9+9=13-1=12

Name: Aashish Kr. Batch: PBTF35A02 Date: 4/2/13

Straight Objective Type

1. A shopkeeper has 10 copies of each of nine different books, then number of ways in which atleast one book can be selected is
(A) $9^{11} - 1$ (B) $10^{10} - 1$ (C) $11^9 - 1$ (D) 10^9

2. Number greater than 7000 and divisible by 5 that can be formed using only the digits 3, 5, 7, 8 and 9, no digit being repeated is
(A) 46 (B) 48 (C) 72 (D) 42

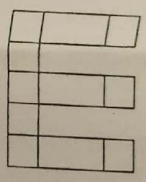
3. Number of different words that can be formed using all the letters of the word "DEEPMALA", if two vowels are together and the other two are also together but separated from the first two is
(A) 960 (B) 1200 (C) 2160 (D) 1440

4. If all the letter of the word "QUEUE" are arranged in all possible manner as then are in a dictionary, then the rank of the word QUEUE is
(A) 15^{th} (B) 16^{th} (C) 17^{th} (D) 18^{th}

5. The number of different ways in which five 'alike dashes' and eight 'alike dots' can be arranged, using only seven of these 'dashes' & 'dots' is
(A) 1287 (B) 119 (C) 120 (D) 1235520

6. There are three coplanar parallel lines. If any p points are taken on each the lines, the maximum number of triangles with vertices at these points is
(A) $3p^2(p-1)+1$ (B) $3p^2(p-1)$ (C) $p^2(4p-3)$ (D) none of these

7. Number of ways in which AAABBB can be placed in the squares of the figure as shown so that no row remains empty, is
(A) 2430
(C) 1620
(B) 2160
(D) none of these



8. Number of ways in which 6 different toys can be distributed among two brothers in ratio 1 : 2, is
(A) 30 (B) 60 (C) 20 (D) 40

Multiple Correct Choice Type

9. Number of ways in which 200 people can be divided in 100 couples is
(A) $\frac{(200)!}{2^{100}(100)!}$ (B) 1, 3, 5, ... 199
(C) $\left(\frac{101}{2}\right)\left(\frac{102}{2}\right)\cdots\left(\frac{200}{2}\right)$ (D) $\frac{(200)!}{(100)!}$

10. The number of ways of arranging the letters AAAAA, BBB, CCC, D, EE & F in a row if the letters C are separated from one another is
(A) ${}^{13}C_5 \frac{12!}{5!3!2!}$ (B) $\frac{13!}{5!3!3!2!}$ (C) $\frac{14!}{3!3!2!}$ (D) $\frac{15!}{5!(3!)^2 2!} - \frac{13!}{5!3!2!} - \frac{12!}{5!3!}{}^{13}C_2$

Assertion Reason Type

11. A: The maximum number of points of intersection of 8 circles of unequal radii is 56
R: The maximum number of points into which 4 circles of unequal radii and 4 non coincident straight lines intersect, is 50.
(A) A and R true and R is the correct explanation of A.
(B) A and R true and R is the incorrect explanation of A.
(C) A is true and R is false.
(D) A is false and R is true.

12. A: If there are six letters $L_1, L_2, L_3, L_4, L_5, L_6$ and their correspondingly addressed six envelopes $E_1, E_2, E_3, E_4, E_5, E_6$. Letters having odd value can be put into odd values envelopes and even value letters can be put into even value envelopes, so that no letter goes into its right envelope, the number of arrangement will be equal to 4.

R: If P_n number of ways in which n letters can be put in 'n' correspondingly addressed envelopes such that no letter goes its correct envelope than $P_n = n!\left(1-\frac{1}{1!}+\frac{1}{2!}+\ldots+\frac{(-1)^n}{n!}\right)$

(A) A and R true and R is the correct explanation of A.
(B) A and R true and R is the incorrect explanation of A.
(C) A is true and R is false.
(D) A is false and R is true.

