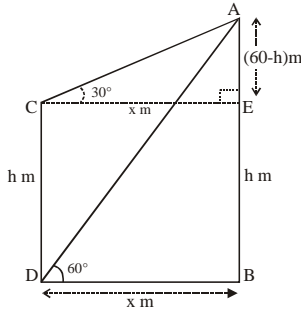


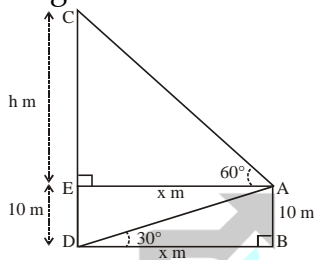
SOME APPLICATIONS OF TRIGONOMETRY

- Q.1) From the top of a building 60 m high the angles of depression of the top and the bottom of a tower are observed to be 30° and 60° . Find the height of the tower.



- (A) 20 M (B) 25
(C) 60 (D) 40 M

- Q.2) A man is standing on the deck of a ship, which is 10 m above water level. He observes the angle of elevation of the top of a hill as 60° and the angle of depression of the base of the hill as 30° . Calculate the distance of the hill from the ship and the height of the hill.



- (A) 10 M (B) 40 M
(C) 80 (D) 35 M

- Q.3) From vertically situated aeroplane to the straight horizontal road, the angle of depression of two consecutive km stones are α and β . If an aeroplane is in vertical plane in between two stones, then the height of the aeroplane from the road (in kilometres) will be

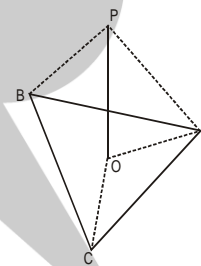
- (A) $\frac{\tan \alpha \tan \beta}{\tan \alpha + \tan \beta}$ (B) $\frac{\tan \alpha \tan \beta}{\tan \alpha - \tan \beta}$

- (C) $\frac{\tan \alpha - \tan \beta}{\tan \alpha + \tan \beta}$ (D) $\frac{\tan \alpha + \tan \beta}{\tan \alpha - \tan \beta}$

- Q.4) The angle of elevation of a cloud from a point situated at a metre height from a lake is α and the angle of depression of its reflection is β . Height of the cloud is

- (A) $\frac{a \sin(\alpha + \beta)}{\sin(\beta - \alpha)} m$ (B) $\frac{a \sin(\alpha + \beta)}{\sin(\alpha - \beta)} m$
(C) $\frac{a \sin(\beta - \alpha)}{\sin(\alpha + \beta)} m$ (D) $a \sin(\alpha + \beta)$

- Q.5) Each side of an equilateral triangle subtends an angle of 60° at the top of a tower h m high located at the centre of the triangle. If a is the length of each side of the triangle, then



- (A) $3a^2 = 2h^2$ (B) $2a^2 = 3h^2$
(C) $a^2 = 3h^2$ (D) $3a^2 = h^2$

- Q.6) A tower subtends an angle of 30° at a point on the same level as the foot of the tower. At a second point, h metre above first, the depression of the foot of the tower is 60° , the horizontal distance of the tower from the point is-

- (A) $h \cos 60^\circ$ (B) $(h/3) \cot 30^\circ$
(C) $(h/3) \cot 60^\circ$ (D) $h \cot 30^\circ$

- Q.7) The top of a hill observed from the top and

bottom of a building of height h is at angles of elevation p and q respectively.

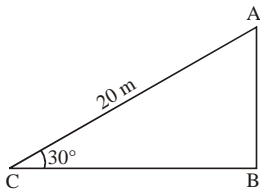
The height of the hill is-

- (A) $\frac{h \cot q}{\cot q - \cot p}$ (B) $\frac{h \cot p}{\cot p - \cot q}$
(C) $\frac{h \tan p}{\tan p - \tan q}$ (D) $h \cot p$

Q.8) If two towers of heights h_1 and h_2 subtend angles 60° and 30° respectively at the midpoint of the line joining their feet, then $h_1 : h_2 =$

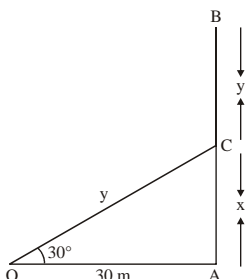
- (A) 1 : 2 (B) 1 : 3
(C) 2 : 1 (D) 3 : 1

Q.9) A circus artist is climbing a 20 m long rope, which is tightly stretched and tied from the top of a vertical pole to the ground. Find the height of the pole if the angle made by the rope with the ground level is 30° .



- (A) 15 m (B) 20 m
(C) 17.5 m (D) 10 m

Q.10) A tree is broken by the wind. The top struck the ground at an angle of 30° and at a distance of 30 metres from the root. Find the whole height of the tree.



