DMM-3347
Second Year B. Sc. (Sem. IV) Examination
March / April - 2016
Group of Symmetries - II
(EG Mathematics)
(Old Course)

Time : 2 Hours] [Total Marks : 50

Instructions :

(1) Fill up strictly the details of signs on your answer book.

(2) All questions are compulsory.

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

1 Check the validity of the following statements. 5

(1) PCl₃ is a planer molecule.

(2) The group of symmetries of a square is an abelian group of order 6.

(3) The group of symmetries of trans N₂F₂ is a cyclic group.

(4) The group of symmetries of a H₂O is isomorphic to that of a rectangle.

(5) The multiplicative group of all forth roots of unity are isomorphic to group of symmetries of a rectangle.

2 (a) Explain by drawing figures, different types of symmetries of a square. 8

OR

2 (a) Explain by drawing figures, different types of symmetries of an equilateral triangle. 8

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(b) Attempt any one:

(1) 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?

(2) Show that the symmetries of a rectangle is a group under composition of symmetry.

3 (a) Show that the set of all possible symmetries of trans $N_2F_2$ is a group under composition of symmetry.

OR

3 (a) Explain all possible symmetries of a molecule $NH_3$.

(b) Attempt any one:

(1) Check whether the multiplicative group of the forth-roots of unity is isomorphic to group of symmetries of a rectangle or not.

(2) Show that the set of all possible symmetries of trans $H_2S$ is a group under composition of symmetry.

4 (a) Show that the group of symmetries of a rectangle is isomorphic to that of trans $N_2F_2$.

OR

4 (a) Check whether the multiplicative group $G = \{1,3,5,7\}$ with $x_8$ is isomorphic to group of symmetries of a rectangle.

(b) Attempt any one:

(1) Show that the multiplicative group of the square-roots of unity is isomorphic to group of symmetries of an isosceles triangle.

(2) Explain Isomorphism of two groups with illustration.