

AHSEC Class 11 Exam Sample Paper - 2

Mathematics

Full marks -100

Time - 3 hrs.

Q1. Answer the followings:

(1x10=10 Marks)

- a) What is the probability that two friends will have the same birthday?
- b) Find the argument of $\frac{1}{1-i}$
- c) Write the truth value of the statement p: Intersection of two disjoint sets is an empty set.
- d) A dice is rolled 6 times. The probability of obtaining 2 and 4 exactly three times each is.
- e) Two events in succession can be performed in _____ ways.
- f) If $A = \{1, 2\}$ and $B = \{3, 4\}$, and then no. of subsets of $A \times B$ is _____.
- g) The foot of perpendicular from (a,b,c) on Y-axis is.
- h) The three planes determine a rectangular parallelepiped which has _____ pairs of rectangular faces
- i) What is the maximum value of a if $a = 1 - \sin x$
- j) Differentiate $|2x - 1|$ w.r.t. x .

Q2. Solve the followings (3x10=30 Marks)

- i) The sum of n terms of two A.P.s are in the ratio $(7n + 1) : (4n + 27)$. Find the ratio of their 13th term.
- ii) Find the domain and range of $f(x) = (x-5)^{1/2}$
- iii) Find the derivative of $f(x) = -1/x$, using the first principle.

- iv) Find the square root of the complex number $5 - 12i$
- v) Justify whether the given information is a 'Set' or 'Not'? A collection of novels written by the writer Munshi Prem Chand.
- vi) Find the equation of the set of points P, the sum of whose distances from A(4, 0, 0) and B(-4, 0, 0) is equal to 10 ?
- vii) If the different permutations of all the letter of the word EXAMINATION are listed as in a dictionary, how many words are there in this list before the first word starting with E?
- viii) Evaluate i^{103}
- ix) Find the conjugate of complex number $3 + i$.
- x) Find the equation of the set of points such that the sum of the square of its distance from the points (3, 4, 5) and (-1, 3,-7) is a constant.

Q3.Solve the followings (4x10=40 Marks)

- i) How many 3-digit numbers can be formed from the digits 1, 2, 3, 4 and 5 assuming that repetition of the digits is allowed
- ii) If the power sets of two sets are equal, then show that the sets are also equal.
- iii) In a committee, 50 people speak French, 20 speak Spanish and 10 speak both Spanish and French. How many speak at least one of these two languages?
- iv) Find the equations of the altitudes of the triangle whose vertices are A (7, -1), B (- 2, 8) and C (1,2)
- v) If a letter is chosen at random from the English alphabet, find the probability that the letter is
- i. a vowel
- ii. a consonant
- vi) Find the equation of a line that cuts off equal intercepts on the coordinate axis and passes through the point (2, 3).
- vii) Evaluate $\lim_{x \rightarrow 0}(\operatorname{cosec} x - \cot x)$

viii) Evaluate $\lim_{x \rightarrow 0} \frac{(x+1)^5 - 1}{x}$

ix) If $z_1 = 3+i$ and $z_2 = 1 + 4i$, then verify that $|Z_1 + Z_2| \leq |Z_1| + |Z_2|$.

x) In a survey of 700 students in a medical college 200 went for regular entrance coaching, 295 attended only correspondence coaching, 115 attended both regular and correspondence coaching. Find how many got admission without any entrance coaching.

Q4.Solve the followings (5x4=20 Marks)

i) Find the variance and standard deviation for the following distribution

xi	4.5	14.5	24.5	34.5	44.5	54.5	64.5
fi	1	5	12	22	17	9	4

ii) Prove that: $\sin 10^\circ \sin 30^\circ \sin 50^\circ \sin 70^\circ = \frac{1}{6}$

iii) A rod of length 12 cm moves with its ends always touching the coordinate axes. Determine the equation of the locus of a point P on the rod, which is 3 cm from the end in contact with the x-axis.

iv) Find the coordinates of the foci, the vertices, the length of major axis, the minor axis, the eccentricity and the length of the latus rectum of the ellipse.

$$\frac{x^2}{400} + \frac{y^2}{100} = 1$$

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