Exercise - 8.4

Multiple Choice questions:-

(1) Let m be the mid point and b be the upper limit of a class in a continuous frequency distribution. The lower limit of the class is -

(1) $2m-b$ (2) $2m+b$ (3) $m-b$ (4) $m-2b$

⇒ Let lower limit $= a$

then; $\frac{a+b}{2} = m$

$a = 2m-b$ (1)

(2) The mean of a set of seven numbers is 81. If one of the numbers is discarded, the mean of the remaining numbers is 78. The value of discarded number is -

(1) 101 (2) 100 (3) 99 (4) 98.

⇒ Discarded number $= (81\times7) - (78\times6)$

$= 567 - 468$

$= 99$ (3)

(3) A particular observation which occurs maximum number of times in a given data is called its -

(1) frequency (2) range (3) mode (4) median.

⇒ mode (3)

(4) For which set of number do the mean, median, and mode all have the same values?

(1) 2, 2, 2, 4 (2) 1, 3, 3, 3, 5 (3) 1, 1, 2, 5, 6 (4) 1, 1, 2, 1, 5.

⇒ 1, 3, 3, 3, 5, mean $= \frac{15}{5} = 3$

median $= \left(\frac{5+1}{2}\right)^{th}$ term $= 3$

(2) mode $= 3$

(5) The algebraic sum of the deviations of a set of n values from their mean is

(1) 0 (2) $n-1$ (3) n (4) $n+1$.

⇒ Let the set $= \{a_1, a_2, a_3 \ldots a_n\}$

$\cancel{a_1 + a_2 + a_3 + a_n = n}$

$\therefore$ mean $= \dfrac{a_1+a_2+a_3+\cdots+a_n}{n} = p$ ---(i)

algebraic sum of the deviation mean

$= (a_1-p)+(a_2-p)+\cdots+(a_n-p)$

$= (a_1+a_2+\cdots+a_n) - (p+p+\cdots+p)$ [n times]

$= (a_1+a_2+\cdots+a_n - p\times n$

$= (a_1+a_2+\cdots+a_n) - ((a_1+a_2+\cdots+a_n)$ [by (i)]

$= 0$. (1)

(6) The mean of a, b, c, d and e is 28. If the mean of a, c and e is 24, then mean of b and d is —

(1) 24 (2) 36 (3) 26 (4) 34

⇒ $a+b+c+d+e = 28\times 5 = 140$ ---(i)

$a+c+e = 24\times 3 = 72$ --(ii)

from, (i)−(ii), we get,

$b+d = 140-72 = 68$.

$\therefore$ ~~b~~ b and d mean $= \dfrac{68}{2} = 34$ (4)

(7) If the mean of five observations $x, x+2, x+4, x+6, x+8$, is 11, then the mean of first three observations is —

(1) 9 (2) ~~11~~ (3) 13 (4) 15

⇒ $x+x+2+x+4+x+6+x+8 = 11\times 5$

$5x+20 = 55$

$5x = 35$

$\therefore 5x = 35$

$x = 7$

Now, first three observation is

7, 9, 11.

$$\text{mean} = \frac{7+9+11}{3} = \frac{27}{3} = 9 \quad (1)$$

(8) The mean of 5, 9, x, 17, and 21 is 13, then find the value of x

(1) 9 (2) 13 (3) 17 (4) 21

$\Rightarrow$ $5+9+x+17+21 = 13\times 5$

$x + 52 = 65$

$x = 13$ (2)

(9) The mean of the square of first 11 natural number is —

(1) 26 (2) 46 (3) 48 (4) 52

$\Rightarrow$ ~~The first 11~~ The square of first 11 netural number are 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121

$$\text{mean} = \frac{1+4+9+16+25+36+49+64+81+100+121}{11}$$

$$= \frac{506}{11} = 46 \quad (2)$$

(10) The mean of a set of numbers is $\bar{x}$. If each number is multiplied by z, the mean is —

(1) $\bar{x} + z$ (2) $\bar{x} - z$ (3) $z\bar{x}$ (4) $\bar{x}$

$\Rightarrow$ Let $\frac{a_1 + a_2 + \cdots + a_n}{n} = \bar{x}$

Now, $\frac{za_1 + za_2 + \cdots + za_n}{n}$

$$= z\frac{(a_1 + a_2 + \cdots + a_n)}{n}$$

$$= z\bar{x} \quad (3)$$