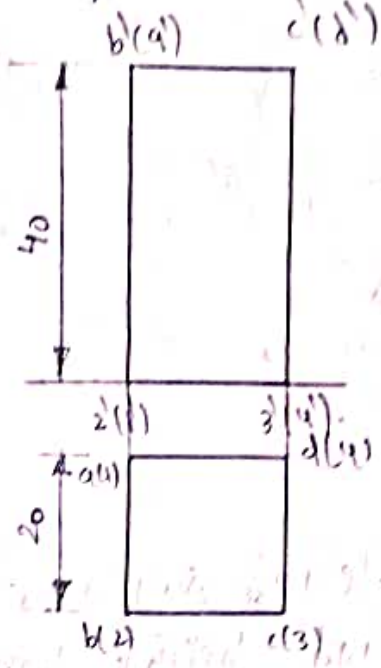
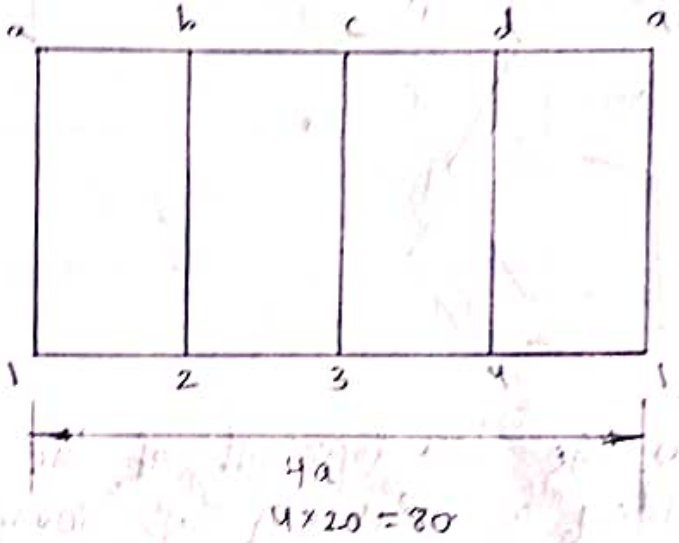
5. Development of Surfaces.

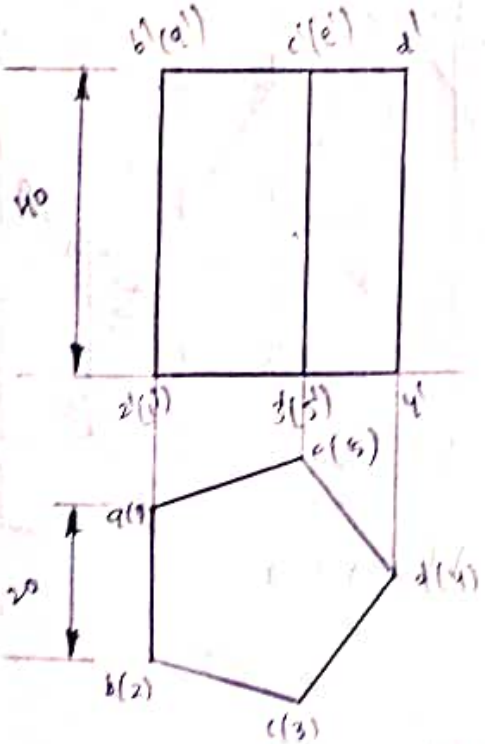
Development of surfaces means unrolling or unfolding of all surfaces of the object on a plane.

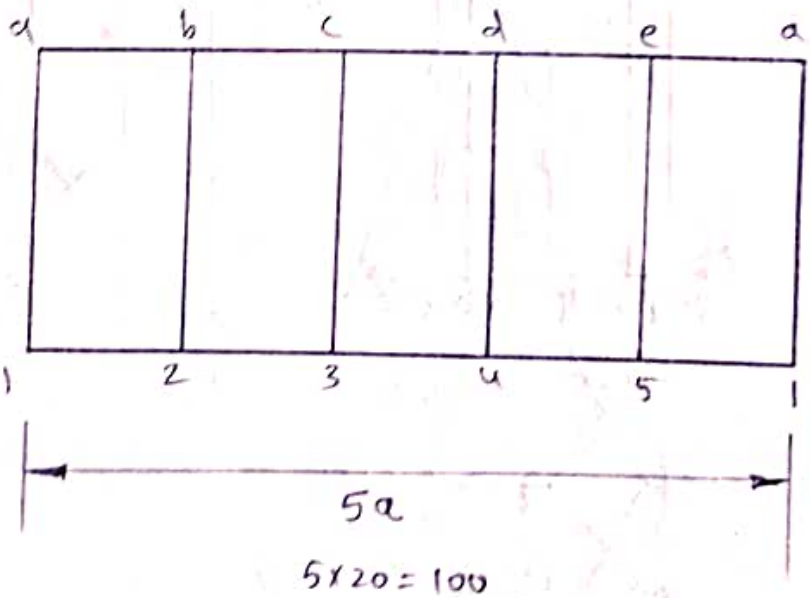
① (a). Draw the development of the lateral surface of a square prism of side of base 20mm and height 40mm.



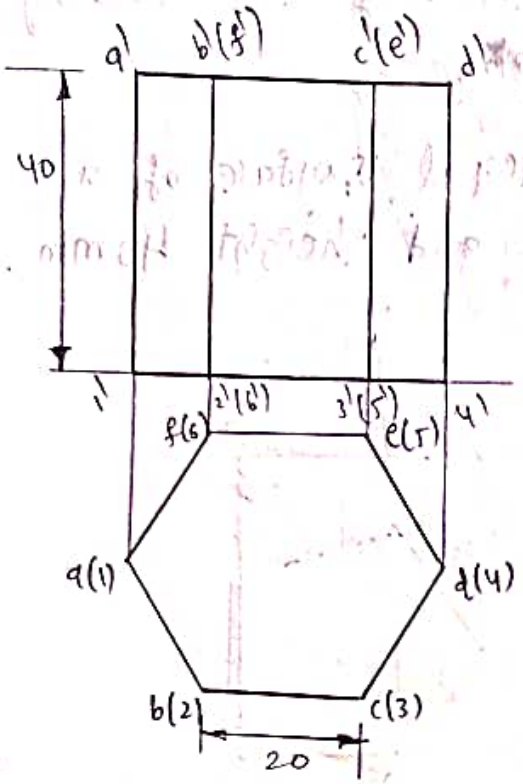


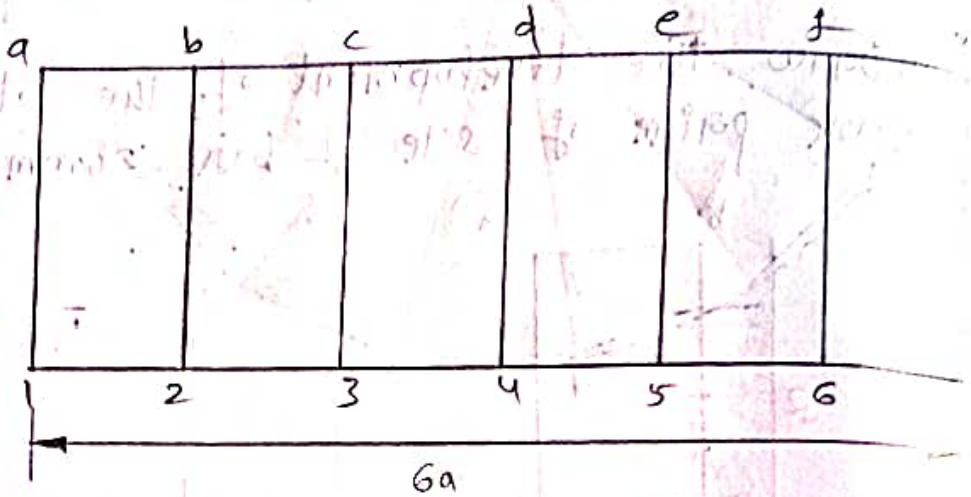
(b) Draw the development of the lateral surfaces of a pentagonal prism of side of base 20mm and height 40mm.





(c) Draw the development of the lateral surfaces of a hexagonal prism of side of base 20mm and height 40mm.

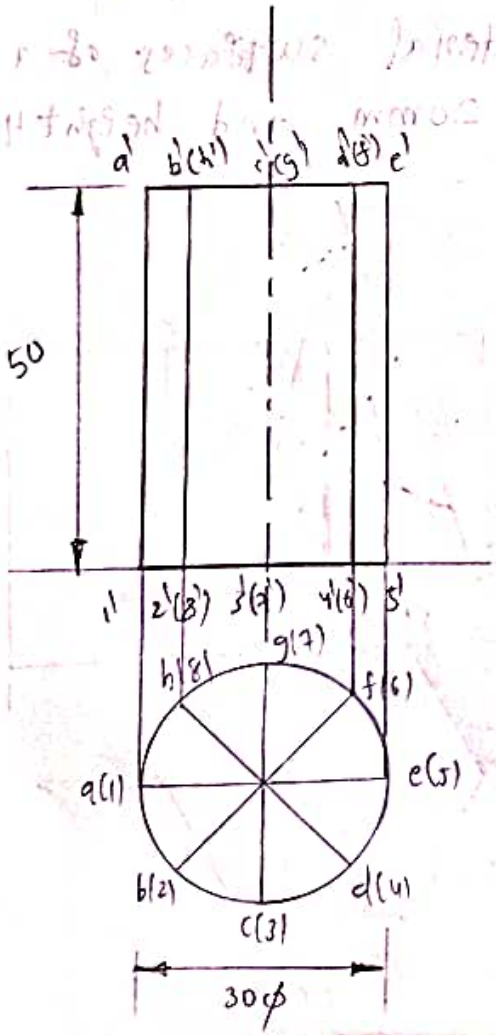


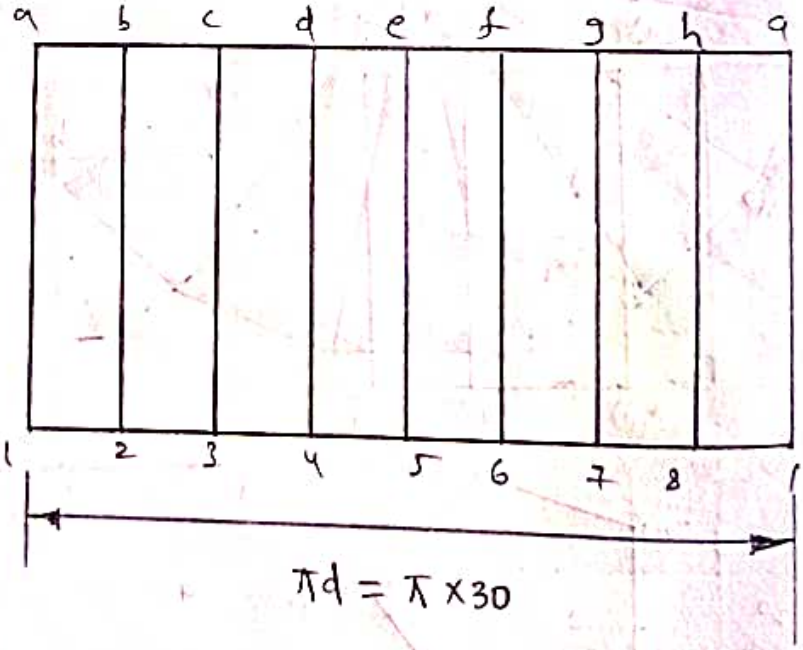


6a

6x20 = 120

(d) Draw the development of the lateral surfaces of cylinder of diameter of 30mm and height 50mm.

