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PT Set No 174

Directions: Study the following information carefully and answer the questions given beside.

A machine has a grid of buttons which are in the form of a 5×3 matrix. The row of the matrix are denoted by alphabets P, Q, R, S and T from top to bottom in the same order and the columns are denoted by the symbols %, # and * from left to right in the same order.

The first column is represented by % and has 5 numbers which are consecutive multiples of 25 starting from 75, from top to bottom.

The second column is represented by # and has 5 numbers which are consecutive multiples of 45 starting from 90, from top to bottom.

The third column is represented by * and has 5 numbers which are consecutive multiples of 20 starting from 80, from top to bottom.

The machine is connected to musical device, which has five musical tones F, G, H, J and K. Each tone plays after receiving a signal of certain frequency based on the conditions given below.

Conditions:

I. If all the values in the string are even, then each value in the string is divided by 5 and after that, only odd digits of the values are added.

II. If only two values in the string are odd and the rest are even, then only the odd values are added and after that the result is divided by 5.

III. If the signal has at least one value that is a multiple of 12, then each value in the string is divided by 5 and after that unit digits of each value is deleted and finally tens digits of all the values are added.

Each signal is transmitted in a single string X or Y or two strings X and Y. The resultant value gives the frequency. If there are two strings, then the values are added.

Note:

I. If none of the conditions to calculate the frequency are following, then the values are simply added and finally the result is divided by 5 to get the frequency.

II. If only X or Y is given, then only string is taken as the input. If condition I or II is follow along with condition III, then the frequency is calculated using condition III.

III. If the resultant value is less than 35, then only F plays, if it is in between 35 to 75, then G plays, if it is in between 76 to 125, then only H plays, if it is in between 126 to 180, then only J plays, if it is greater than 180, then only K plays.

Example:

$$X = P \# R \% Q * S * T\%, Y = Q \# R \% P * S \# T *$$

P# denotes value in Row-P and Column #, which is equal to 90.

$$\text{So, } X = 90 \ 125 \ 100 \ 140 \ 175$$

This has only two odd values, so condition II follows i.e. only odd values are added and the result is divided by 5. Here $\text{sum} = 125 + 175 = 300$ and then $300/5 = 60$ i.e. frequency of X

$$Y = 135 \ 125 \ 80 \ 225 \ 160$$

None of the conditions follow, so the values are simply added and the result is divided by 5. Here $\text{sum} = 135 + 125 + 80 + 225 + 160 = 725$ and then $725/5 = 145$ i.e. frequency of Y

→ $X + Y = 60 + 145 = 205$ which is greater than 180, thus tone K will play.

1. Which of the following values of X will play tone J?

- A. $S * P \# T \% R \% Q *$ B. $P * T \# Q \% S \# R *$ C. $Q \# P \% T * R \# S \%$ D. $T \% S * R \% P \% Q \#$ E. $R \# P * S \% Q * T *$

2. Which of the following tone will play when string $Y = S \% T \# Q * P \# R \%$?

- A. Tone K B. Tone J C. Tone H D. Tone F E. Tone G

3. Which of the following values of Y along with string $X = P * R \# Q \% T \# S *$ will make tone K play?

- A. $Q * T \% R \# S \# P \%$ B. $T * Q \# P \% S * R \%$ C. $T \# S \# R \% Q \# P *$ D. All the above E. None of the above

4. String $X = S * Q \% P * T *$? What minimum value should come in place of “?” in the string so that tone H plays?

- A. S% B. R# C. Q# D. S# E. R*

5. String $X = R \% Q * P * S \# Q \%$ and string $Y = T * P \% Q \# S \% T \#$. Which values of string X and string Y should be interchanged so that tone G plays?

- A. Q% and T# B. P* and P% C. Q* and T* D. Q% and T* E. None of the above

Correct Answers:

1	2	3	4	5
D	B	E	C	E



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Common explanation :

References:

A machine has a grid of buttons which are in the form of a 5×3 matrix.

The row of the matrix are denoted by alphabets P, Q, R, S and T from top to bottom in the same order and the columns are denoted by the symbols %, # and * from left to right in the same order.

The first column is represented by % and has 5 numbers which are consecutive multiples of 25 starting from 75, from top to bottom.

The second column is represented by # and has 5 numbers which are consecutive multiples of 45 starting from 90, from top to bottom.

The third column is represented by * and has 5 numbers which are consecutive multiples of 20 starting from 80, from top to bottom.

Inferences:

From above statements/information we can form Table (Matrix 5×3) as shown below,

Table-1			
Row/Column	% consecutive multiples of 25 from 75	# consecutive multiples of 45 from 90	* consecutive multiples of 20 from 80
P	75	90	80
Q	100	135	100
R	125	180	120
S	150	225	140
T	175	270	160

Keep this table-1 and given condition/note/example in mind while solving the questions given beside.

Answers:

1. Following the common explanation, we get “T%S*R%P%Q#”.

If $X = T\% S\% R\% P\% Q\%$ and then J will play as shown below

Hence, option D is correct.

