



RAN-0959

S.Y.B.Sc.(Semester-4) Examination

March / April - 2019

Group of symmetries -I I (EG-Mathematics)

(Old or New to be mentioned where necessary)

Time: 2 Hours]

[Total Marks: 50

सूचना : / Instructions

नीचे दृशविले निशानीवाणी विगतो उत्तरवही पर अवश्य लभवी.
Fill up strictly the details of signs on your answer book

Name of the Examination:

S.Y.B.Sc.(Semester-4)

Name of the Subject :

Group of symmetries -I I (EG-Mathematics)

Subject Code No.: 0 9 5 9

Seat No.:

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Student's Signature

Instruction:

- (1) All questions are compulsory.
 - (2) Figures to the right indicate marks of the corresponding question.
- ◆ To be filled in by the press.

Note: Full marks of each question to be indicated in a circle at the right end of first line of each question e.g. (10)

Q:1 Check the validity of the following statements.(Any six)

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1. The group of symmetries of a square is isomorphic to that of NH_3 ,
2. The multiplicative group of the forth-roots of unity is isomorphic to group of symmetries of a molecule H_2O .
3. The order of group of symmetries of a square is six.
4. The number of elements in a group is called order of a group.
5. In a group of symmetries of square the inverse element of symmetry C_4 is C_2 .
6. $CHCl_3$ is a planer molecule.
7. The group of symmetries of an equilateral triangle is a cyclic group.
8. The multiplicative group $G = \{1,3,5,7\}$ with X_8 is isomorphic to group of symmetries of a rectangle .

- Q:2. Attempt any Two. 14**
1. Show that the set of all possible symmetries of an isosceles triangle is a group under operation of composition of symmetries.
 2. Explain by drawing figures, different types of symmetries of an equilateral triangle.
 3. Obtain group table for the symmetries of a rectangle. Is it abelian group? Find order of each element.
- Q:3. Attempt any Two. 16**
1. Show that the set of all possible symmetries of H_2O_2 is a group under composition of symmetry.
 2. Explain by drawing figures, all possible symmetries of a molecule PCl_3 .
 3. Show that the multiplicative group of the square-roots of unity is isomorphic to group of symmetries of an isosceles triangle.
- Q:4. Attempt any Two. 14**
1. Show that the group of symmetries of a rectangle is isomorphic to that of H_2O .
 2. Show that group of symmetries of an equilateral triangle is isomorphic to that of NH_3 .
 3. Check whether the multiplicative group $G = \{6,12,18,24\}$ with X_{30} is isomorphic to group of symmetries of a rectangle.
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