Q.No.33. (a) If \(A\{1,2,4,5,6\}, B\{3,4,5,6\} \text{ and } C\{6,7,8,9,10\} \) then show that 
\[A \cap (B \cap C) = (A \cap B) \cap C\]

\[
\begin{align*}
\text{B} \cap \text{C} &= \{6\} \quad 1 \text{ Mark} \\
\text{A} \cap (\text{B} \cap \text{C}) &= \{6\} \quad 1 \text{ Mark} \\
\text{A} \cap \text{B} &= \{4,5,6\} \quad 1 \text{ Mark} \\
(\text{A} \cap \text{B}) \cap \text{C} &= \{6\} \quad 1 \text{ Mark} \\
\text{A} \cap (\text{B} \cap \text{C}) &= (\text{A} \cap \text{B}) \cap \text{C} \quad 1 \text{ Mark}
\end{align*}
\]

(b) Find the square root of 10 up to 2 decimal places.

\[
\sqrt{10} \approx 3.16 
\]

\[
\begin{array}{c|c}
3 & 10.000000 \\
-9 & \hline
6.1 & 1.00 \\
-0.61 & \hline
6.26 & 0.3900 \\
-0.3756 & \hline
6.322 & 0.014400 \\
-0.012644 & \hline
& 0.001756
\end{array}
\]

\[
\sqrt{10} \approx 3.16 
\]

Q.No.34.(a) Evaluate the following and express the answer into decimal number system.

\[
(1234)_5 + \{335 - (1011)_2\}
\]

\[
\begin{align*}
(1234)_5 &= 1 \times 5^3 + 2 \times 5^2 + 3 \times 5^1 + 4 \times 5^0 \\
&= 125 + 50 + 15 + 4 \\
&= 194 \quad 0.5 \text{ Mark} \\
(1011)_2 &= 1 \times 2^3 + 0 \times 2^2 + 1 \times 2^1 + 1 \times 2^0 \\
&= 8 + 2 + 1 \\
&= 11 \quad 0.5 \text{ Mark} \\
(1234)_5 + \{335 - (1011)_2\} &= 194 + \{335 - 11\} \\
&= 194 + 324 \quad 0.5 \text{ Mark} \\
&= 518 \quad \text{Answer} \quad 1 \text{ Mark}
\end{align*}
\]
(b) Ayesha and Meerab started a business with Rs.150000 and Rs.180000 respectively. After one year they earned profit of Rs.55000. Find the share of each one in the profit.

Ratios of capitals

Ayesha’s share : Meerab’s share

<table>
<thead>
<tr>
<th>Ayesha’s share</th>
<th>Meerab’s share</th>
</tr>
</thead>
<tbody>
<tr>
<td>150000</td>
<td>180000</td>
</tr>
<tr>
<td>15</td>
<td>18</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

Sum of ratios = 5 + 6 = 11

Total profit = Rs. 55000

Ayesha’s profit = \( \frac{5}{11} \times 55000 \) = Rs. 25000

Meerub’s profit = \( \frac{6}{11} \times 55000 \) = Rs. 30000

Q.No. 35. (a) Find two solutions for the equation \( x + 5y = 6 \)

If y = 0 then

\[ x + 5(0) = 6 \]

\[ x = 6 \]

If y = 1 then

\[ x + 5 = 6 \]

\[ x = 1 \]

The two solutions of given equation are (6, 0), (1, 1)

(b) The price of 2 books and 4 pencils is Rs.160 while the price of 4 such books and 1 pencil is Rs.215. Find the price of one book and one pencil.

