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' → A ≥ B
'A # B' means 'A is neither smaller than nor equal to B' → A > B
'A % B' means 'A is neither smaller than nor greater than B' → A = B
'A $ B' means 'A is not greater than B' → A ≤ B
'A * B' means 'A is neither greater than nor equal to B' → A < B

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

Explanation : T @ V, V # M, M % F → T ≥ V, V > M, M = F → **T ≥ V > M = F**
Conclusion a → T # M → T > M
The relation between T and M in the statement **T ≥ V > M = F** : T > M. So, it is true.
Conclusion b → T @ F → T ≥ F
The relation between T and F in the statement **T ≥ V > M = F** : T > F. So, it is not true.
(T > M = F → T > F)

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

Explanation : L $ N, N * F, R % L → L ≤ N, N < F, R = L → **R = L ≤ N < F**
Conclusion a → F # R → F > R
The relation between F and R in the statement **R = L ≤ N < F :** R < F. So, it is true.
(R ≤ N < F → R < F)
Conclusion b → R $ N → R ≤ N
The relation between R and N in the statement **R = L ≤ N < F :** R ≤ N. So, it is true.

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

Explanation : H # I, I @ J, J $ P → H > I, I ≥ J, J ≤ P → **H > I ≥ J ≤ P**
Conclusion a → H # J → H > J
The relation between H and J in the statement **H > I ≥ J ≤ P :** H > J. So, it is true.
Conclusion b → H # P → H > P
The relation between H and P in the statement **H > I ≥ J ≤ 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 → L < D, D > K, K ≤ J → **L < D > K ≤ J**
Conclusion a → L * K → L < K
The relation between L and K in the statement **L < D > K ≤ J** : L = K or L > K or L < K. So, it is not true.
Conclusion b → D $ J → D ≤ J

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

5) <u>Answer : b) : If only conclusion b is true .</u>
Explanation : Q $ W, W % E, E @ K → Q ≤ W, W = E, E ≥ K → **Q ≤ W = E ≥ K**
Conclusion a → Q $ K → Q ≤ K
The relation between Q and K in the statement **Q ≤ W = E ≥ K :** Q = K or Q > K or Q < K. So, it is not true.
Conclusion b → W @ K → W ≥ K
The relation between W and K in the statement **Q ≤ W = E ≥ K :** W ≥ 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' → **P ≥ Q**
'P # Q' means 'P is not greater than Q' → **P ≤ Q**
'P $ Q' means 'P is neither greater than nor equal to Q' → **P < Q**
'P © Q' means 'P is neither smaller than nor equal to Q' → **P > Q**
'P % Q' means 'P is neither greater than nor smaller than Q' → **P = Q**

6) Answer : d) : If neither conclusion a nor b is true .
Explanation : V $ W, W @ T, T # H → V < W, W ≥ T, T ≤ H → **V < W ≥ T ≤ H**
Conclusion a → V © T → V > T
The relation between V and T in the statement **V < W ≥ T ≤ H** : V = T or V > T or V < T. So, it is not true.
Conclusion b → H % W → H = W
The relation between H and W in the statement **V < W ≥ T ≤ H** → 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 → H > M, M ≥ E, E < C → **H > M ≥ E < C**
Conclusion a → C © M → C > M
The relation between C and M in the statement **H > M ≥ E < C** → M > C. So, it is not true.
Conclusion b → H © E → H > E
The relation between H and E in the statement **H > M ≥ E < C** → H > E. So, it is true.

8) Answer : e) : If both conclusions a and b are true .
Explanation : N @ J, J % R, R © H → N ≥ J, J = R, R > H → **N ≥ J = R > H**
Conclusion a → R # N → R ≤ N
The relation between R and N in the statement **N ≥ J = R > H** : N ≥ R. So, it is true.
Conclusion b → N © H → N > H
The relation between N and H in the statement **N ≥ 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 → L ≥ K, K > A, A < W → **L ≥ K > A < W**
Conclusion a → W $ L → W < L
The relation between W and L in the statement **L ≥ K > A < W** : W = L or W > L or W < L . So, it is not true.
Conclusion b → L # W → L ≤ W
The relation between L and W in the statement **L ≥ 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 © D, D @ F → J ≤ R, R > D, D ≥ F → **J ≤ R > D ≥ F**
Conclusion a → F $ R → F < R
The relation between F and R in the statement **J ≤ R > D ≥ F :** R > F. So, it is true.
Conclusion b → F % R → F = R
The relation between F and R in the statement **J ≤ R > D ≥ 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 grater 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' → P ≤ Q
'P © Q' means 'P is greater than Q' → P > Q
'P # Q' means 'P is neither greater than nor smaller than Q' → P = Q
'P $ Q' means 'P is smaller than Q' → P < Q

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

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

Explanation : B # F, F $ H, H © K → B = F, F < H, H > K → **B = F < H > K**

Conclusion a → H @ B → H ≥ B

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

Conclusion b → K $ B → 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 © N, N $ W → H ≥ T, T > N, N < W → **H ≥ T > N < W**

Conclusion a → N $ H → N < H

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

Conclusion b → W $ H → W < H

The relation between W and H in the statement **H ≥ 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 © J → H < F, F ≤ M, M > J → **H < F ≤ M > J**

Conclusion a → J $ F → J < F

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

Conclusion b → M © H → M > H

The relation between M and H in the statement **H < F ≤ 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 © N → M < T, T ≤ R, M > N → **N < M < T ≤ R**

Conclusion a → M $ R → M < R

The relation between M and R in the statement **N < M < T ≤ R :** M < R. So, it is true.

Conclusion b → N $ T → N < T

The relation between N and T in the statement **N < M < T ≤ 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 → D < T, T ≤ B, B ≥ F → **D < T ≤ B ≥ F**

Conclusion a → D # T → D = T

The relation between D and T in the statement **D < T ≤ B ≥ F :** D < T. So, it is not true.

Conclusion b → D @ F → D ≥ F

The relation between D and F in the statement **D < T ≤ B ≥ F :** D < F. So, it is not true.