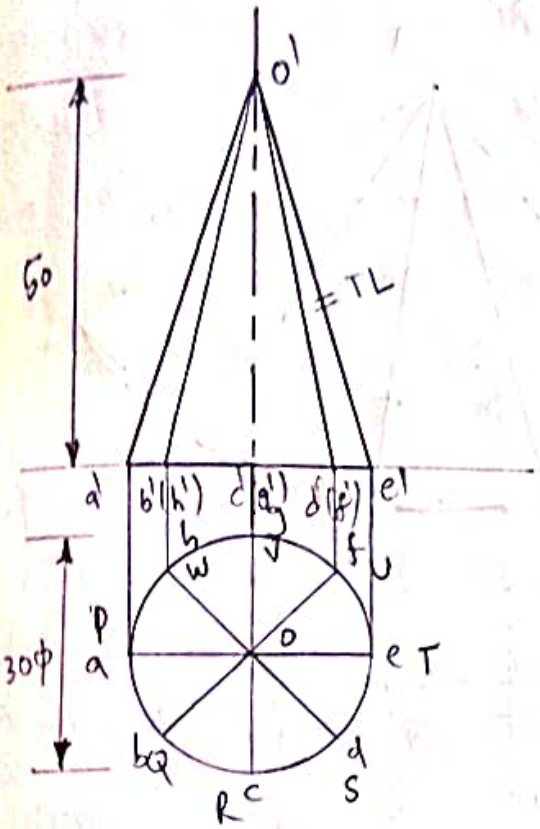


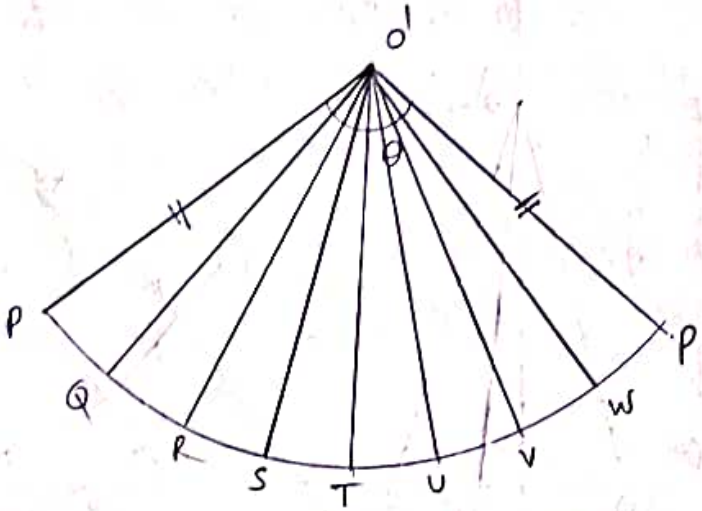


πd = π x 30

πd = 94.2477 ≈ 94.4

(e) Draw the development of lateral surfaces of a cone of a base diameter 30mm and height 50mm.

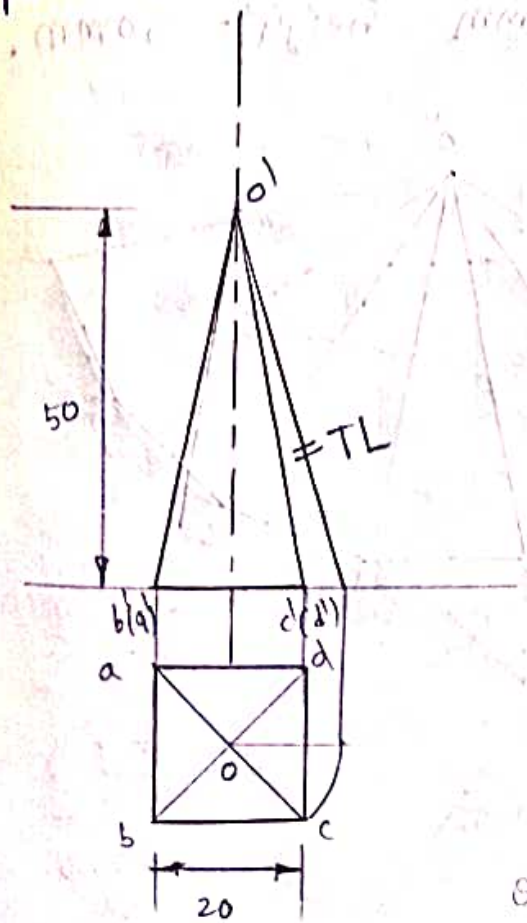


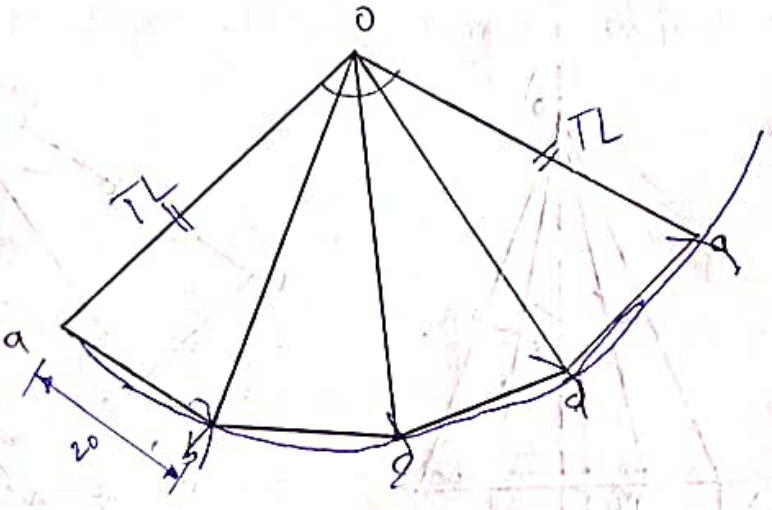


$$\theta = 360 \times \frac{r}{L} = 360 \times \frac{15}{53} = 100°$$

$$\frac{\theta}{8} = \frac{100}{8}$$

(f) Draw the development of lateral surface of a square pyramid of base 20mm and 50mm (height)

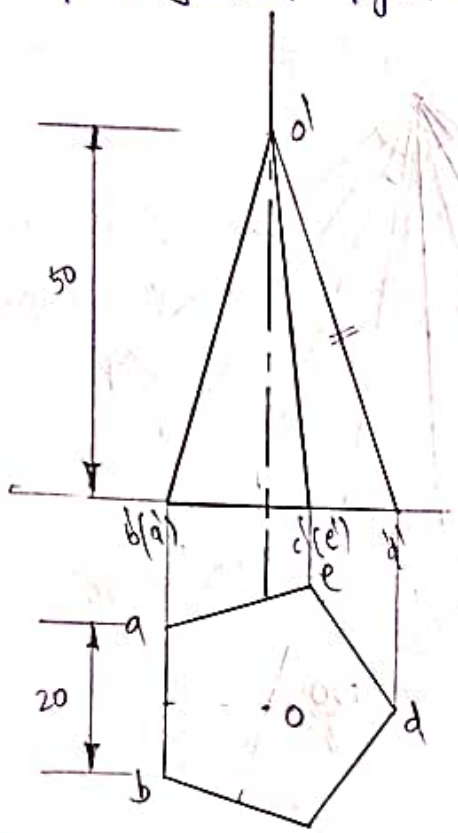


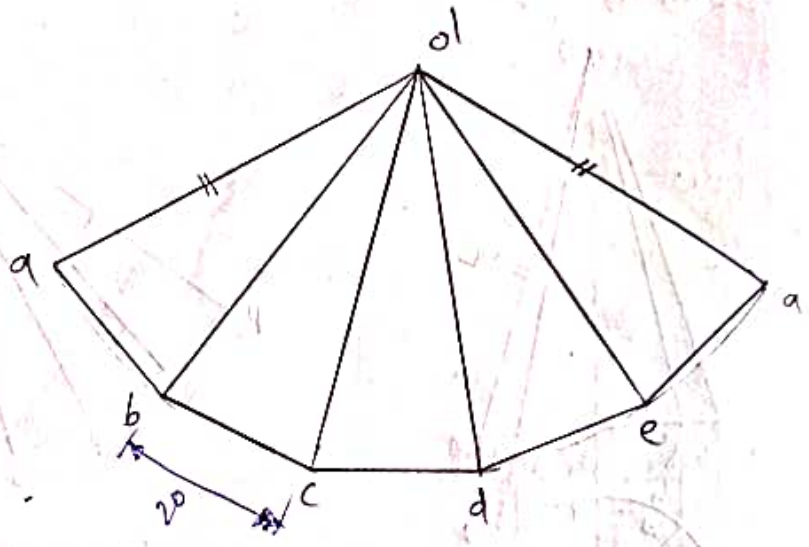


$$\theta = \frac{111.5}{53}$$

$$\frac{\theta}{4} = \frac{}{4} = 24.62$$

(g). Draw the development of the lateral surfaces of a pentagonal pyramid of base 20mm height 50mm.

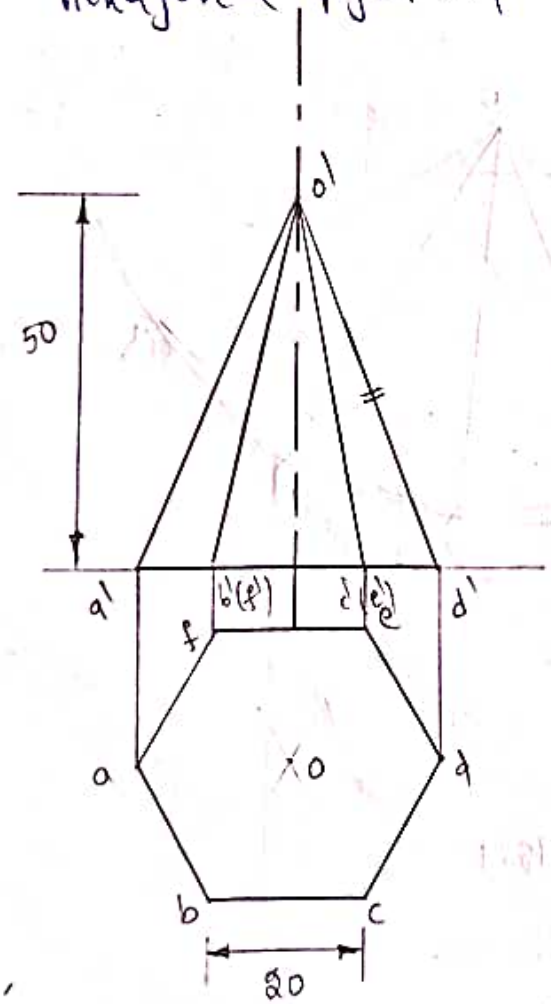


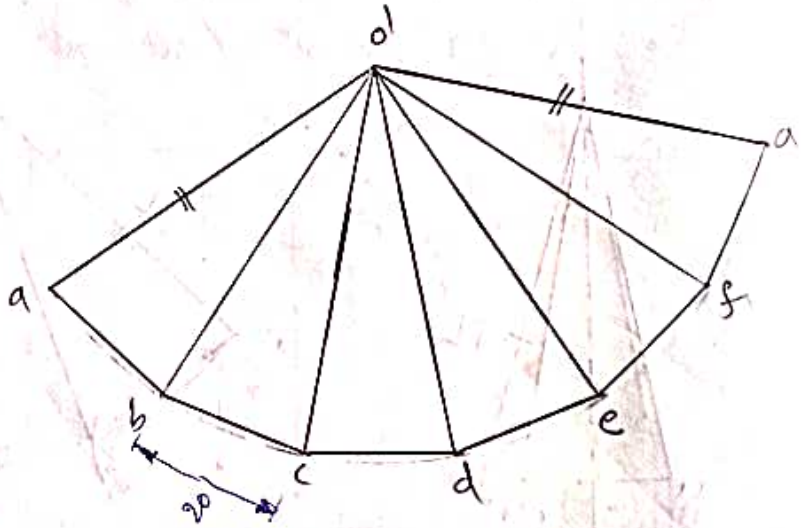


$$\theta = 360 \times \frac{r}{L} = 360 \times \frac{?}{54} = 120$$

$$\frac{\theta}{5} = \frac{120}{5}$$

(h) Draw the development of the lateral surfaces of a hexagonal pyramid of base 20mm height 50mm.





