# 22.MISCELLANEOUS

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## I. Section A

1) A variable takes value x with frequency ${}^{n+x-1}C_x, x = 0, 1, 2, \ldots n$. The mode of the variable is ... $(1982 - 2Marks)$

## II. Section B

2) For real numbers x and y, we write x*y if $x - y + \sqrt{2}$ is an irrational number. Then, the relation * is an equivalence relation. $(1981 - 2Marks)$

## III. Section C

3) If $X$ and $Y$ are two sets, then $X \cap (X \cup Y)^c$ equals. (1979)
   a) X
   b) Y
   c) $\phi$
   d) None of these

4) The expression $\frac{12}{3+\sqrt{5}+2\sqrt{2}}$ is equal to (1980)
   a) $1 - \sqrt{5} + \sqrt{2} + \sqrt{10}$
   b) $1 + \sqrt{5} + \sqrt{2} - \sqrt{10}$
   c) $1 + \sqrt{5} - \sqrt{2} + \sqrt{10}$
   d) $1 - \sqrt{5} - \sqrt{2} + \sqrt{10}$

5) Select the correct alternative in each of the following. Indicate your choice by the appropriate letter only.Let S be the standard deviation of n observations. Each of the n observations is multiplied by a constant c. Then the standard deviation of the resulting number is (1980)
   a) s
   b) cs
   c) s $\sqrt{c}$
   d) none of these

6) The standard deviation of 17 numbers is zero. Then (1980)
   a) The numbers are in geometric progression with common ratio not equal to one.
   b) Eight numbers are positive, eight are negative and one is zero.
   c) either (a) or (b)
   d) none of these

7) Consider any set of 201 observations $x_1, x_2, \ldots x_{200}, x_{201}$. It is given that $x_1 < x_2 < \cdots < x_{200} < x_{201}$.Then the mean deviation of this set of observations about a point k is minimum when k equals (1981 -2 Marks)
   a) $(x_1 + x_2 + \cdots + x_{200} + x_{201})/201$
   b) $x_1$
   c) $x_{101}$
   d) $x_{201}$

8) If $x_1, x_2, \ldots, x_n$ are any ral numbers and n is any positive integer, then (1982 - 2 Marks)
   a) $n \sum_{i=1}^{n} {x_i}^2 < \left(\sum_{i=1}^{n} x_i\right)^2$

b) $\sum_{i=1}^{n} x_i^2 \geq \left(\sum_{i=1}^{n} x_i\right)^2$
c) $\sum_{i=1}^{n} x_i^2 \geq n\left(\sum_{i=1}^{n} x_i\right)^2$
d) none of these

9) Let $S = 1, 2, 3, 4$.The total number of unordered pairs of disjoint subsets of S is equal to (2010)

a) 25 b) 34 c) 42 d) 41

10) Let $P = \theta : \sin\theta - \cos\theta = \sqrt{2}\cos\theta$ and $Q = \theta : \sin\theta + \cos\theta = \sqrt{2}\sin\theta$ be two sets. Then (2011)

a) $P \subset QandQ - P \neq \emptyset$
b) $Q \not\subset P$
c) $P \not\subset Q$
d) $P = Q$

IV. D

11) In a college of 300 students every student reads 5 newspapers and every newspaperis read by 60 students.The number of newspapers is $(1998 - 2Marks)$

a) at least 30
b) at most 20
c) exactly 25
d) none of these

12) Let $S_1, S_2, \ldots$ be squares such that for each $n \geq 1$, the length of a side of $S_n$ equals the length of a diagonal of $S_{n+1}$.If the length of a side of $S_1$ is 10cm, then for which of the following values of n is the area of $S_n$ less than 1sq.cm? $(1999 - 3Marks)$

a) 7 b) 8 c) 9 d) 10

13) Let $S = 1, 2, 3, \ldots, 9$. For $k = 1, 2, \ldots, 5$, let $N_k$ be the number of subsets of S, each containing five elements out of which exactly k are odd. Then $N_1 + N_2 + N_3 + N_4 + N_5 =$ $(JeeAdv.2017)$

a) 210 b) 252 c) 125 d) 126

V. E

14) An investigator interviewed 100 students to determine their preferences for the three drinks : milk (M), coffee (C) and tea (T).He reported the following :10 students had all the three drinks M,C and T;20 had M and C; 30 had C and T;25 had M and T; 12 had M only ; 5 had C only ; and 8 had T only.Using a Venn diagram find how many did not take any of the three drinks. (1978)

15) (a) Construct a triangle with base 9cm and altitude 4cm, the ratio of the other two sides being 2:1
(b) Construct a triangle in which the sum of the three sides is 15cm with base angles 60° and 45°. Justify your steps. (1979)