M. Marks: 30

1. For what value of p are 2p + 1, 13, 5p – 3 are three consecutive terms of an A.P.? (1 marks)
2. If the sum of first p term of an A.P. is $ap^2 + bp$, find its common difference. (1 marks)
3. Write the nth term of the A.P. $\dfrac{1}{m}, \dfrac{1+m}{m}, \dfrac{1+2m}{m}, ...$ (1 marks)
4. The height of a tower is 10 m. what is the length of its shadow when Sun's altitude is 45°? (1 marks)
5. If the ratio of the height of a tower and the length of its shadow is $\sqrt{3}:1$, what is the angle of elevation of the Sun? (1 marks)
6. Find the sum of n terms of the series $\left(4 - \dfrac{1}{n}\right) + \left(4 - \dfrac{2}{n}\right) + \left(4 - \dfrac{3}{n}\right) + ...$ (2 marks)
7. Find the sum of all even integers between 101 and 999. (2 marks)
8. Which term of the A.P. 3, 10, 17, ….. will be 84 more than its 13th term? (2 marks)
9. On a horizontal plane there is a vertical tower with a flag pole on the top of the tower. At a point 9 metres away from the foot of the tower the angle of elevation of the top and bottom of the flag pole are 60° and 30° respectively. Find the height of the tower and the flag pole mounted on it. (2 marks)
10. A tree breaks due to storm and the broken part bends so that the top of the tree touches the ground making an angle of 30° with the ground. The distance between the foot of the tree to the point where the top touches the ground is 8 m Find the height of the tree. (2 marks)
11. The digits of a positive integer, having three digits are in A.P. and their sum is 15. The number obtained by reversing the digits is 594 less than the original number. Find the number. (3 marks)
12. As observed from the top of a light house, 100 m above sea level, the angle of depression of a ship, sailing directly towards, it, changes from 30° to 45°. Determine the distance travelled by the ship during the period of observation. (3 marks)
13. The angle of elevation of a jet plane from a point A on the ground is 60°. After a flight of 20 seconds, the angle of elevation changes to 30°. If the jet plane is flying at a constant height of $3600\sqrt{3}\,m$, find the speed of the jet plane. (3 marks)
14. 150 workers were engaged to finish a piece of work in a certain number of days. Four workers dropped the second day, four more workers dropped the third day and so on. It takes 8 more days to finish the work now. Find the number of days in which the work was completed. (4 marks)
15. The angle of elevation of the top of a tower from a point A due south of the tower is α and from, N die east of the tower is β. If AB = d, show that the height of the tower is $\dfrac{d}{\sqrt{\cot^2\alpha + \cot^2\beta}}$ (4 marks)