$$\frac{\theta}{6} = 22.6.$$

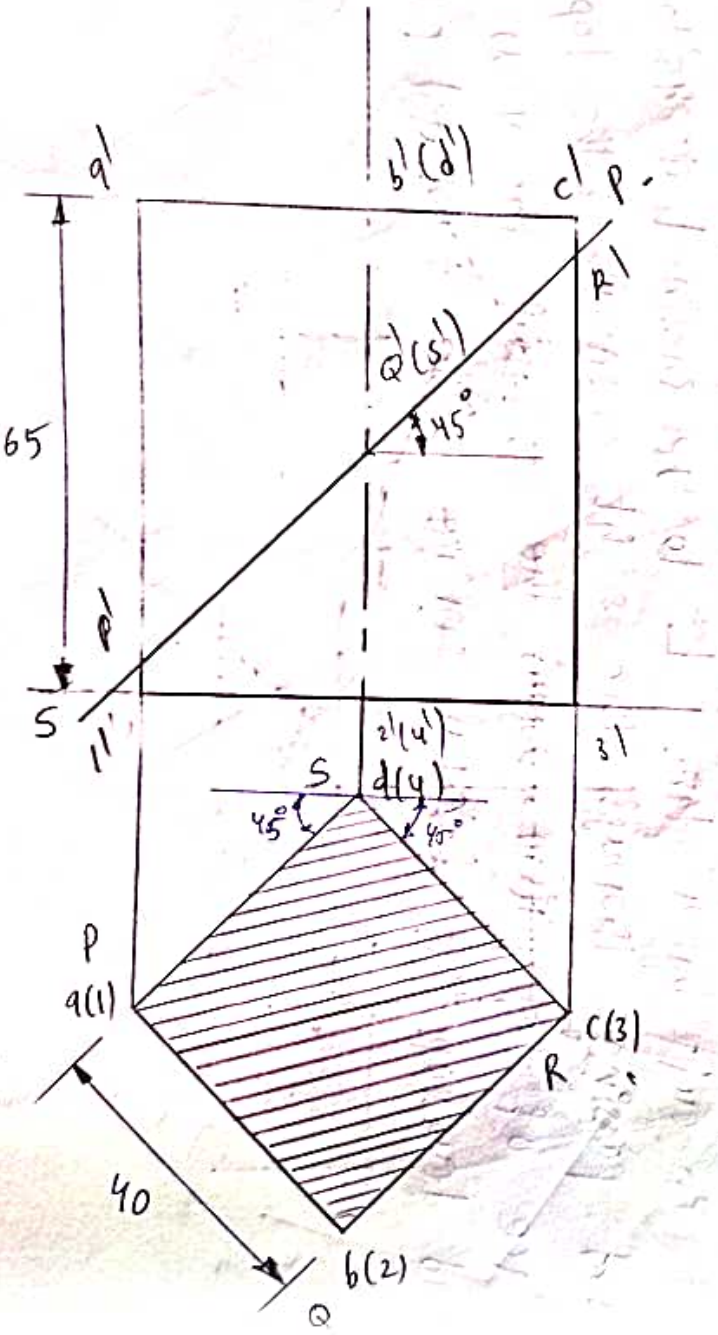
$$\theta = 360 \times \frac{r}{L} = 360 \times \frac{20}{53} = 135.849 \approx$$

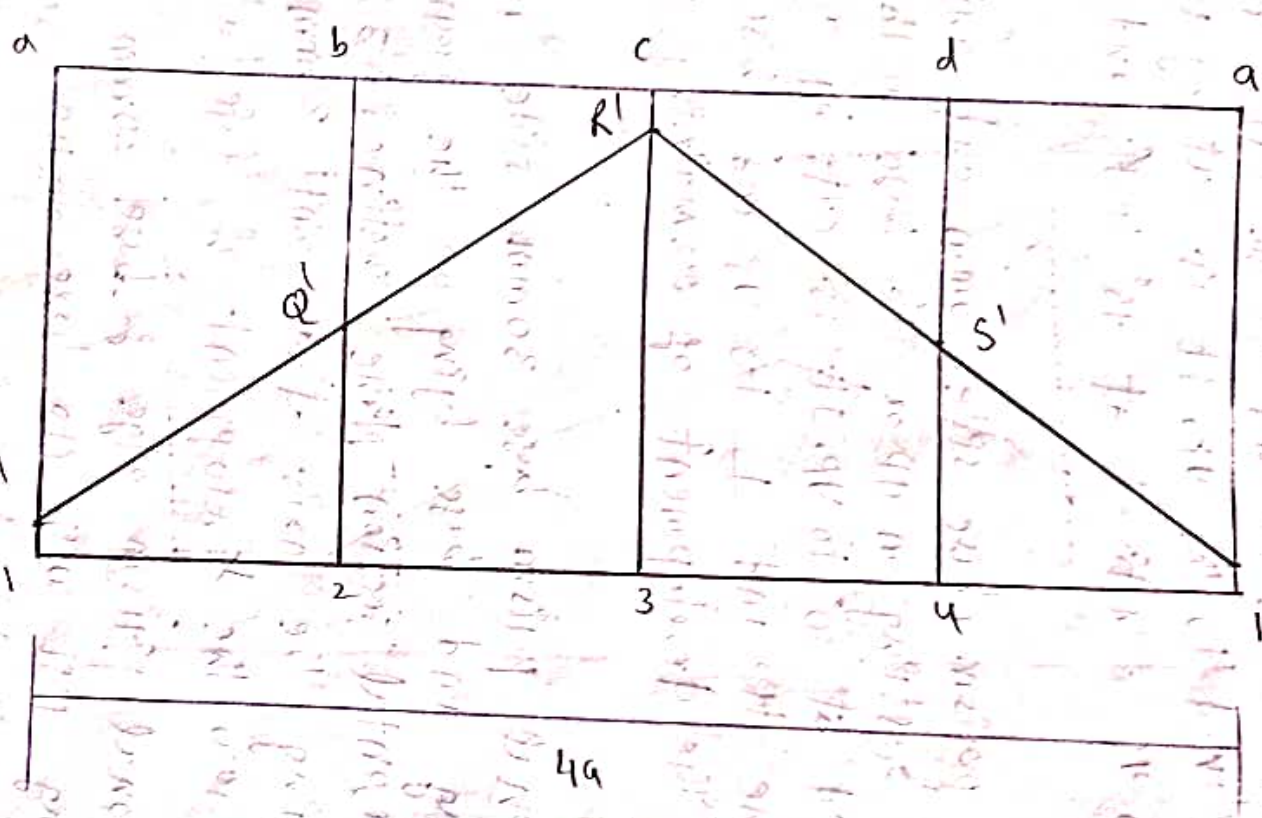
② A square prism, base 40mm side and axis 65mm long has its base on the HP and all the edges of the base equally inclined to the VP. It is cut by a sectional plane ⊥ to VP, inclined at 45° to HP and bisecting the axis.

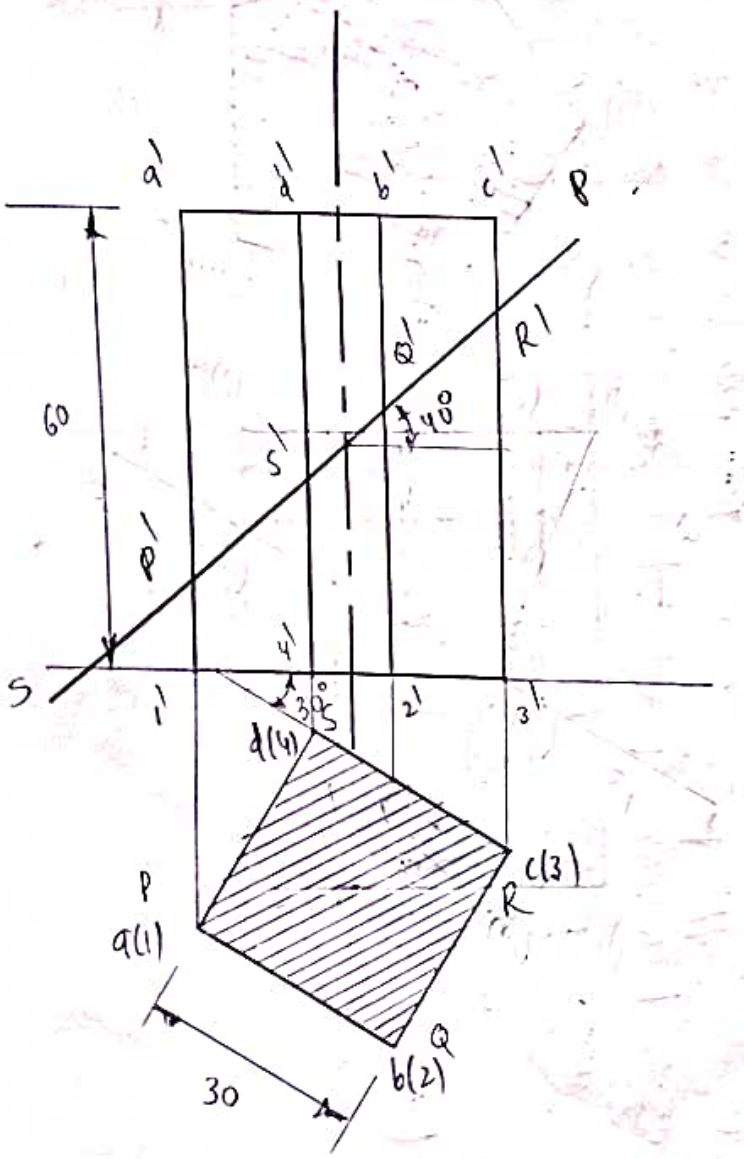
③ A square prism, base side 30mm and axis length 60mm is resting on HP on its base with a side of base inclined at 30° to VP. It is cut by a plane inclined at 40° to the HP and ⊥ to VP and bisecting the axis. Draw the development of remaining part of the prism.

