

ATOMIC ENERGY CENTRAL SCHOOL-KAKRAPAR

ANNUAL EXAMINATION MARCH 2015

MATHEMATICS

CLASS - XITime : 3 hoursMAX. MARKS - 100GENERAL INSTRUCTIONS :

- All the questions are compulsory
 - This question paper consists of 26 questions divided into three sections A, B and C.
 - Each question of section A carries one mark, each question of section B carries four marks and each question of section C carries six marks.
 - All questions of section A are to be answered in one word, or one sentence as per the requirement of the question.
 - There is no overall choice. However, Internal choice has been provided in three questions of section B and two questions of section C.
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Section A

- Express the set in roster form $\{x: x \text{ is a prime number which is divisor of } 60\}$
- Write down all the subsets of the set $\{1,2,3\}$
- Find the angle in radians through which a pendulum swings if its length is 75 cm and the tip describes an arc of length 15 cm
- Express $(1-i)^4$ in $a + ib$ form.
- Solve the inequality $3(x-1) < 2(x-3)$
- Determine 'n' if ${}^{2n}C_3 : {}^nC_3 = 12 : 1$

Section B

- Draw appropriate Venn diagram for each of the following
a. $(A \cup B)'$ b. $(A \cap B)'$ c. $A' \cap B'$ d. $A' \cup B'$. Write your conclusion.

8. In a group of 400 people, 250 can speak Hindi, 200 can speak English. How many can speak both the languages and how many can speak only one language? Explain the importance of both the languages in national integration.

9. The Cartesian product $A \times A$ has 9 elements among which are $(-1,0)$ and $(0,1)$.

Find the set A and remaining elements of $A \times A$.

10. Let $A = \{1,2\}$, and $B = \{3,4\}$, Write $A \times B$. How many subsets will $A \times B$ have?

List them.

11. Show that $(\cos 4x + \cos 3x + \cos 2x) / (\sin 4x + \sin 3x + \sin 2x) = \cot 3x$

Or

Show that $\cot x \cot 2x - \cot 2x \cot 3x - \cot 3x \cot x = 1$

12. Prove by using principle of Mathematical Induction, for all natural numbers

$$1.2.3 + 2.3.4 + 3.4.5 \dots \text{up to } n \text{ terms} = n(n+1)(n+2)(n+3)/4$$

13. Find the modulus and argument of $-1 - (\sqrt{3})i$ and express the number in polar form.

14. How many words with or without meaning can be made from the letters of the word MONDAY, assuming that no letter is repeated, if

- 4 letters are used at a time
- All letters are used at time
- All letters are used but first letter is a vowel.
- 4 letters are used but M is last letter always.

15. Find the middle term(s) in the expansion of $(3 - x^3/6)^7$.

