



AC-3106
Second Year B. Sc. (Sem. IV) Examination
April / May – 2015
Mathematics
(Group of Symmetries - II) (Elective Generic) (New Course)

Time : 2 Hours]

[Total Marks : 50

Instructions :

(1)

<p>नीचे दर्शायेव निशानीवाणी विगतो उत्तरवडी पर अवश्य लपवी. Fillup strictly the details of signs on your answer book.</p> <p>Name of the Examination : SECOND YEAR B. SC. (SEM. IV)</p> <p>Name of the Subject : MATHEMATICS (ELECTIVE GENERIC) (NEW)</p> <p>Subject Code No. : 3 1 0 6 Section No. (1, 2,.....): Nil</p>	<p>Seat No. : <input type="text"/><input type="text"/><input type="text"/><input type="text"/><input type="text"/><input type="text"/></p> <p style="text-align: center; border: 1px solid black; border-radius: 15px; padding: 10px;">Student's Signature</p>
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- (2) All questions are compulsory.
- (3) Figures to the right indicate marks of the corresponding question.
- 1 Check the validity of the following statements. (Any Five) 5
1. The group of symmetries of an isosceles triangle is a cyclic group.
 2. The order of group of symmetries of trans N_2-F_2 is 8.
 3. The group of symmetries of H_2O is isomorphic to that of an equilateral triangle.
 4. PCl_3 is a planer molecule.
 5. The group of symmetries of a square is an abelian group of order 4.
 6. The group of symmetries of $CHCl_3$ is isomorphic to that of a rectangle.
- 2 a. Explain different types of symmetries of a square by drawing figures. 8
- OR**
- a. Show that the set of all possible symmetries of an isosceles triangle is a group under operation of composition of symmetries. Is it a cyclic group ? 8

- b. Attempt any one : 7
- 1 Explain by drawing figures, different types of symmetries of an equilateral triangle.
 - 2 Explain different types of symmetries of a rectangle by drawing figures, also prepare composition table.
- 3 a. Show that the set of all possible symmetries of H_2O is a group under composition of symmetry. 8
- OR**
- a. Show that the set of all possible symmetries of trans N_2-F_2 is a group under composition of symmetry. Is it an abelian group? 8
- b. Attempt any one. 7
- 1 Explain by drawing figures, different types of symmetries of a $CHCl_3$
 - 2 Show that the multiplicative group $G = \{1,3,5,7\}$ with X_8 is isomorphic to group of symmetries of a rectangle.
- 4 a. Explain Isomorphism of two groups with illustration. 8
- OR**
- a. Check whether the multiplicative group of the forth-roots of unity is isomorphic to group of symmetries of a rectangle or not. 8
- b. Attempt any one : 7
- 1 Show that the group of symmetries of a rectangle is isomorphic to that of trans N_2-F_2 .
 - 2 Show that the group of symmetries of an equilateral triangle is isomorphic to that of PCL_3 .