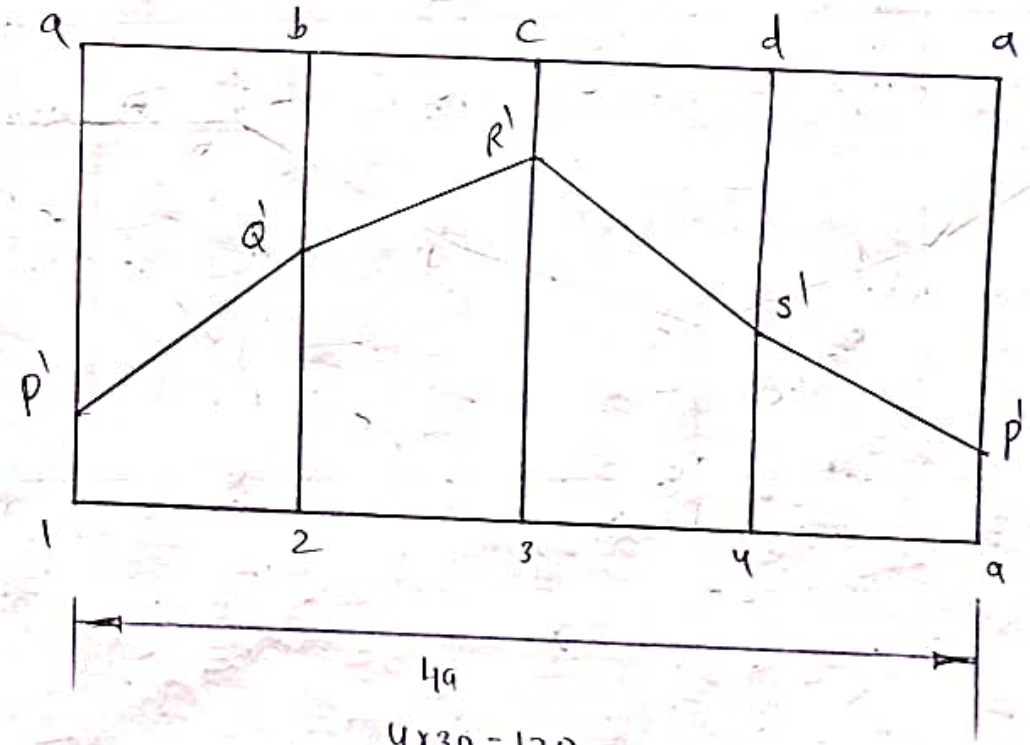
④ A pentagonal prism base 30mm side and axis 60mm long and base lying on the ground. It is cut by a horizontal section plane inclined at 30° to the HP and cutting the axis at a point 25mm above the ground. Draw the development of lateral surface.

⑤ A Hexagonal prism edge of base 20mm and axis 50mm long rest with its base on HP, such that one of its rectangular faces is parallel to VP. It is cut by a plane ⊥ to VP inclined at 45° to HP and passing through the right corner of the top face of the prism. Draw the sectional top view and develop the lateral surface of the truncated prism.

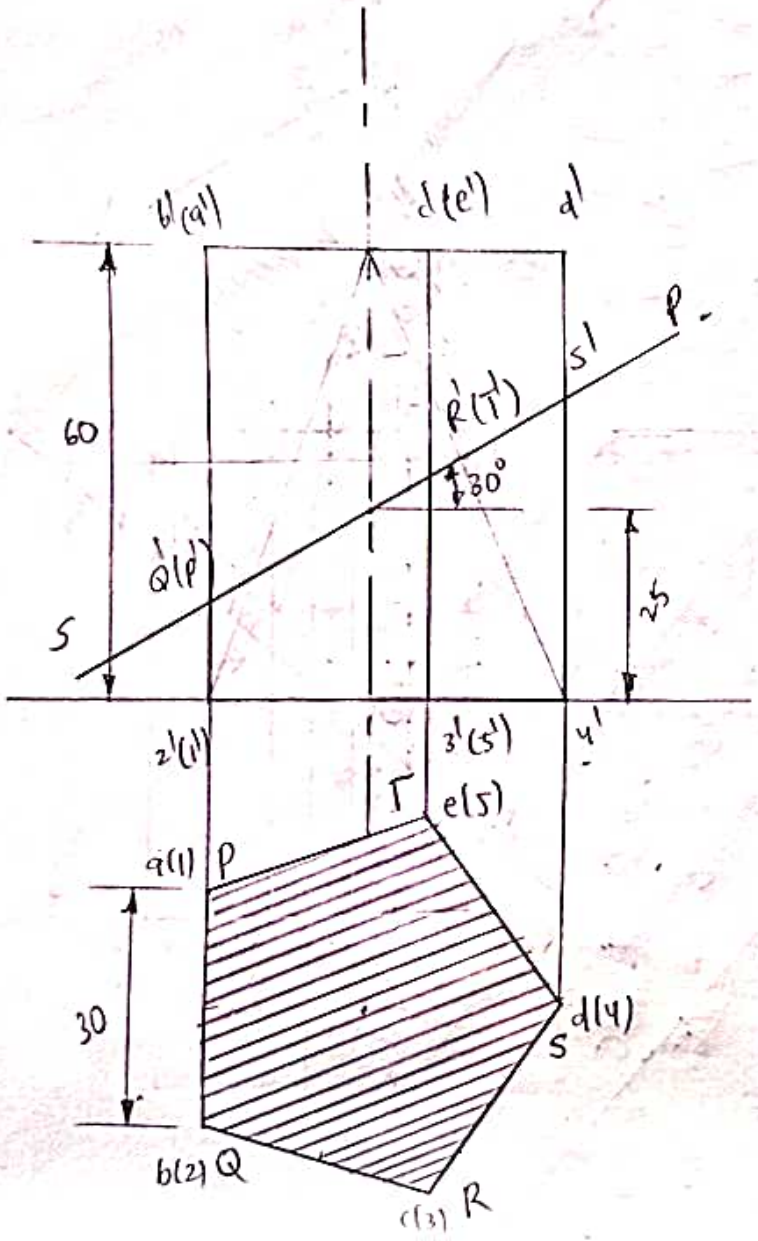

a'
b'(d')
c'
P
R'
Q'(5')
45°
65
P'
S
1'
2'(4')
3'
S.
d(4)
45°
45°
P
a(1)
c(3)
R
40
b(2)
Q