Calculating the frequency for each option				
Expression	Values	Conditions	Frequency calculation	Tone play
If $X = S\% P\% T\% R\% Q\%$ (Option-A)	$X = 140\ 90\ 175\ 125\ 100$	Condition-II follows	$X = 175 + 125 = 300$ $X = 300/5 = 60$	G will play
If $X = P\% T\% Q\% S\% R\%$ (Option-B)	$X = 80\ 270\ 100\ 225\ 120$	Condition-III follows	$X = 16\ 54\ 20\ 45\ 24$ $X = 1\ 5\ 2\ 4\ 2$ $X = 1 + 5 + 2 + 4 + 2 = 14$	F will play
If $X = Q\% P\% T\% R\% S\%$ (Option-C)	$X = 135\ 75\ 160\ 180\ 150$	Condition-III follows (refer note-ii)	$X = 27\ 15\ 32\ 36\ 30$ $X = 2\ 1\ 3\ 3\ 3$ $X = 2 + 1 + 3 + 3 + 3 = 12$	F will play
If $X = T\% S\% R\% P\% Q\%$ (Option-D)	$X = 175\ 140\ 125\ 75\ 135$	No condition follow	$X = 175 + 140 + 125 + 75 + 135 = 650$ $X = 650/5 = 130$	J will play
If $X = R\% P\% S\% Q\% T\%$ (Option-E)	$X = 180\ 80\ 150\ 100\ 160$	Condition-III follows (refer note-ii)	$X = 36\ 16\ 30\ 20\ 32$ $X = 3\ 1\ 3\ 2\ 3$ $X = 3 + 1 + 3 + 2 + 3 = 12$	F will play

2. Following the common explanation, we get “T one J”.

For string $Y = S\% T\% Q\% P\% R\%$, tone J will play as shown below

Hence, option B is correct.

Calculating the frequency				
Expression	Values	Conditions	Frequency calculation	Tone play
$Y = S\% T\% Q\% P\% R\%$	$Y = 150\ 270\ 100\ 90\ 125$	No condition follow	$Y = 150 + 270 + 100 + 90 + 125 = 735$ $Y = 735/5 = 147$	J will play

3. Following the common explanation, we get “None of the above”.

None of the values of Y along with X will make tone K play as shown below.

Hence, option E is correct.

Calculating the frequency for each option with given question				
Expression	Values	Conditions	Frequency calculation	Tone play
$X=P^* R\# Q\% T\# S^*$	X=80 180 100 270 140	Condition-III follows (refer note-ii)	X=16 36 20 54 28 X=1 3 2 5 2 X=1+3+2+5+2=13	-----
If Y= $Q^* T\% R\# S\# P\%$ (Option-A)	Y=100 175 180 225 75	Condition-III follows	Y=20 35 36 45 15 Y=2 3 3 4 1 Y=2+3+3+4+1=13	X+Y=13+13 X+Y=26 F will play
If Y= $T^* Q\# P\% S^* R\%$ (Option-B)	Y=160 135 75 140 125	No condition follow	Y=160+135+75+140+125=635 Y=635/5=127	X+Y=13+127 X+Y=140 J will play
If Y= $T\# S\# R\% Q\# P^*$ (Option-C)	Y=270 225 125 135 80	No condition follow	Y=270+225+125+135+80=835 Y=167	X+Y=13+167 X+Y=180 J will play

4. Following the common explanation, we get “Q#”.

For String X=S* Q% P* T* Q#,tone H will play as shown below.

Hence, option C is correct.

Calculating the frequency with missing value from each option				
Expression	Values	Conditions	Frequency calculation	Tone play
If X=S* Q% P* T* S% (Option-A)	X=140 100 80 160 150	Condition I follows	X=28 20 16 32 30 X=1 3 3 X=1+3+3=7	F will play
If X=S* Q% P* T* R# (Option-B)	X=140 100 80 160 180	Condition-III follows (refer note-ii)	X=28 20 16 32 36 X=2 2 1 3 3 X=2+2+1+3+3=11	F will play
If X=S* Q% P* T* Q# (Option-C)	X=140 100 80 160 135	No condition follow	X=140+100+80+160+135=615 X=615/5=123	H will play
If X=S* Q% P* T* S# (Option-D)	X=140 100 80 160 225	No condition follow	X=140+100+80+160+225=705 X=705/5=141	J will play
If X=S* Q% P* T* R* (Option-E)	X=140 100 80 160 120	Condition-III follows (refer note-ii)	X=28 20 16 32 24 X=2 2 1 3 2 X=10	F will play

5. Following the common explanation, we get “None of the above”.

None of the interchanges will make tone G play as shown below.

Hence, option E is correct.

Calculating the frequency by interchanging the value from each option				
Expression	Values	Conditions	Frequency calculation	Tone play
If X= R% Q* P* S# T# If Y= T* P% Q# S% Q% (Option A)	X=125 100 80 225 270	Condition II follows	$X=125+225=350$ $X=350/5=70$	-----
	Y=160 75 135 150 100	Condition II follows	$Y=75+135=210$ $Y=210/5=42$	X+Y=70+42 X+Y=112 H will play
If X= R% Q* P% S# Q% If Y= T* P* Q# S% T# (Option B)	X=125 100 75 225 100	No condition follow	$X=125+100+75+225+100=625$ $X=625/5=125$	-----
	Y=160 80 135 150 270	No condition follow	$Y=160+80+135+150+270=795$ $Y=795/5=159$	X+Y=125+159 X+Y=284 K will play
If X=R% T* P* S# Q% If Y=Q* P% Q# S% T# (Option C)	X=125 160 80 225 100	Condition II follows	$X=125+225=350$ $X=350/5=70$	-----
	Y=100 75 135 150 270	Condition II follows	$Y=75+135=210$ $Y=210/5=42$	X+Y=70+42 X+Y=112 H will play
If X=R% Q* P* S# T* If Y=Q% P% Q# S% T# (Option D)	X=125 100 80 225 160	Condition II follows	$X=125+225=350$ $X=350/5=70$	-----
	Y=100 75 135 150 270	Condition II follows	$Y=75+135=210$ $Y=210/5=42$	X+Y=70+42 X+Y=112 H will play





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