Suppose cost of 1 book = Rs. \( x \)

Suppose cost of 1 pencil = Rs. \( y \)

Then by given conditions

\[ 2x + 4y = 160 \]  \( \text{(1)} \)

\[ 4x + y = 215 \]  \( \text{(2)} \)

Multiplying equation (1) by 2

\[ 4x + 8y = 320 \]  \( \text{(3)} \)

\[ \text{Equation (3) − equation (2)} \Rightarrow \]

Solutions of equations (2) and (3)
4x + 8y = 320 \hspace{1cm} \text{----------------- (1)} \hspace{1cm} 1.5 \text{ Mark}
\begin{align*}
-4x + y &= -215 \hspace{1cm} \text{----------------- (2)} \\
7y &= 105
\end{align*}
\begin{align*}
y &= 15
\end{align*}

Cost of one pencil = Rs. 15

Now put y=15 in equation (2)
\begin{align*}
4x + 15 &= 215 \\
4x &= 215 - 15 \\
x &= 50
\end{align*}

Cost of one book = Rs. 50 \hspace{1cm} 1.5 \text{ Marks}

Q. No.36 (a) Construct a rhombus ABCD when \( \overline{AB} = 4 \text{ cm} \) and \( \overline{AC} = 6 \text{ cm} \).

For drawing a line segment \( \overline{AB} \) of given length \hspace{1cm} 1 \text{ mark}
For drawing four correct arcs \hspace{1cm} 2 \text{ marks}
For the correct construction of rhombus \hspace{1cm} 2 \text{ mark}

(b) Construct a kite ABCD where \( \overline{AB} = 3 \text{ cm} \), \( \overline{BC} = 5 \text{ cm} \) and length of its longer diagonal \( = \overline{AC} = 7 \text{ cm} \).

For drawing \( \overline{AB} \) of length 3cm \hspace{1cm} 3 \text{ marks}
For drawing an arc with centre at B and radius 5cm \hspace{1cm} 1 \text{ mark}
For drawing an arc with centre at A and radius 7cm which intersects the previous arc at C. \hspace{1cm} 1 \text{ mark}
For drawing an arc with centre at A and radius 3cm above A \hspace{1cm} 1 \text{ mark}
For drawing an arc with centre at C and radius 5cm which intersects the arc drawn from A at D \hspace{1cm} 1 \text{ mark}
Joining C with B and D and A with D \hspace{1cm} 0.5 \text{ mark}
Q.No: 37. (a) The height of a conical tent is 7 metre and radius of its base is 6 metre. Find the volume of air present in it. \(\pi = \frac{22}{7}\)

\[
V = \frac{1}{3} \pi r^2 h
\]

\[
= \frac{1}{3} \left( \frac{22}{7} \right) (6)^2 (7)
\]

\[
= 22 \times 12
\]

Volume of air \(\frac{22}{7} \times 12 = 264\text{m}^3\)

(1 Mark)

(2 Mark)

(1 Mark)

(1 Mark)

(b) Find the mean of the following frequency table.

<table>
<thead>
<tr>
<th>Class interval</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5</td>
<td>2</td>
</tr>
<tr>
<td>6-10</td>
<td>3</td>
</tr>
<tr>
<td>11-15</td>
<td>5</td>
</tr>
<tr>
<td>16-20</td>
<td>4</td>
</tr>
<tr>
<td>21-25</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Class interval</th>
<th>Frequency ((f))</th>
<th>Mid values ((x))</th>
<th>(fx)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1—5</td>
<td>2</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>6—10</td>
<td>3</td>
<td>8</td>
<td>24</td>
</tr>
<tr>
<td>11—15</td>
<td>5</td>
<td>13</td>
<td>65</td>
</tr>
<tr>
<td>16—20</td>
<td>4</td>
<td>18</td>
<td>72</td>
</tr>
<tr>
<td>21—25</td>
<td>1</td>
<td>23</td>
<td>23</td>
</tr>
</tbody>
</table>

\[\sum f = 15\]

\[\sum fx = 190\]

\[\bar{x} = \frac{\sum fx}{\sum f} = \frac{190}{15} = 12.666\]

(1 Mark)

(1 Mark)

Column-wise marks:
Frequency \((f)\)=1 Mark, Mid values \((x)\)= 1 Mark , \(fx\) = 1 Mark