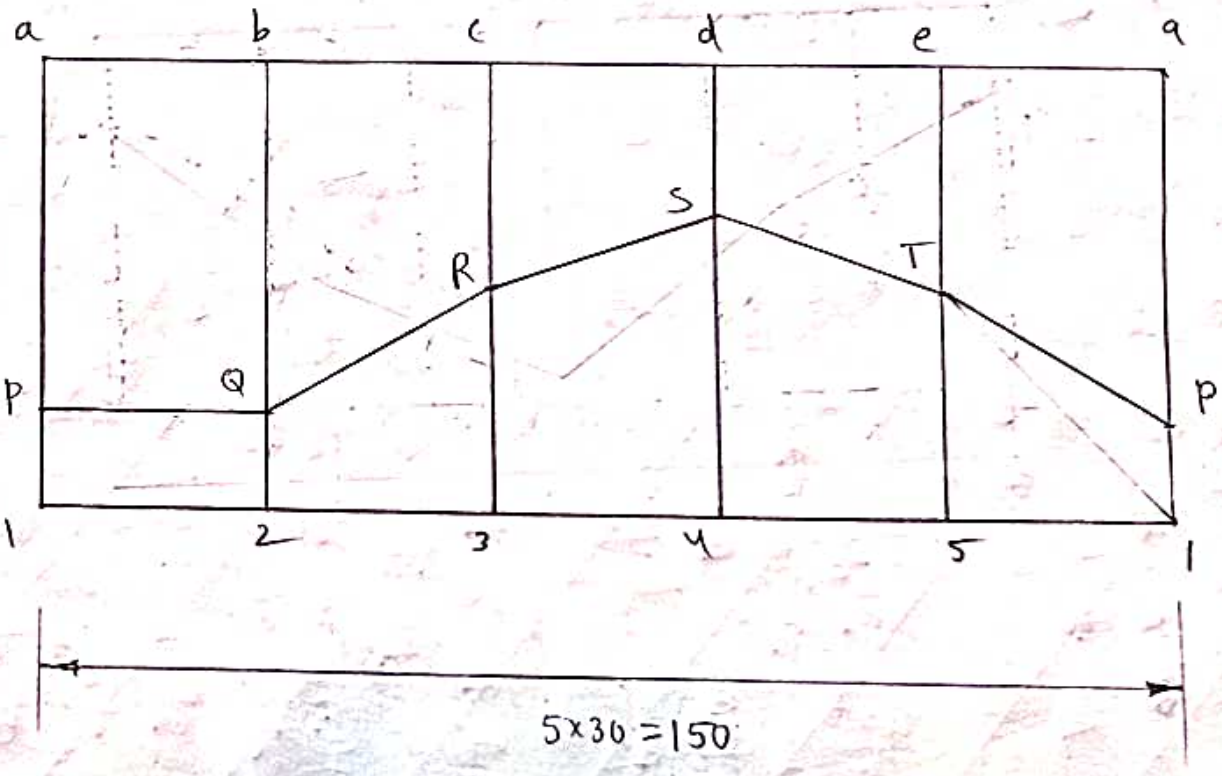

a
b
c
d
a
R'
Q'
S'
P'
1
2
3
4
1
P'
49
4x40 =160

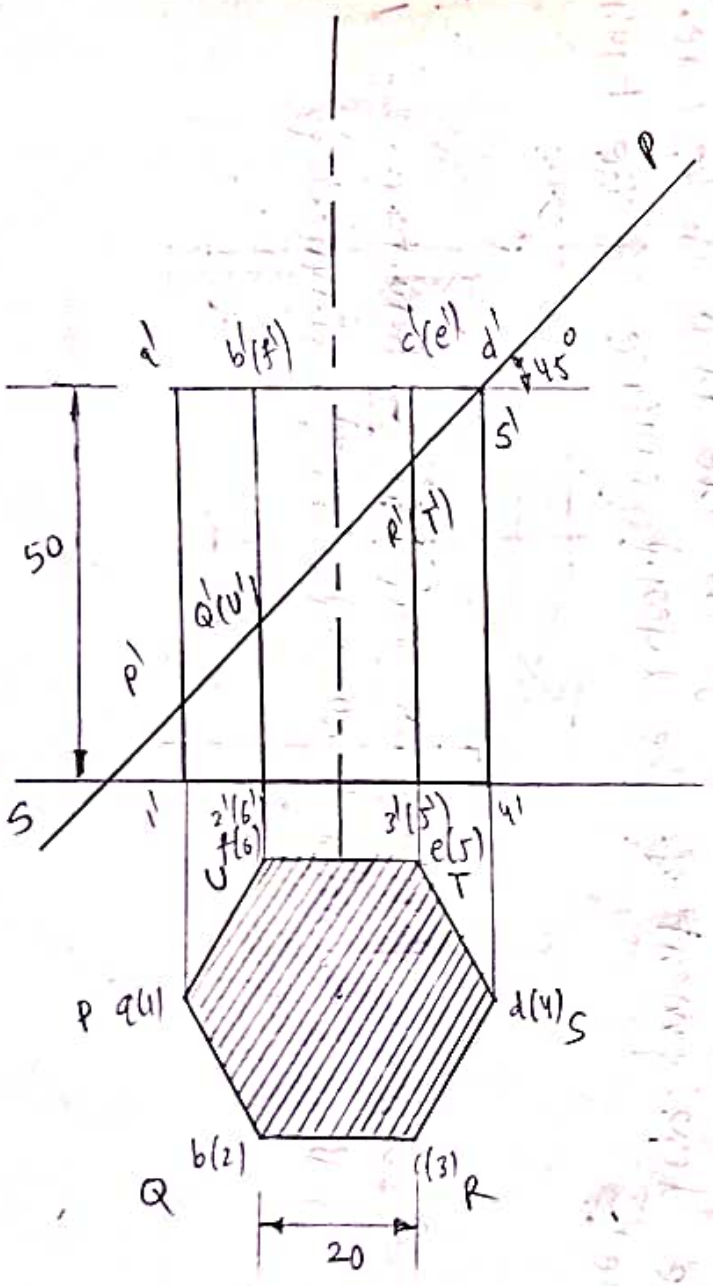


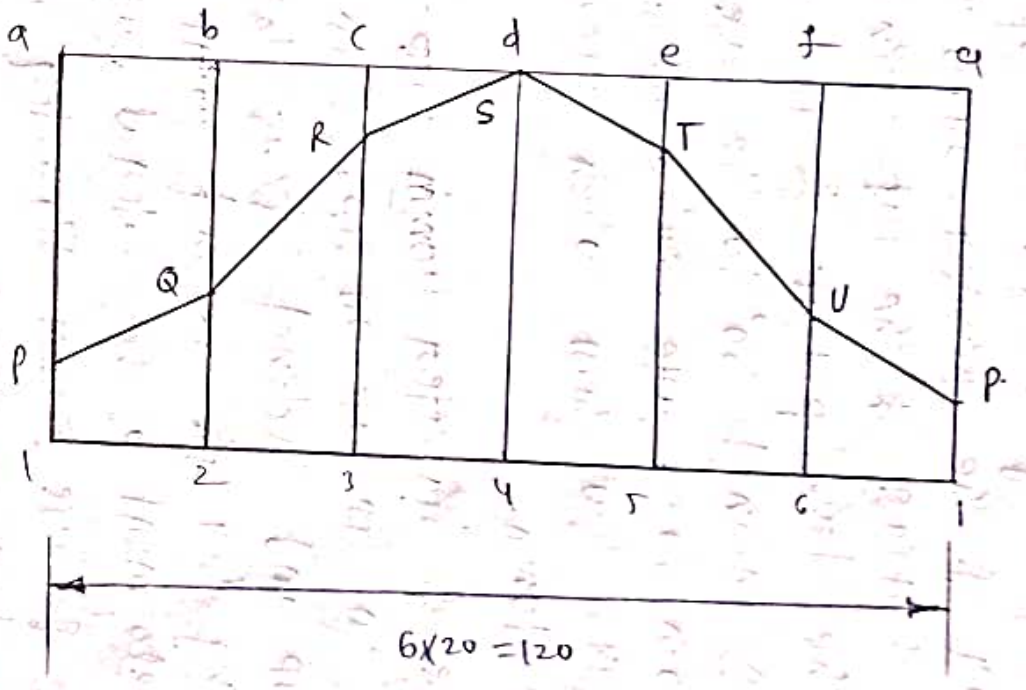


$4 \times 30 = 120$


b'(q')
d(e')
d'
s'
P
R'(T')
60
30°
Q'(P')
S
25
2'(1')
3'(5')
4'
T
e(5)
q(1)
P
30
d(4)
S
b(2)
Q
c(3)
R


a
b
c
d
e
q
S
R
T
P
Q
P
1
2
3
4
5
1
5×30 = 150


P
a'
b'(f')
c'(e')
d'
45°
50
S'
R'(T')
Q'(U')
P'
S
1'
2'(6')
3'(5')
4'
f(6)
e(5)
U
T
P q(1)
d(4) S
b(2)
c(3) R
Q
20


a
b
c
d
e
f
g
R
S
T
Q
U
P
P
1
2
3
4
5
6
1
6X20 = 120

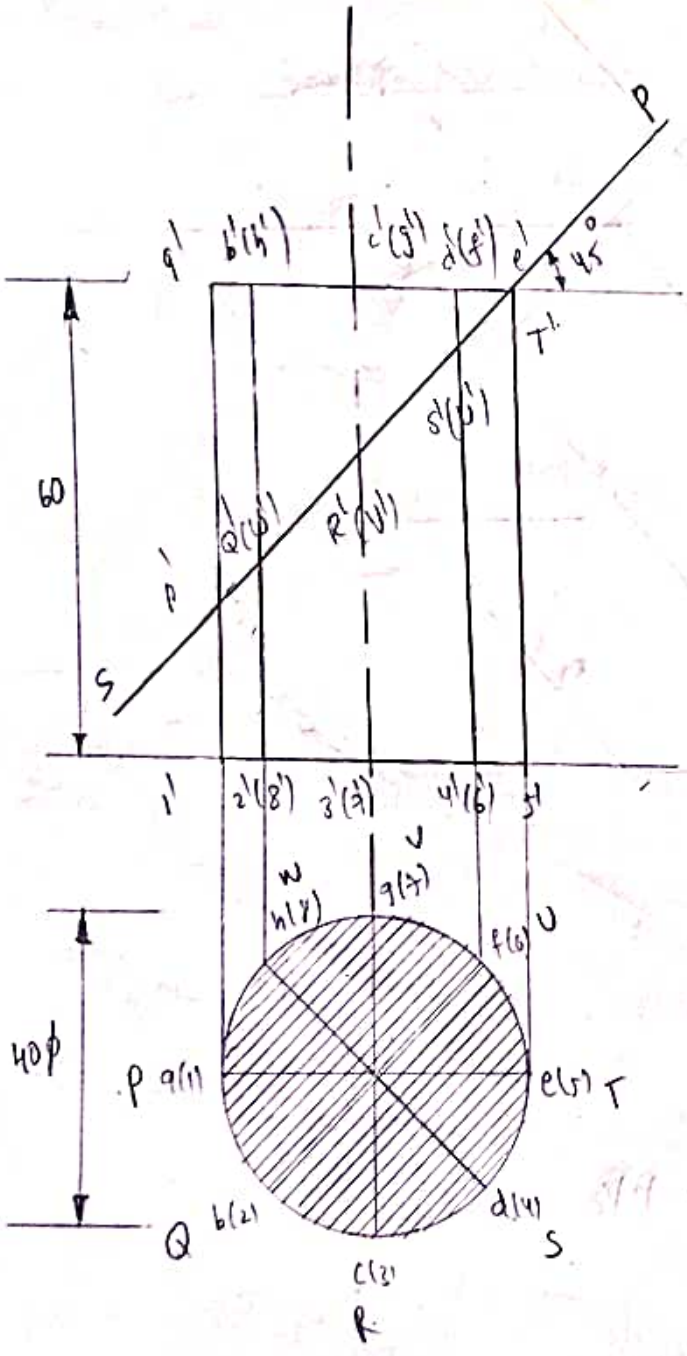
(6) A cylinder of diameter 40mm base and 60mm long is resting on its base on HP. It is cut by section plane ⊥ to VP and inclined at 45° to HP. The section plane is passing through the top end of an extreme generator of the cylinder. Draw the development of the lateral surface of the cut cylinder.

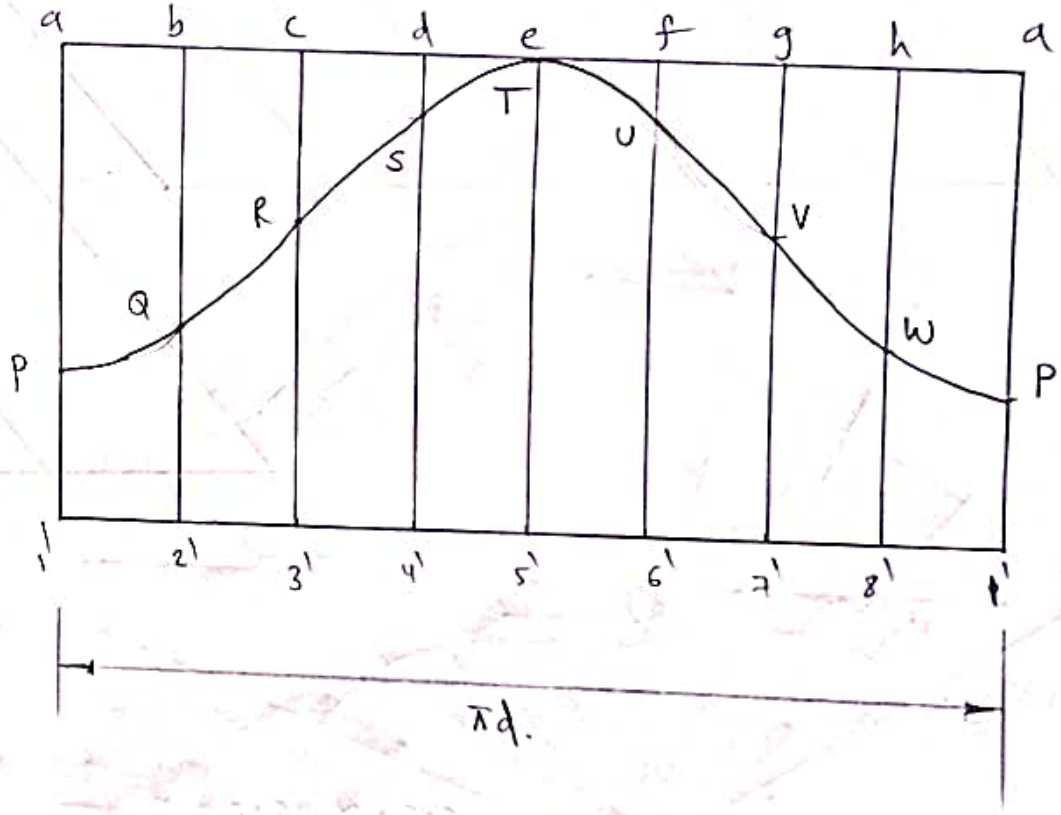
(7). Draw the development of an oblique cylinder whose axis is inclined 50° to the base. Assume that the top and bottom faces are circles of 60mm diameter and the distance b/w them when measured along the axis is 90mm.

(8). A cone of diameter 40mm base and 60mm long is resting on its base on HP. It is cut by section plane ⊥ to VP and inclined at 45° to HP. The section plane is passing through the mid point of the axis. Draw the development of the lateral surface of the cut cone.

(9) A cone of base 50mm diameter and height 65 mm is with its base on HP. A section plane ⊥ to VP and inclined at 30° to HP bysects the axis of the cone. Draw the development of the lateral surface of the truncated cone?.

→ Base ∥ parallel ಗೆ cut ಆದ್ರೆ - Frustrum
→ Base ∥ inclined ಗೆ cut ಆದ್ರೆ - Truncated