- (A) $20\sqrt{3}$ m (B) $15\sqrt{3}$ m
(C) $30\sqrt{3}$ m (D) $\frac{30}{\sqrt{3}}$ m

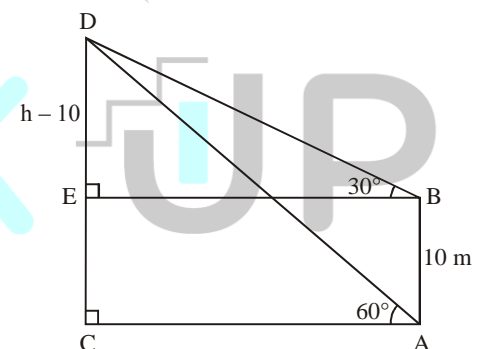
Q.11) An electric pole is 10 m high. A steel wire tied to top of the pole is affixed at a point on the ground to keep the pole upright. If the wire makes an angle of 45° with the horizontal through the foot of the pole, find the length of the wire.

- (A) 14.1 m (B) 11.1 m
(C) 16 m (D) 17.5 m

Q.12) The angle of elevation of the top of a vertical tower from a point on the ground is 60° . From another point 10 m vertically above the first, its angle of elevation is 45° . Find the height of the tower.

- (A) $5(\sqrt{3} + \sqrt{2})$ m (B) $15(\sqrt{3} + 3)$ m
(C) $10(\sqrt{3} + 3)$ m (D) $5(\sqrt{3} + 3)$ m

Q.13) The angles of elevation of the top of a tower at the top and the foot of a pole of height 10 m are 30° and 60° respectively. Find the height of the tower.



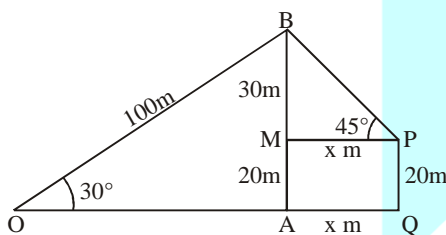
- (A) 20 m (B) 15 m
(C) 25 m (D) 10 m

Q.14) A man on the deck of a ship is 16 m above water level. He observes that the angle of

elevation of the top of a cliff is 45° and the angle of depression of the base is 30° . Find the height of the cliff.

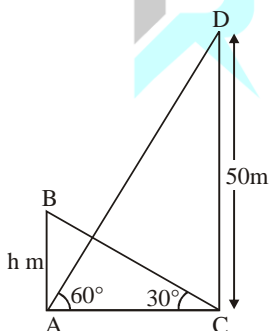
- (A) $15(\sqrt{3} + 1)$ m (B) $10(\sqrt{3} + 1)$ m
(C) $\frac{5}{2}(\sqrt{3} + 1)$ m (D) $16(\sqrt{3} + 1)$ m

- Q.15)** A boy standing on a horizontal plane find a bird flying at a distance of 100 m from him at an elevation of 30° . A girl standing on the roof of 20 metre high building finds the angle of elevation of the same bird to be 45° . Both the boy and the girl are on opposite side of the bird. Find the distance of bird from the girl.



- (A) $20\sqrt{2}$ m (B) $30\sqrt{2}$ m
(C) $40\sqrt{2}$ m (D) $10\sqrt{2}$ m

- Q.16)** The angle of elevation of the top of a building from the foot of the tower is 30° and the angle of elevation of the top of the tower from the foot of the building is 60° . If the tower is 50 m high, find the height of the building.



- (A) $10\frac{2}{3}$ m (B) $50\sqrt{3}$ m
(C) 20 m (D) $16\frac{2}{3}$ m

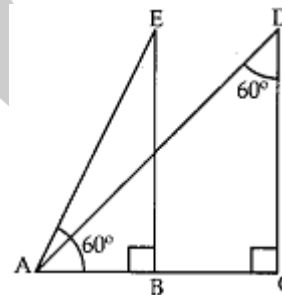
- Q.17)** A man of the top of a vertical tower observes a car moving at a uniform speed coming directly towards it. If it takes 12 minutes for the angle of depression to change from 30° to 45° , how soon after this, will the car reach the tower?

- (A) 16 minutes 23 seconds
(B) 15 minutes 20 seconds
(C) 10 minutes 23 seconds
(D) 20 minutes 15 seconds

- Q.18)** The angle of elevation of a jet plane from a point A on the ground is 60° . After a flight of 30 second, the angle of elevation changes to 30° . If the jet plane is flying at a constant height of m, find the speed of the jet plane.

