Sahaj Adhyayan (सहज अध्ययन)

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तर ते आम्हाला **WhatsApp** वर पाठवा,

इतर विद्यार्थी मित्रांना त्या सर्वांचा उपयोग होईल.

BVK / XIX-XX / A

FIRST SEMESTER EXAMINATION

Time : 2.30 Hrs.]   Class : 11th [Marks : 50

Subject : **Mathematics and Statistics**

Note : (1) All questions are compulsory.

(2) The question paper consists of 22 questions divided into four sections A, B, C and D.

(3) Section-A contains 6 multiple choice questions of 1 marks each.

(4) Section-B contain 8 questions of 2 mark each.

(5) Section-C contain 4 questions of 3 marks each. (one of them will have internal option)

(5) Section-D contain 4 questions of 4 marks each. (Two of them will have internal option)

(6) Use of calculator is not allowed.

Section – A   (6 Marks)

Q.1. A pendulum of 14 cms long oscillates through an angle of 12°, then the angle of the path described by its extrimities is ....

(a) $\dfrac{13\pi}{14}$ (b) $\dfrac{14\pi}{13}$ (c) $\dfrac{15\pi}{14}$ (d) $\dfrac{14\pi}{15}$

Q.2. If $\operatorname{cosec}\theta + \cot\theta = \dfrac{5}{2}$ then the value of $\tan\theta$ is ....

(a) $\dfrac{14}{25}$ (b) $\dfrac{20}{21}$ (c) $\dfrac{21}{20}$ (d) $\dfrac{15}{16}$

Q.3. Distance between the two parallel lines $y = 2x + 7$ and $y = 2x + 5$ is ....

(a) $\dfrac{\sqrt{2}}{\sqrt{5}}$ (b) $\dfrac{1}{\sqrt{5}}$ (c) $\dfrac{\sqrt{5}}{2}$ (d) $\dfrac{2}{\sqrt{5}}$

Q.4. If $z = x + iy$ and $|z - zi| = 1$ then ....

(a) z lies on x axis   (b) z lies on y-axis

(c) z lies on a circle   (d) z lies on a rectangle

Q.5. Which term of the geometric progression 1, 2, 4, 8 .... is 2048.

    (a) 10th (b) 11th (c) 12th (d) 13th

Q.6. The relation " > " is the set of N (Natural numbers) is ....

    (a) Symmetric   (b) Reflexive

    (c) Transitive   (d) Equivalence relation

Section – B   B B (16 Marks)

Q.7. A train is running on a circular track of radius 1 km at the rate of 36 km per hour. Find the angle to the nearest minute, through which it will turn in 30 seconds.

Q.8. If $\tan q = \dfrac{1}{\sqrt{7}}$ then evaluate :

$$\frac{\csc^2\theta - \sec^2\theta}{\csc^2\theta + \sec^2\theta}$$

Q.9. Prove that : $\sin\dfrac{\pi}{15} + \sin\dfrac{4\pi}{15} - \sin\dfrac{14\pi}{15} - \sin\dfrac{11\pi}{15} = 0$

Q.10. Find the value of x if : $\begin{vmatrix} x & -1 & 2 \\ 2x & 1 & -3 \\ 3 & -4 & 5 \end{vmatrix} = 29$

Q.11. Find the sum of n terms $0.3 + 0.33 + 0.333 + \ldots$ n terms.

Q.12. Find the number of ways of drawing 9 balls from a bag that has 6 red balls, 8 green balls and 7 blue balls so that 3 balls of every colour are drawn.

Q.13. Expand $(x^2 + 3y)^5$

Q.14. Express $\{ (x, y) / x^2 + y^2 = 25$ where $x, y \in w \}$ as a set of ordered pairs.

Section – C   (12 Marks)

Q.15. In $\triangle ABC$ prove that
$$\sin^2 A + \sin^2 B - \sin^2 C = 2 \sin A \sin B \sin C$$

Q.16. Find the equation or lines which pass through the origin and make an angle of $45°$ with the line $3x - y = 6$

Q.17. If w is a complex cube root or unity, then show that :–
$$(1 - w + w^2)^5 + (1 + w - w^2)^5 = 32$$

(OR)

Find the value of $x^3 + 2x^2 - 3x + 21$ if $x = 1 + 2i$

Q.18. There are 20 straight lines in a plane so that no two lines are parallel and no three lines are concurrent. Determine the number of points of intersection.

Section – D   (16 Marks)

Q.19. Solve the following equation by using Cramer's rule.
$$x + y - z = 1, \quad 8x + 3y - 6z = 1, \quad -4x - y + 3z = 1$$

Q.20. Show that following pairs of lines are perpendicular to each other.
$$2x - 4y = 5 \quad \text{and} \quad 2x + y = 17$$

(OR)

Find the equation of lines which passes through the point of intersection of lines $3x + 2y - 6 = 0$, $x + y + 1 = 0$ and the point $A(2, 1)$

Q.21. Find the middle term in the expansion of $\left(2x - \dfrac{1}{4x}\right)^9$

(OR)

Find the coefficient of x^{-2} in the expansion of $\left(2x - \dfrac{1}{\sqrt{3}x^2}\right)^9$

11th-Maths-A-(3)

Q.22. In a school there are 20 teachers who teach mathematics or physics. Of these 12 teach mathematics and 4 teach both physics and mathematics. How many teachers teach physics?

In school there are 20 ~~teah~~

12 teach Math _____

4 teach both Math