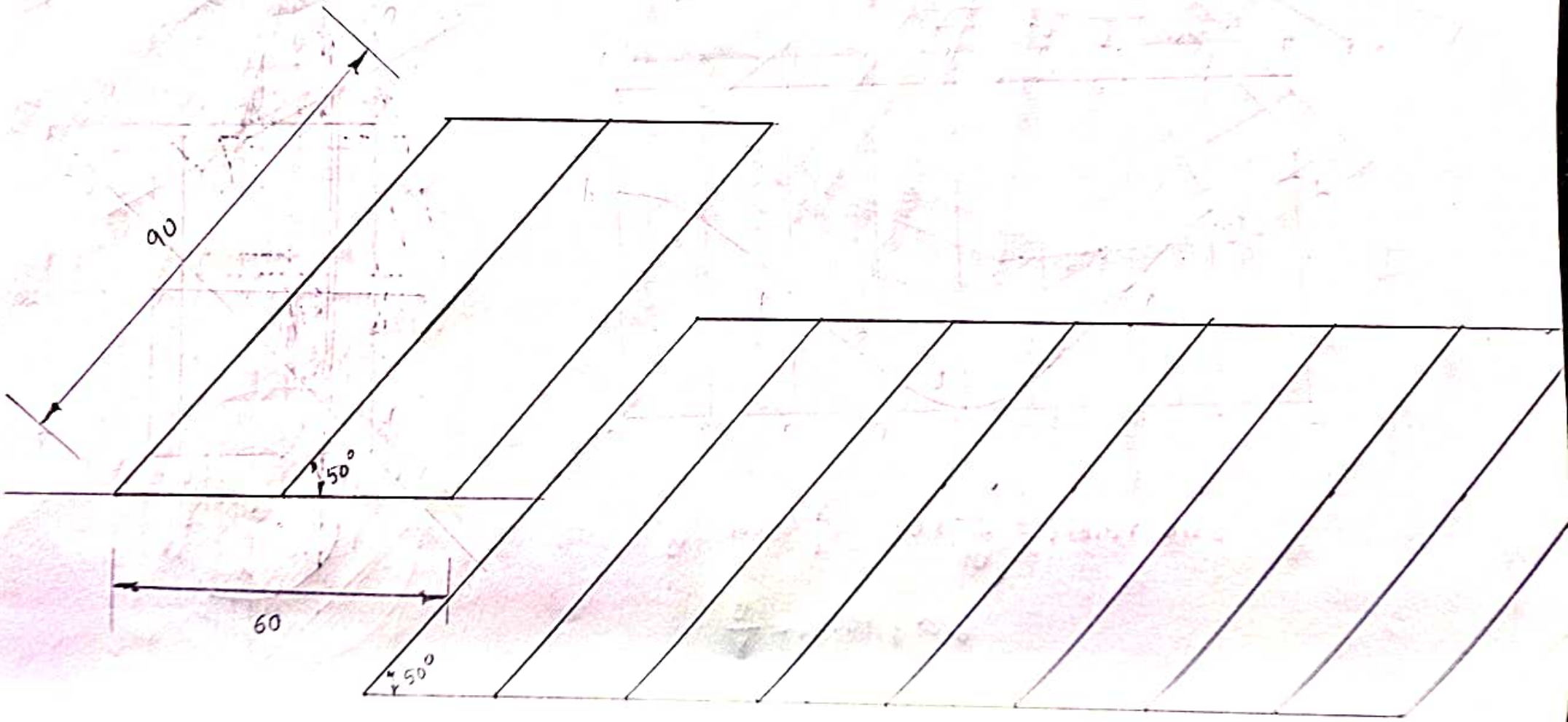


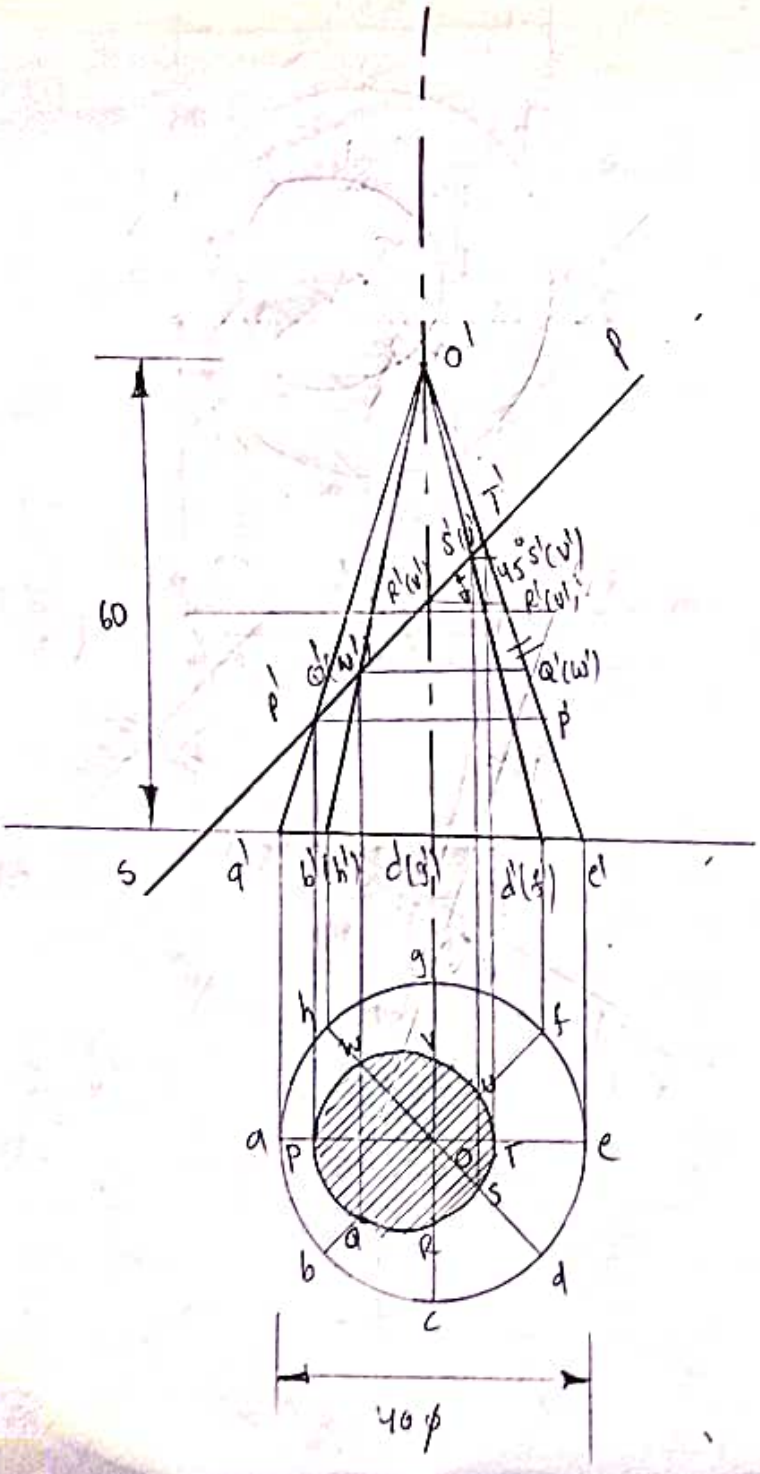
$\pi d = \pi \times 40 = 125.66$

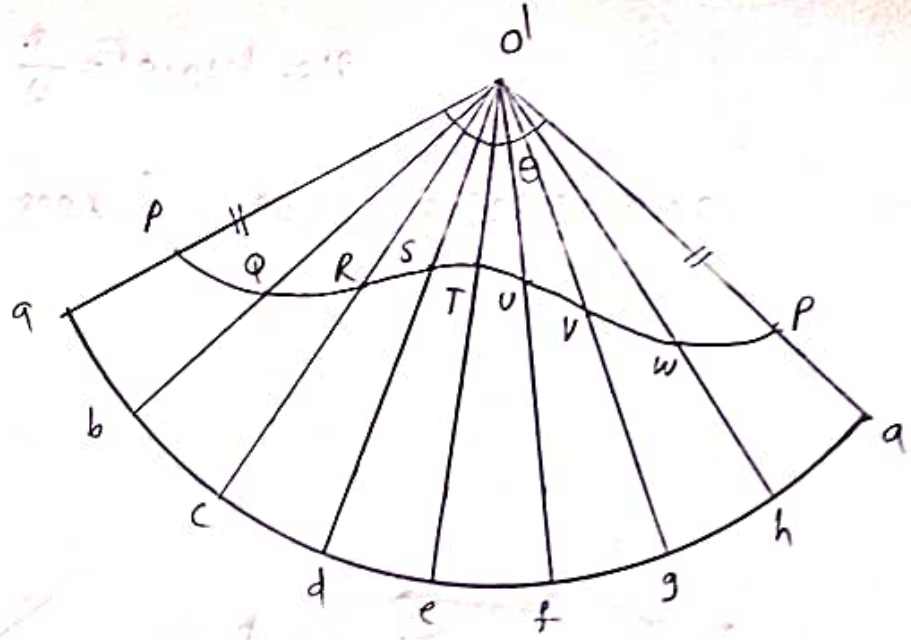
$\frac{\pi d}{8} = 15.7079 \approx 15.7$

$\pi d = \pi \times 60 = 188.495 \approx 188.5 \approx 188$

$\frac{\pi d}{8} = 23.56 \approx 23.5$



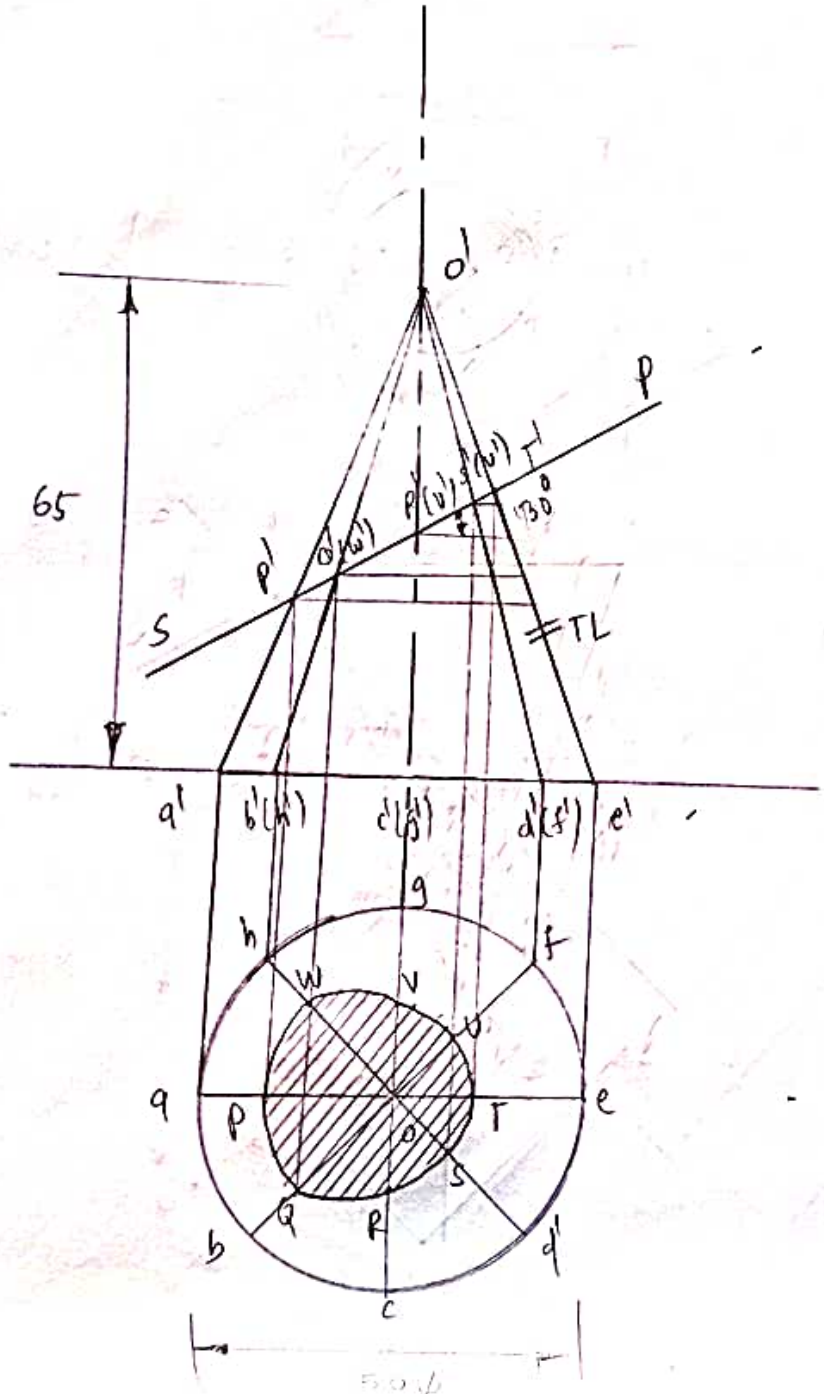


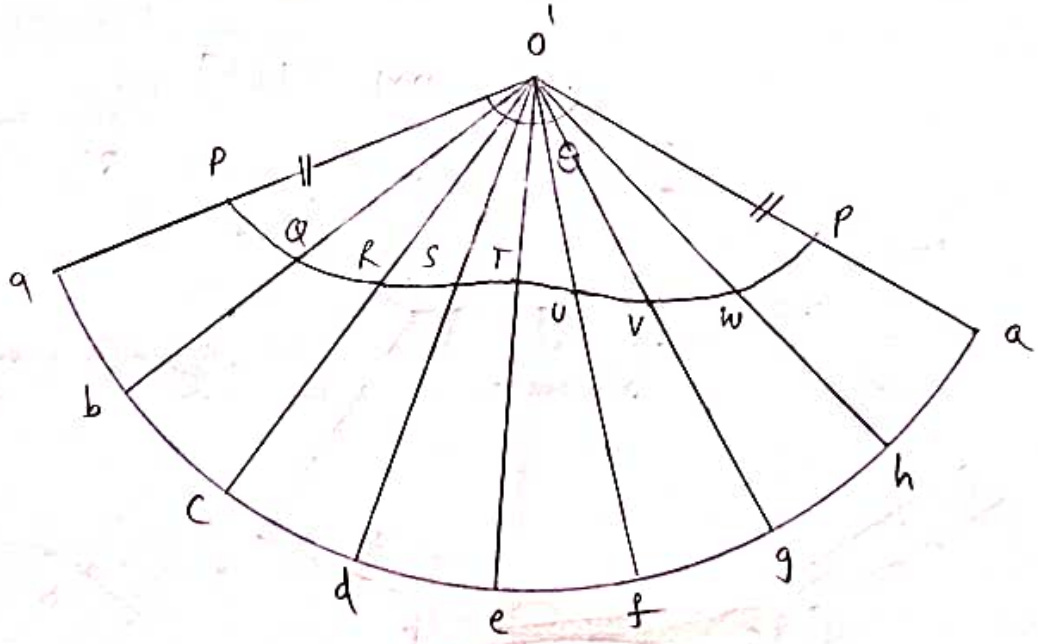


$$\theta = 360 \times \frac{r}{L} = 360 \times \frac{20}{64} = 112^\circ$$

L = TL = True length.

