ANSWER KEYS

1. (3)	**2.** (1)	**3.** (4)	**4.** (3)	**5.** (3)	**6.** (4)	**7.** (3)	**8.** (3)
9. (1)	**10.** (2)						

1. **(3)** $\because$ Total marks of 10 failed students $= 28 \times 10 = 280$ and Total marks of 50 students $= 2800$

$\therefore$ Total marks of 40 passed students $= 2800 - 280 = 2520$

$\therefore$ Average marks of 40 passed students $= \frac{2520}{40} = 63$

2. **(1)** Let the mean of the last four observations be A_2. Then, by the formula for combined mean, we get,

$15 = \frac{6 \times 16 + 4 \times A_2}{6+4}$

or $150 = 96 + 4A_2$

$\therefore A_2 = \frac{54}{4}$

Let the sixth number is x, then taking the sixth number as a collection, the combined mean of this collection and the collection of the last four is 12.

$\therefore$ By the definition of combined mean

$12 = \frac{1 \times x + 4 \times \frac{54}{4}}{1+4}$

$\therefore 60 = x + 54$

$\therefore x = 6$

Hence, the sixth number $= 6$

3. **(4)** Given that, $n_1 = 4,\ \bar{x}_1 = 7.5,\ n_1 + n_2 = 10,\ \bar{x} = 6$

$\therefore \quad 6 = \frac{4 \times 7.5 + 6 \times \bar{x}_2}{10}$

$\Rightarrow \quad 60 = 30 + 6\bar{x}_2$

$\Rightarrow \quad \bar{x}_2 = \frac{30}{6} = 5$

4. **(3)** Let the numbers are $x_1, x_2, \ldots x_{10} (N = 10)$

Given $\left.\begin{array}{r} x_1 + x_2 + x_3 + x_4 = 4.11 = 44 \\ x_5 + x_6 \ldots . + x_{10} = 6.16 = 96 \end{array}\right\} \Rightarrow \sum x_i = 140$

$\Rightarrow \quad$ variance $\sigma^2 = \frac{\sum x_i^2}{N} - \left(\frac{\sum x_i}{N}\right)^2$

$\Rightarrow \sigma^2 = \frac{2000}{10} - \left(\frac{140}{10}\right)^2$

$\Rightarrow \sigma^2 = 200 - 196 = 4$

$\Rightarrow \quad$ Standard deviation $\sigma = 2$.

5. **(3)** We have, Observation $= 8, 11, 9, 8, 11, 9, 7, 8, 7, 3, 2$

Since, 8 is occurring highest time.

$\therefore$ Mode $= 8$

6. **(4)** Let the other two numbers be x and y.

According to the question,

Mean$= \frac{-1+1+2+x+y}{5} = 0 \Rightarrow x + y = -2 \ldots$(i)

Also, $\sigma^2 = 2$

$\Rightarrow \frac{(-1-0)^2 + (1-0)^2 + (2-0)^2 + (x-0)^2 + (y-0)^2}{5} = 2$

$\Rightarrow 1 + 1 + 4 + x^2 + y^2 = 10 \Rightarrow x^2 + y^2 = 4 \ldots$(ii)

$\Rightarrow (x+y)^2 - 2xy = 4$

$\Rightarrow 4 - 2xy = 4 \Rightarrow xy = 0 \ldots$(iii)

Now, $(x-y)^2 = x^2 + y^2 - 2xy = 4 - 0 = 4$ {using (ii) and (iii) } $\ldots$(iv)

$\Rightarrow x - y = \pm 2$

Solving (i) and (iv) , we get,

If $x - y = 2, x = 0, y = -2$

If $x - y = -2, x = -2, y = 0$

So, the other two numbers are $-2, 0$

7. **(3)**
Mean, $\bar{x}=\frac{a+b+8+5+10}{5}=6$
$\Rightarrow a+b=7$
$\because$ Variance$=\frac{\Sigma\left(x_i-\bar{x}\right)^2}{n}$
$\therefore \frac{(a-6)^2+(b-6)^2+(8-6)^2+(5-6)^2+(10-6)^2}{5}=6.8$
$\Rightarrow(a-6)^2+(b-6)^2+4+1+16=34$
$\Rightarrow(a-6)^2+(1-a)^2=13$
$\Rightarrow 2a^2-14a+24=0$
$\Rightarrow 2(a-3)(a-4)=0$
$\Rightarrow a=3,\ 4$
$\Rightarrow b=4,\ 3$
Hence, $a=3,\ b=4$.

8. **(3)** Given, $\sigma=9$
Let a student obtains x marks out of 75. Then, his marks out of 100 are $\frac{100}{75}x=\frac{4}{3}x$
Each observation is multiply by $\frac{4}{3}$
$\therefore$ New $SD,\ \sigma=\frac{4}{3}\times 9=12$
Hence, variance is $\sigma^2=144$

9. **(1)** Let other two observation be a and b

$\Rightarrow \quad a+b+1+2+6=5\times 4.4$

$\Rightarrow \quad a+b=13 \quad ....(1)$

$\sigma^2=\frac{1}{5}\left(a^2+b^2+1+4+36\right)-(4.4)^2=8.24$

$\Rightarrow \quad a^2+b^2=97 \ ....(2)$

From (1) and (2) we get, $a=9,\ b=4$

10. **(2)**
By the result
Mode = 3 Median−2 mean
$\Rightarrow$ Mean − mode = 3(mean − median)
$\Rightarrow 63=3(\text{mean}-\text{median})$
i.e. mean − median $=21$