rightarrow L < D, D > K, K \leq J \rightarrow L < D > K \leq J$

Conclusion a $\rightarrow L * K \rightarrow L < K$

The relation between L and K in the statement $L < D > K \leq J$: $L = K$ or $L > K$ or $L < K$. So, it is not true.

Conclusion b $\rightarrow D \$ J \rightarrow D \leq J$

The relation between D and J in the statement $L < D > K \leq J : D = J$ or $D > J$ or $D < J$. So, it is not true.

5) Answer : b) : If only conclusion b is true .

Explanation : $Q \$ W, W \% E, E @ K \rightarrow Q \leq W, W = E, E \geq K \rightarrow Q \leq W = E \geq K$

Conclusion a $\rightarrow Q \$ K \rightarrow Q \leq K$

The relation between Q and K in the statement $Q \leq W = E \geq K : Q = K$ or $Q > K$ or $Q < K$. So, it is not true.

Conclusion b $\rightarrow W @ K \rightarrow W \geq K$

The relation between W and K in the statement $Q \leq W = E \geq K : W \geq K$. So, it is true.

Directions(6-10): In the following questions, the symbols @, #, \$, © and % are used with the following meaning as illustrated below.

'P @ Q' means 'P is not smaller than Q'

'P # Q' means 'P is not greater than Q'

'P \$ Q' means 'P is neither greater than nor equal to Q'

'P © Q' means 'P is neither smaller than nor equal to Q'

'P % Q' means 'P is neither greater than nor smaller than Q'

6) **Statements** : $V \$ W, W @ T, T \# H$

Conclusions : a) $V © T$

b) $H \% W$

7) **Statements** : $H © M, M @ E, E \$ C$

Conclusions : a) $C © M$

b) $H © E$

8) **Statements** : $N @ J, J \% R, R © H$

Conclusions : a) $R \# N$

b) $N © H$

9) **Statements** : $L @ K, K © A, A \$ W$

Conclusions : a) $W \$ L$

b) $L \# W$

10) **Statements** : $J \# R, R © D, D @ F$

Conclusions : a) $F \$ R$

b) $F \% R$

Explanation :

- 'P @ Q' means 'P is not smaller than Q' $\rightarrow P \geq Q$
'P # Q' means 'P is not greater than Q' $\rightarrow P \leq Q$
'P \$ Q' means 'P is neither greater than nor equal to Q' $\rightarrow P < Q$
'P © Q' means 'P is neither smaller than nor equal to Q' $\rightarrow P > Q$
'P % Q' means 'P is neither greater than nor smaller than Q' $\rightarrow P = Q$

6) Answer : d) : If neither conclusion a nor b is true .

Explanation : $V \$ W, W @ T, T \# H \rightarrow V < W, W \geq T, T \leq H \rightarrow V < W \geq T \leq H$

Conclusion a $\rightarrow V © T \rightarrow V > T$

The relation between V and T in the statement $V < W \geq T \leq H : V = T$ or $V > T$ or $V < T$. So, it is not true.

Conclusion b $\rightarrow H \% W \rightarrow H = W$

The relation between H and W in the statement $V < W \geq T \leq H \rightarrow H = W$ or $H > W$ or $H < W$. So, it is not true.

7) Answer : b) : If only conclusion b is true .

Explanation : $H © M, M @ E, E \$ C \rightarrow H > M, M \geq E, E < C \rightarrow H > M \geq E < C$

Conclusion a $\rightarrow C © M \rightarrow C > M$

The relation between C and M in the statement $H > M \geq E < C \rightarrow M > C$. So, it is not true.

Conclusion b $\rightarrow H © E \rightarrow H > E$

The relation between H and E in the statement $H > M \geq E < C \rightarrow H > E$. So, it is true.

8) Answer : e) : If both conclusions a and b are true .

Explanation : $N @ J, J \% R, R © H \rightarrow N \geq J, J = R, R > H \rightarrow N \geq J = R > H$

Conclusion a $\rightarrow R \# N \rightarrow R \leq N$

The relation between R and N in the statement $N \geq J = R > H : N \geq R$. So, it is true.

Conclusion b $\rightarrow N © H \rightarrow N > H$

The relation between N and H in the statement $N \geq J = R > H : N > H$. So, it is true.

9) Answer : d) : If neither conclusion a nor b is true .

Explanation : $L @ K, K © A, A \$ W \rightarrow L \geq K, K > A, A < W \rightarrow L \geq K > A < W$

Conclusion a $\rightarrow W \$ L \rightarrow W < L$

The relation between W and L in the statement $L \geq K > A < W : W = L$ or $W > L$ or $W < L$. So, it is not true.

Conclusion b $\rightarrow L \# W \rightarrow L \leq W$

The relation between L and W in the statement $L \geq K > A < W : L = W$ or $L < W$ or $L > W$. So, it is not true.