$$\frac{\theta}{8} = \frac{112}{8} = 14^\circ.$$





$$\theta = 360 \times \frac{r}{L} = 360 \times \frac{25}{70} = 128.57 \approx 128$$

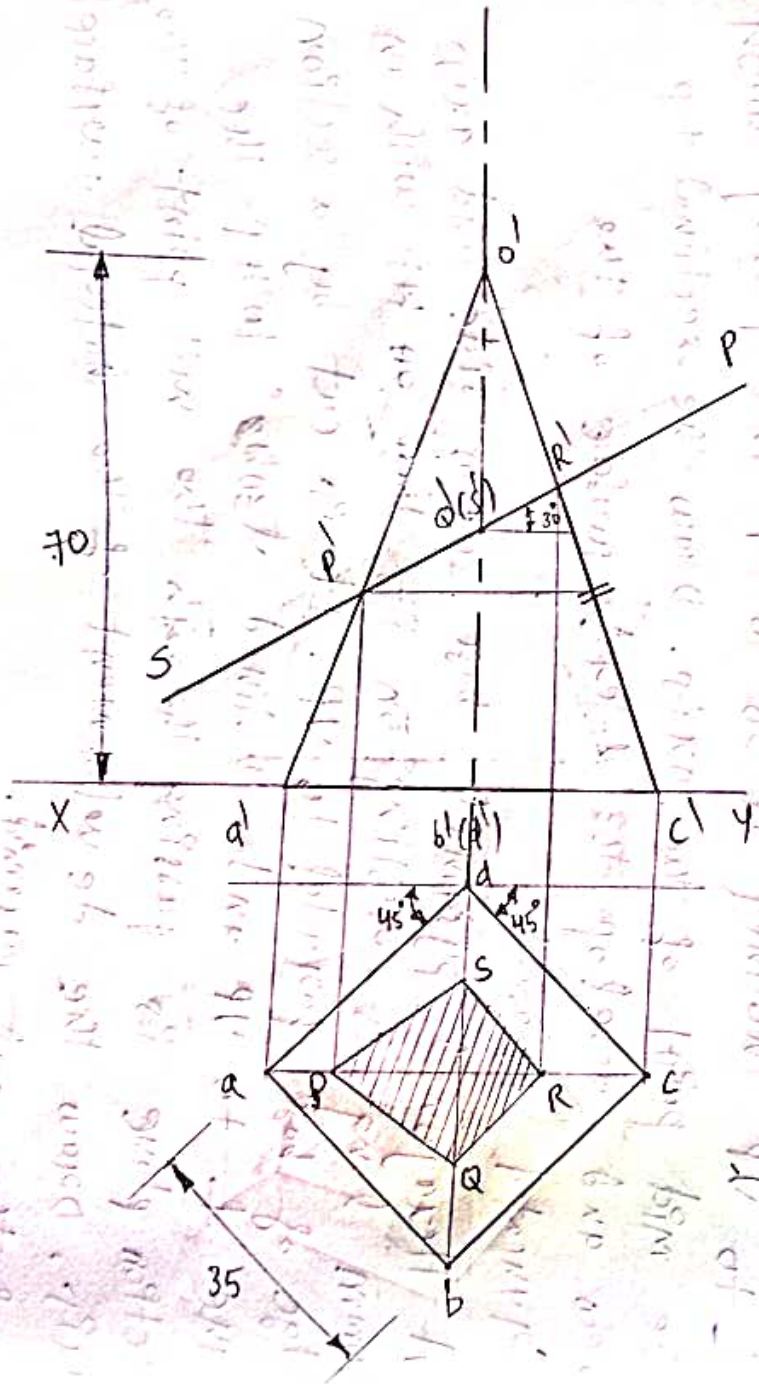
$$\frac{\theta}{8} = 16.0714 \approx 16$$

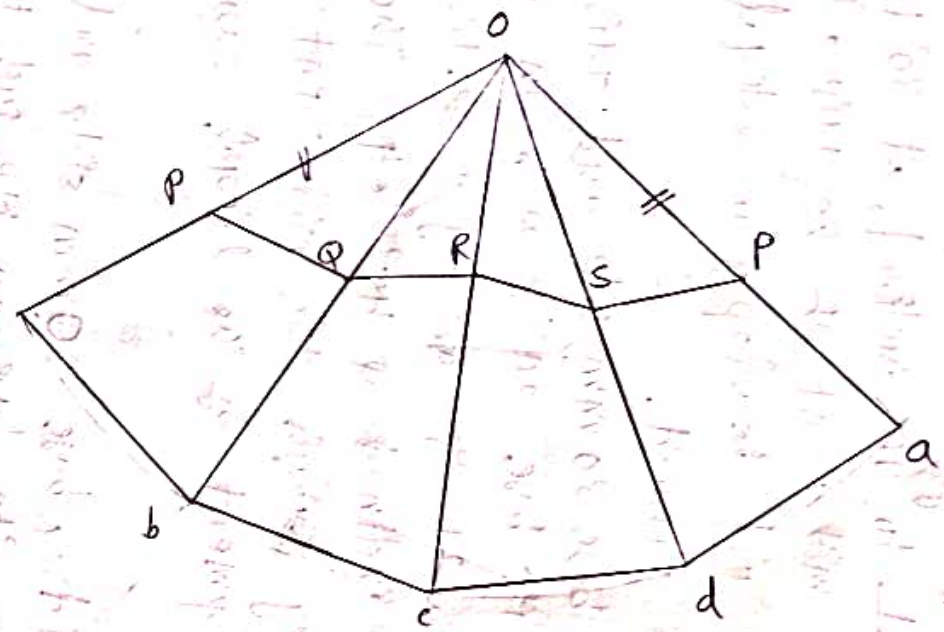
(10) A square pyramid base 35mm side, axis 40mm long rest on its base on HP such that two adjacent sides of the base are equally inclined to VP. It is sectioned by a plane ⊥ to VP inclined at 30° to HP. and passing through the mid point of the axis. Draw the sectional top view and develop the lateral surface of the truncated pyramid.

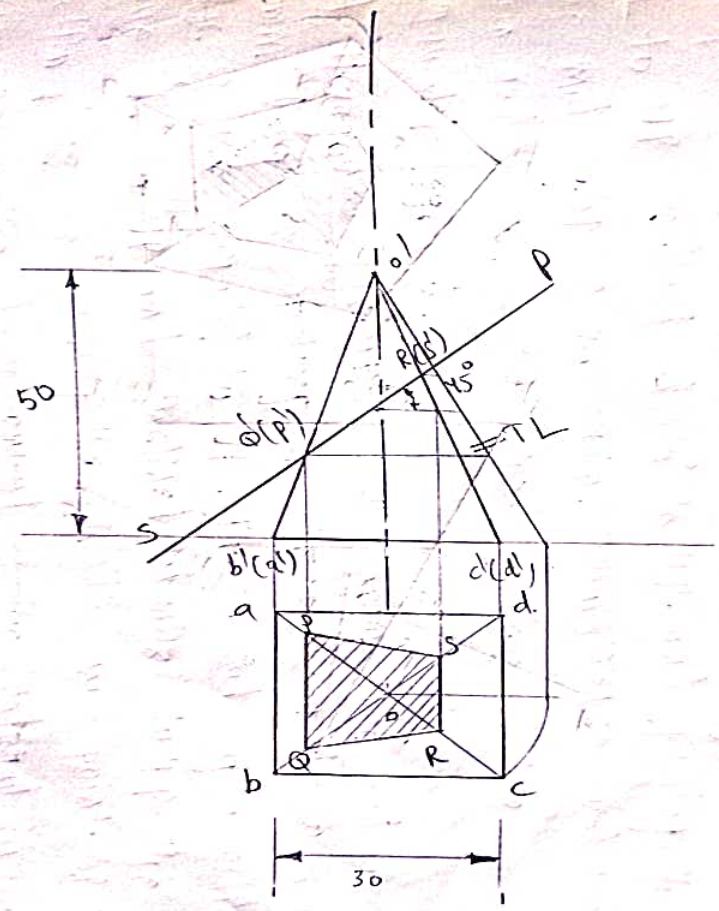
(11). A square pyramid base 30 mm side and axis 50mm long is resting on its base on HP with an edge of base parallel to VP. It is cut by a section plane ⊥ to VP and inclined at 45° to HP. The section plane is passing through the mid point of the axis. Draw the development of the lateral surface of the cut pyramid.

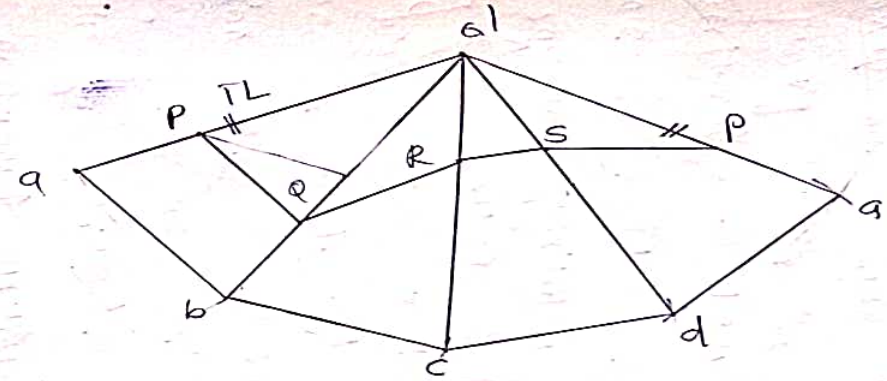
(12) A pentagonal pyramid, base 30mm side and axis 60mm long rest on its base on HP. ~~such that two adjacent sides of the base are equally~~ and perpendicular to VP. It is sectioned by a plane ⊥ to VP inclined at 30° to HP. and passing through the mid point of the axis. Draw the sectional top view and develop the lateral surface of the truncated pyramid.