- (A) 800 km/h (B) 864 km/h
(C) 664 km/h (D) 846 km/h

- Q.19)** In given Fig., the angle of depression from the observing position D and E of the object at A are



- (A) $60^\circ, 60^\circ$ (B) $30^\circ, 30^\circ$
(C) $30^\circ, 60^\circ$ (D) $60^\circ, 30^\circ$

- Q.20)** When the length of shadow of a vertical pole is equal to $\sqrt{3}$ times of its height, the angle of elevation of the Sun's altitude is

- (A) 30° (B) 45°
(C) 60° (D) 15°

- Q.21)** A plane is observed to be approaching the airport. It is at a distance of 12 km from the point of observation and makes an angle of elevation of 60° .

- The height above the ground of the plane is
 (A) $6\sqrt{3}$ M (B) $4\sqrt{3}$ M
 (C) $3\sqrt{3}$ M (D) $2\sqrt{3}$ M
- Q.22)** The angle of depression of a car, standing on the ground, from the top of a 75 m high tower, is 30° . The distance of the car from the base of the tower (in m) is:
 (A) $25\sqrt{3}$ (B) $50\sqrt{3}$
 (C) $75\sqrt{3}$ (D) 150
- Q.23)** A ladder 15 m long just reaches the top of a vertical wall. If the ladder makes an angle of 60° with the wall, then the height of the wall is
 (A) $15\sqrt{3}$ m (B) $\frac{15\sqrt{3}}{2}$ m
 (C) $\frac{15}{2}$ m (D) 15 m
- Q.24)** If two towers of heights h_1 and h_2 subtend angles of 60° and 30° respectively at the mid-point of the line joining their feet, then $h_1 : h_2 =$
 (A) 1 : 2 (B) 1 : 3
 (C) 2 : 1 (D) 3 : 1
- Q.25)** A spherical balloon of radius 3cm subtends an angle of 60° at the eye of the observer. If the angle of elevation of its centre is 45° , then the height of the centre of the balloon is ____
 (A) $6\sqrt{2}$ cm (B) $3\sqrt{2}$ cm
 (C) 9cm (D) 3cm
- Q.26)** The angle of elevation of a jet plane from a point Q on the ground is 60° . After a flight of 20 seconds, the angle of elevation changes to 45° . If the Jet plane is flying at a constant height of $3000\sqrt{3}$ m, then find the speed of the jet plane.
 (A) 295.18 km/hr (B) 395.28 km/hr
 (C) 255.20 km/hr (D) 345.38 km/hr
- Q.27)** The angle of elevation of a cliff from a fixed point is 45° . On up a distance of 300 m towards the top of the cliff at an angle of 30° , it is that the angle of elevation is 60° . The height of the cliff is _____
 (A) 93.42 m (B) 97.12 m
 (C) 102.18 m (D) 112.39 m
- Q.28)** A ladder rests against a wall at an angle θ to the horizontal. Its foot is away from the wall through a distance 'm?', so that it slides a distance 'n' down the wall making an angle ϕ with the horizontal then n/m is equal to _____
 (A) $\frac{\cos \theta - \cos \phi}{\sin \phi - \sin \theta}$ (B) $\frac{\sin \phi - \sin \theta}{\cos \theta - \cos \phi}$
 (C) $\frac{\cos \theta + \cos \phi}{\sin \phi + \sin \theta}$ (D) $\frac{\sin \phi + \sin \theta}{\cos \theta + \cos \phi}$
- Q.29)** The lower window of a house is at a height of 3 m above the ground and its upper window is 5m vertically above the lower window. At certain instant it is found that the angles of elevation of a balloon from these windows are 60° and 30° respectively. Find the height of the balloon above the ground.
 (A) 8.5 m (B) 10.5 m
 (C) 7.5 m (D) 8 m
- Q.30)** The angle of elevation of the top of a tower from a point A due south of the tower is and from a point B due east of the tower is 45° . If $AB = 160$ metre then the height of the tower is _____
 (A) $\frac{160}{\sqrt{3}}$ m (B) $75\sqrt{3}$ m
 (C) $80\sqrt{3}$ m (D) 80 m

Answer Sheet

Q.1	D	Q.11	A	Q.21	A
Q.2	B	Q.12	D	Q.22	C
Q.3	A	Q.13	B	Q.23	B
Q.4	A	Q.14	D	Q.24	D
Q.5	B	Q.15	B	Q.25	B
Q.6	B	Q.16	D	Q.26	B
Q.7	B	Q.17	A	Q.27	B
Q.8	D	Q.18	B	Q.28	B
Q.9	D	Q.19	C	Q.29	B
Q.10	C	Q.20	A	Q.30	D