13. A: The maximum value of k such that $(50)^k$ divides 100! Is 24.

R: If P is any prime number, then power of P in n! is equal to $\left[\frac{n}{P}\right]+\left[\frac{n}{P^2}\right]+\left[\frac{n}{P^3}\right]\ldots$

(A) A and R true and R is the correct explanation of A.
(B) A and R true and R is the incorrect explanation of A.
(C) A is true and R is false.
(D) A is false and R is true.

Comprehension Type: I

Consider the letters of the word MATHEMATICS. There are eleven letters some of them are identical. Letters are classified as repeating and non-repeating letters. Set of repeating letters = {M, A, T}. Set of non-repeating letters = {H, E, I, C, S}.

14. Possible number of words taking all letters at a time such that atleast one repeating letter is at odd position in each word, is NOT POSSIBLE

(A) $\frac{9!}{2!2!2!}$ (B) $\frac{11!}{2!2!2!}$ (C) $\frac{11!}{2!2!2!}-\frac{9!}{2!2!}$ (D) $\frac{9!}{2!2!}$

15. Possible number of words taking all letters at a time such that in each word both M's are together and both T's are together but both A's are not together, is

(A) $7!.{}^8C_2$ (B) $\frac{11!}{2!2!2!}-\frac{10!}{2!2!}$ (C) $\frac{6!4!}{2!2!}$ (D) $\frac{9!}{2!2!2!}$

16. Possible number of words in which no two vowels are together, is

(A) $\frac{7!}{2!2!}.{}^8C_4.\frac{4!}{2!}$ (B) $\frac{7!}{2!}.{}^8C_4.\frac{4!}{2!}$ (C) $7!.{}^8C_4.\frac{4!}{2!}$ (D) $\frac{7!}{2!2!2!}.{}^8C_4.\frac{4!}{2!}$

Comprehension Type: II

Let Set S = {1, 2, 3, ..., n} be a set of first n natural numbers and $A \subseteq S$. Suppose n(A) represents cardinal number of the set A and min(A) represents least number among the elements of set A.

17. The greatest value of min(A), where $A \subseteq S$ and $n(A) = r$, $1 \le r \le n$; is

(A) r (B) (n – r) (C) n – r + 1 (D) r + 1

18. The number of subsets A of S for which n(A) = r and min(A) = k, is

(A) $n.{}^{n-K}C_{r-1}$ (B) ${}^nC_{r-1}$ (C) ${}^{n-K+1}C_{r-1}$ (D) ${}^{n-K}C_{r-1}$

19. If n(A) = r (fixed constant), min(A) = k (fixed constant), then $\sum_{A\subseteq S} \min(A)$ is

(A) $n.{}^{n-K}C_{r-1}$ (B) $(n+1)^{n-K}C_{r-1}-r.{}^{n-K+1}C_r$
(C) $K.{}^{n-K}C_{r-1}+{}^{n.n-K+1}C_1$ (D) None

Matrix – Match Type

20. Match the following.

Column – I		Column – II	
(A)	The total number of selections of atleast one of the fruits which can be made from 3 bananas, 4 apples and 2 oranges is	(p)	Greater than 50
(B)	If 7 points out of 12 are in the same straight line, then the number of triangles formed is	(q)	Greater than 100
(C)	The number of ways of selecting 10 balls from unlimited number of red, black, white and green balls is	(r)	Greater than 150
(D)	The total number of proper divisors of 38808 is	(s)	Greater than 200
		(t)	Greater than 300

21. Consider the word "HONOLULU".

Column – I		Column – II	
(A)	Number of words that can be formed using the letters of the given word in which consonants & vowels are alternate is	(p)	26
(B)	Number of words that can be formed without changing the order of vowels is	(q)	288
(C)	Number of ways in which 4 letters can be selected form the letters of the given word is	(r)	840
(D)	Number of words in which two O's are together but U's are separated is	(s)	900
		(t)	144

(20) a – p
b – p q r
c – p q r s
d – p

(21) a – t
b – r
c – p
d – q