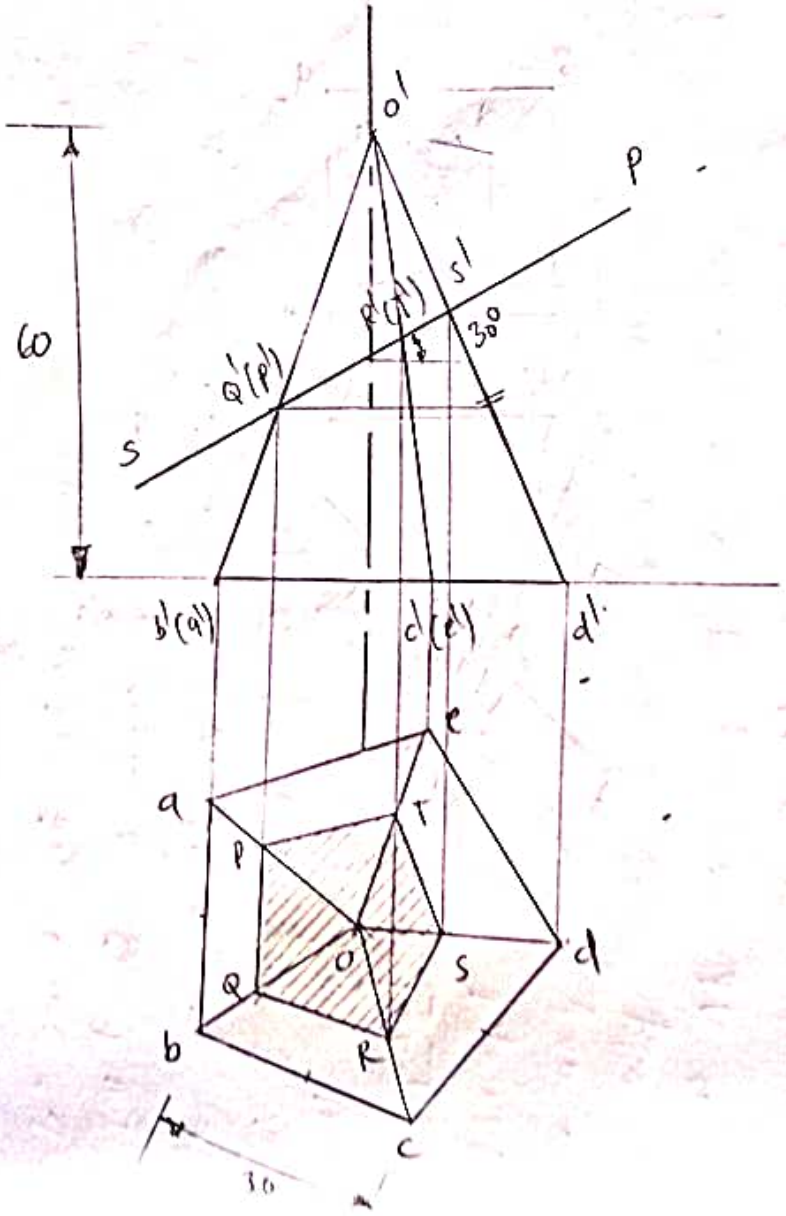
(13) A Hexagonal pyramid base 30mm side and axis 50mm long is resting on its base on HP with an edge of base parallel to VP. It is cut by a section plane ⊥ to VP and inclined at 30° to HP. The section plane is passing through the mid point of the axis. Draw the development of the lateral surface of the cut pyramid.

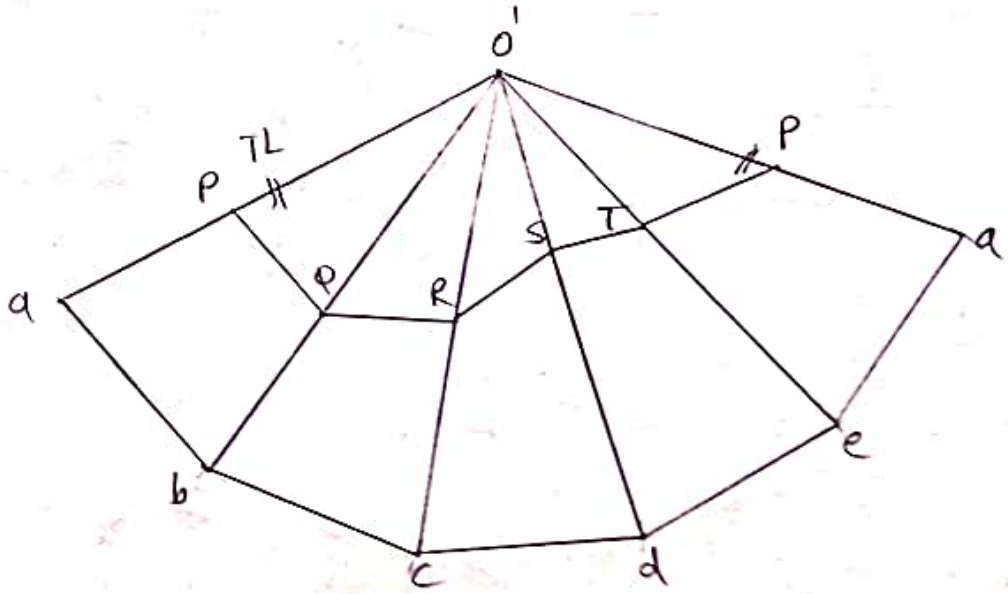

o'
P
R'
Q(S')
30°
P'
S
70
X
a'
b'(R')
c'
Y
d
45°
45°
S
a
P
R
c
Q
35
b

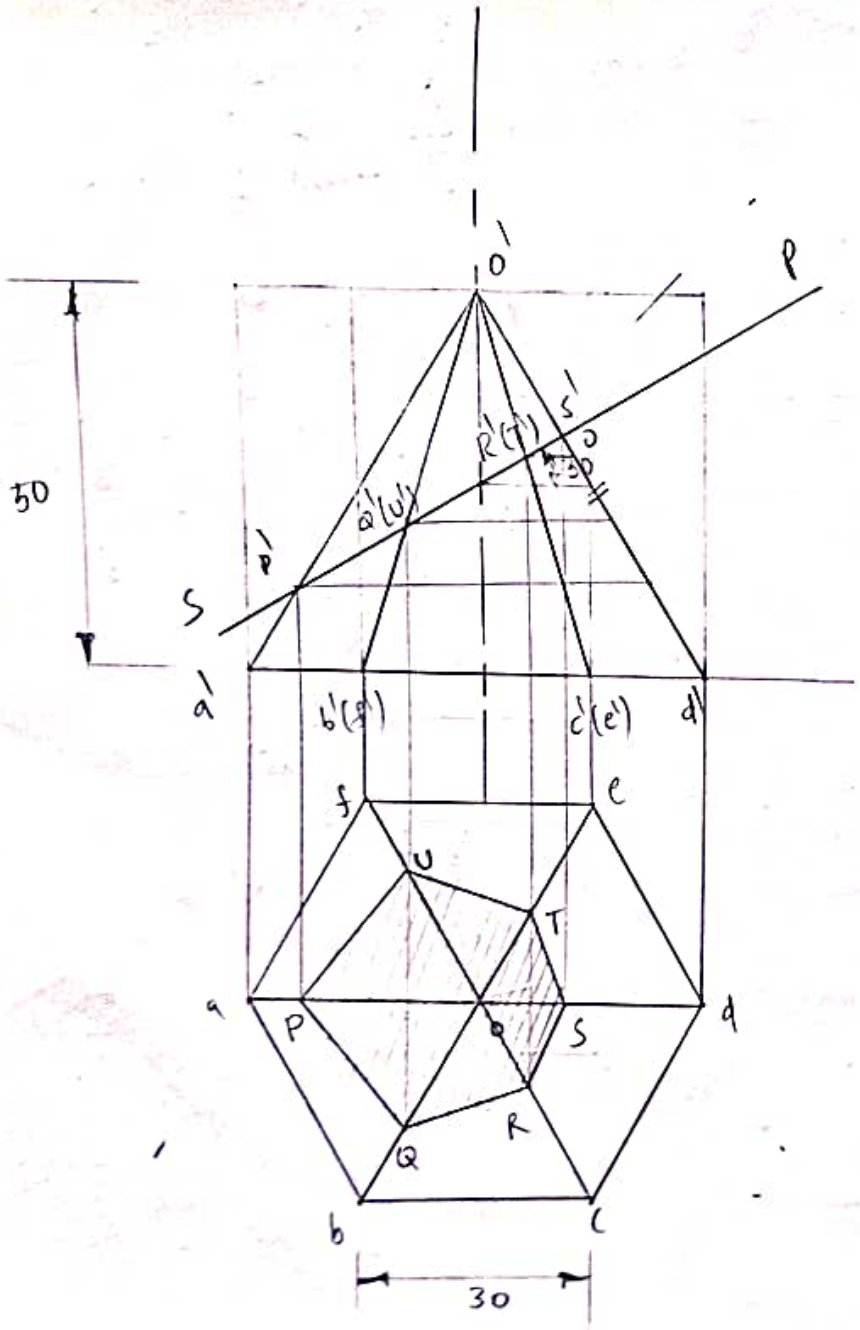

o
P
P
Q
R
S
P
a
a
b
c
d


50
o'
P
R(S')
45°
Q(P')
TL
S
b'(a')
c'(d')
a
d
P
S
o
Q
R
b
c
30


a'
P
TL
P
S
R
Q
a
a
b
c
d


o'
P
60
s'
r'(t')
30
Q'(p')
S
s'(q')
c'(e')
d'
e
a
T
P
Q
O
S
d
b
R
c
30


o'
P
TL
P
S
T
P
a
a
Q
R
e
b
c
d


o'
P
30
S
a'
b'(g')
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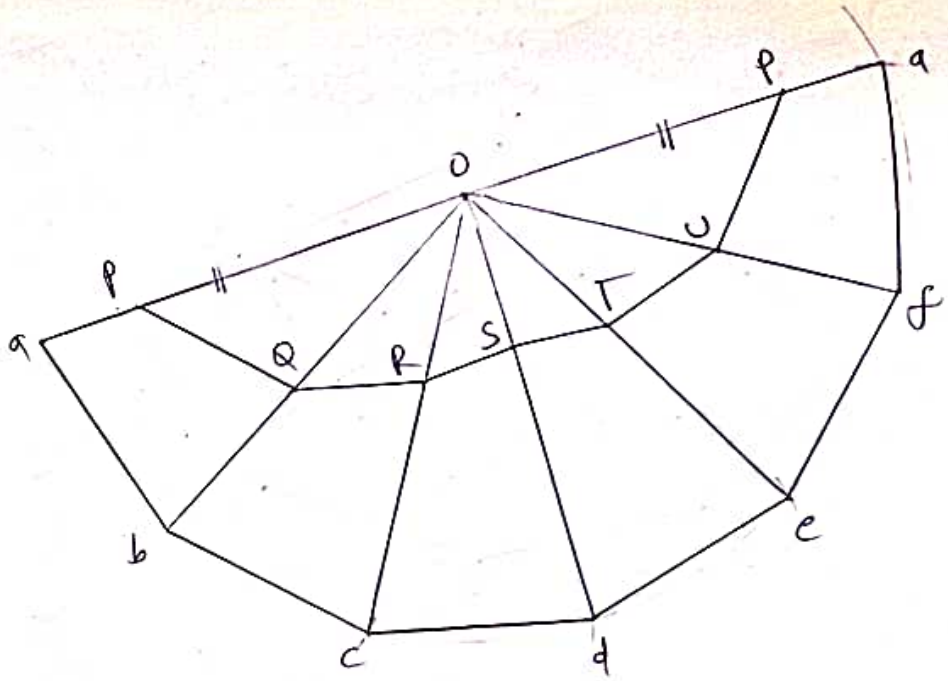
o
P
a
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