

2SM

SECOND MID TERM TEST - 2019

10 - STD

MATHEMATICS

Marks : 50

Time : 1.30 Hrs.

PART - A

7 X 1 = 7

Answer to all the questions.

1. The nature of roots of the quadratic equation $x^2 - 11x - 10 = 0$ is
 a) Real and unequal b) Real and equal c) Not real d) None of the above
2. Which of the following can be calculated from the given matrices.

$$A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{pmatrix}, \quad B = \begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{pmatrix}$$

i) A^2 ii) B^2 iii) AB iv) BA

- a) i and ii only b) ii and iii only c) ii and iv only d) all of these
3. A tangent is perpendicular to the radius at the
 a) centre b) point of contact c) infinity d) chord

4. If the ratio of the height of a tower and the length of its shadow is $\sqrt{3}:1$, then the angle of elevation of the sun is
 a) 45° b) 30° c) 60° d) 75°

5. The angle of elevation of a cloud from a point h metres above a lake is β . The angle of depression of the reflection in the lake is 45° . The height of location of the cloud from the lake is

a) $\frac{h(1 + \tan \beta)}{1 - \tan \beta}$ b) $\frac{h(1 - \tan \beta)}{1 + \tan \beta}$ c) $h \tan(45^\circ - \beta)$ d) none of these

6. The base area of a right circular cylinder is 80cm^2 and its height is 5cm , then the volume of right circular cylinder is

a) 400cm^3 b) 16cm^3 c) 200cm^3 d) $\frac{400}{3}\text{cm}^3$

7. The Total surface area of a solid hemisphere is $12\pi\text{cm}^2$, then its curved surface area is

a) $6\pi\text{cm}^2$ b) $24\pi\text{cm}^2$ c) $36\pi\text{cm}^2$ d) $8\pi\text{cm}^2$

PART - B

Answer to any five of the following question.

5 X 2 = 10

Question number 14 is compulsory.

8. Determine the nature of the roots of the quadratic equation $\sqrt{2}t^2 - 3t + 3\sqrt{2} = 0$.
9. If A is of order $p \times q$ and B is of order $q \times r$ what is the order of AB and BA?
10. The length of the tangent to a circle from a point P, Which is 25cm away from the centre is 24cm . What is the radius of the circle?

11. Find the angle of elevation of the top of a tower from a point on the ground, which is 30m away from the foot of a tower of height $10\sqrt{3}$ m.
12. A player sitting on the top of a tower of height 20m observes the angle of depression of a ball lying on the ground as 60° . Find the distance between the foot of the tower and the ball.
13. If the total surface area of a cone of radius 7cm is 704cm^2 , then find its slant height?
14. If the ratio of radii of two spheres is 4 : 7, find the ratio of their volumes.

PART - C

Answer to any five questions from the following questions.

Question number 21 is compulsory.

5 X 5 = 25

15. If α and β are the roots of the polynomial $f(x) = x^2 - 2x + 3$, Find the polynomial whose roots are $\frac{\alpha-1}{\alpha+1}$ and $\frac{\beta-1}{\beta+1}$.
16. If $A = \begin{pmatrix} 5 & 2 & 9 \\ 1 & 2 & 8 \end{pmatrix}$, $B = \begin{pmatrix} 1 & 7 \\ 1 & 2 \\ 5 & -1 \end{pmatrix}$ verify that $(AB)^T = B^T A^T$.
17. State and prove Pythagoras theorem.
18. From a point on a bridge across a river the angles of depression of the banks on opposite sides at the river are 30° and 45° , respectively. If the bridge is at a height at 3m from the bank find the width at the river.
19. The horizontal distance between two buildings is 140m. The angle of depression of the top of the first building as seen from the top of the second building is 30° . If the height of the first building is 60m, find the height of the second building. ($\sqrt{3} = 1.732$).
20. The volume of a cone is $1005 \frac{5}{7}$ cu.cm. The area of its base is $201 \frac{1}{7}$ sq.cm. Find the slant height of the cone.
21. A right circular cylindrical container of base radius 6cm and height 15cm is full of ice-cream. The ice-cream is to be filled in cones of height 9cm and base radius 3cm, having a hemi-spherical cap. Find the number of cones needed to empty the container.

PART - D

Answer to the following questions.

1 X 8 = 8

22. a) Draw a circle of radius 4cm. At a point L on its draw a tangent to the circle using the alternate segment. (OR)
- b) Draw in 5cm away from the centre of a circle of diameter 6cm. Also measure the length of the tangents.