10) Answer : a) : If only conclusion a is true .

Explanation : $J \# R, R \odot D, D @ F \rightarrow J \leq R, R > D, D \geq F \rightarrow J \leq R > D \geq F$

Conclusion a $\rightarrow F \$ R \rightarrow F < R$

The relation between F and R in the statement $J \leq R > D \geq F : R > F$. So, it is true.

Conclusion b $\rightarrow F \% R \rightarrow F = R$

The relation between F and R in the statement $J \leq R > D \geq F : R > F$. So, it is not true.

Directions(11-15): In the following questions, the symbols @, ⊙, %, \$ and # are used with the following meaning as illustrated below.

'P % Q' means 'P is either smaller than or equal to Q'

'P ⊙ Q' means 'P is greater than Q'

'P # Q' means 'P is neither greater than nor smaller than Q'

'P \$ Q' means 'P is smaller than Q'

'P @ Q' means 'P is either greater than or equal to Q'

11) **Statements** : B # F, F \$ H, H ⊙ K

Conclusions : a) H @ B

b) K \$ B

12) **Statements** : H @ T, T ⊙ N, N \$ W

Conclusions : a) N \$ H

b) W \$ H

13) **Statements** : H \$ F, F % M, M ⊙ J

Conclusions : a) J \$ F

b) M ⊙ H

14) **Statements** : M \$ T, T % R, M ⊙ N

Conclusions : a) M \$ R

b) N \$ T

15) **Statements** : D \$ T, T % B, B @ F

Conclusions : a) D # T

b) D @ F

Explanation :

'P % Q' means 'P is either smaller than or equal to Q' $\rightarrow P \leq Q$

'P ⊙ Q' means 'P is greater than Q' $\rightarrow P > Q$

'P # Q' means 'P is neither greater than nor smaller than Q' $\rightarrow P = Q$

'P \$ Q' means 'P is smaller than Q' $\rightarrow P < Q$

'P @ Q' means 'P is either greater than or equal to Q' $\rightarrow P \geq Q$

11) Answer : d) : If neither conclusion a nor b is true .

Explanation : $B \# F, F \$ H, H \odot K \rightarrow B = F, F < H, H > K \rightarrow B = F < H > K$

Conclusion a $\rightarrow H @ B \rightarrow H \geq B$

The relation between H and B in the statement $B = F < H > K$: $B < H$. So, it is not true.

Conclusion b $\rightarrow K \$ B \rightarrow K < B$

The relation between K and B in the statement $B = F < H > K$: $K = B$ or $K > B$ or $K < B$. So, it is not true.

12) Answer : a) : If only conclusion a is true.

Explanation : $H @ T, T \odot N, N \$ W \rightarrow H \geq T, T > N, N < W \rightarrow H \geq T > N < W$

Conclusion a $\rightarrow N \$ H \rightarrow N < H$

The relation between N and H in the statement $H \geq T > N < W$: $H > N$. So, it is true.

Conclusion b $\rightarrow W \$ H \rightarrow W < H$

The relation between W and H in the statement $H \geq T > N < W$: $W = H$ or $W > H$ or $W < H$. So, it is not true.

13) Answer : b) : If only conclusion b is true .

Explanation : $H \$ F, F \% M, M \odot J \rightarrow H < F, F \leq M, M > J \rightarrow H < F \leq M > J$

Conclusion a $\rightarrow J \$ F \rightarrow J < F$

The relation between J and F in the statement $H < F \leq M > J$: $J = F$ or $J < F$ or $J > F$. So, it is not true.

Conclusion b $\rightarrow M \odot H \rightarrow M > H$

The relation between M and H in the statement $H < F \leq M > J$: $M > H$. So, it is true.

14) Answer : e) : If both conclusions a and b are true .

Explanation : $M \$ T, T \% R, M \odot N \rightarrow M < T, T \leq R, M > N \rightarrow N < M < T \leq R$

Conclusion a $\rightarrow M \$ R \rightarrow M < R$

The relation between M and R in the statement $N < M < T \leq R$: $M < R$. So, it is true.

Conclusion b $\rightarrow N \$ T \rightarrow N < T$

The relation between N and T in the statement $N < M < T \leq R$: $N < T$. So, it is true.

15) Answer : d) : If neither conclusion a nor b is true .

Explanation : $D \$ T, T \% B, B @ F \rightarrow D < T, T \leq B, B \geq F \rightarrow D < T \leq B \geq F$

Conclusion a $\rightarrow D \# T \rightarrow D = T$

The relation between D and T in the statement $D < T \leq B \geq F$: $D < T$. So, it is not true.

Conclusion b $\rightarrow D @ F \rightarrow D \geq F$

The relation between D and F in the statement $D < T \leq B \geq F$: $D < F$. So, it is not true.