RAN-7029

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

March / April - 2019

Group of Symmetries -II (EG-Mathematics) (l)(old)

(Old or New to be mentioned where necessary)

Time: 2 Hours]   **[Total Marks: 50**

સૂચના : / Instructions

(1)

> **નીચે દર્શાવેલ ☞ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.**
> **Fill up strictly the details of ☞ signs on your answer book**
>
> Name of the Examination:
> ☞ **S.Y.B.Sc.(Semester-IV)**
>
> Name of the Subject :
> ☞ **Group of Symmetries -II (EG-Mathematics)**
>
> Subject Code No.: | 7 | 0 | 2 | 9 |

Seat No.:

Student's Signature

(2)   All questions are compulsory.

(3)   Figures to the right indicate marks of the corresponding question.

Q:1   **Check the validity of the following statements. (Any six)**   **06**

    1.   The order of group of symmetries of a square is same as that of $CHCL_3$.

    2.   The group of symmetries of trans $N_2 - F_2$ is isomorphic to that of a square.

    3.   There are four possible different symmetry operations of molecule PCL_3.

    4.   A group G of order 4 is a cyclic group if all elements of G are of order less than 3.

    5.   The group of symmetries of any triangle is an abelian group group.

    6. $H_2 - O$ is a planer molecule.

    7.   The group of symmetries of H_2O_2 is isomorphic to that of a square.

    8.   The group of symmetries of a rectangle is a cyclic group of order six.

RAN-7029]   **[1]**   **[P.T.O.]**

Q:2.   **Attempt any Two**   **14**

1. Show that the symmetries of an isocelestriangle is a group under composition of symmetry. Is it a cyclic group?

2. Obtain group table for the symmetries of a rectangle. Is it abelian group? Find order of each element.

3. Explain all possible symmetries of an equilateral triangle.

Q:3.   **Attempt any Two.**   **16**

1. Show that the set of all possible symmetries of $H_2 - O_2$ is a group under composition of symmetry.

2. Explain all possible symmetries of a molecule NH_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. Check whether the multiplicative group $G = \{1, 3, 5, 7\}$ with X_8 is isomorphic to group of symmetries of a rectangle .

2. Show that the group of symmetries of an equilateral triangle is isomorphic to that of NH_3.

3. Show that the group of symmetries of a rectangle is isomorphic to that of H_2O.

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