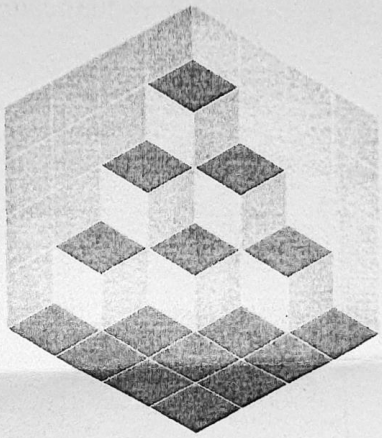
Cluster Innovation Centre, University of Delhi, Delhi-110007

End Semester Examination – May 2024

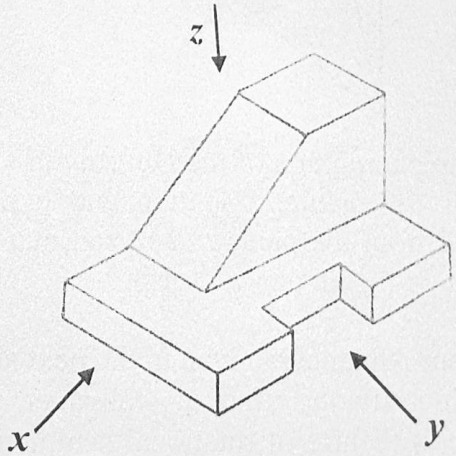
Name of the Course : **B.Tech (Information Technology and Mathematical Innovations)**
Semester : **VI**
Paper Title : **Mathematical Visualisation**
Paper Code : **228603202**
Maximum Marks : **38** **Duration: 2 Hours**

Instructions: This question paper contains six questions, out of which any four are to be attempted. Each question carries equal marks.

Q1) How many cubes do you visualize in the following figure? Give proper justification for your answer. **(9 ½ marks)**



Q2) Draw the perpendicular projection of the given figure when viewed from the x, y and z direction respectively. **(9 ½ marks)**



Q3) A serpenski carpet is formed by taking a square; dividing it into nine squares and removing the centre square. Each of the eight remaining squares is again divivided into nine squares and the central square is again removed (see the figure). Find the area enclosed and the perimeter after n iterations. What will the area and the perimeter be after infinite number of iterations? **(9 ½ marks)**

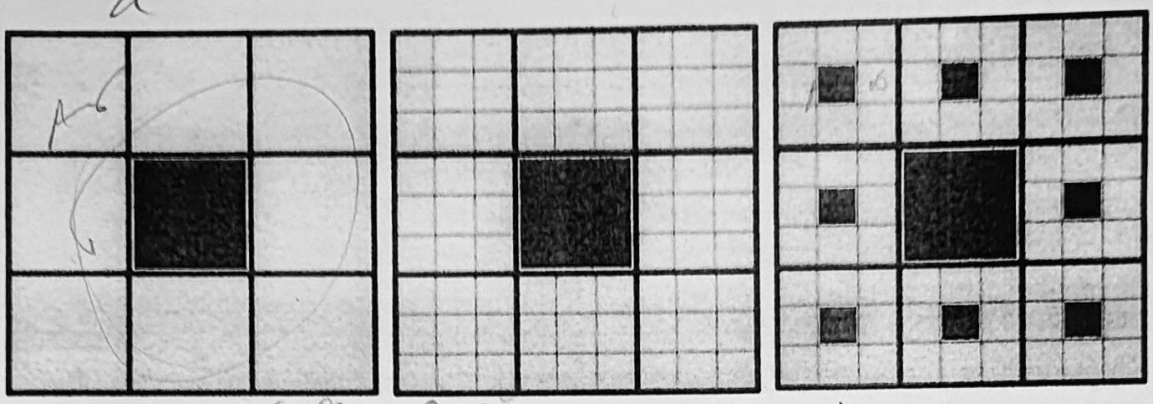
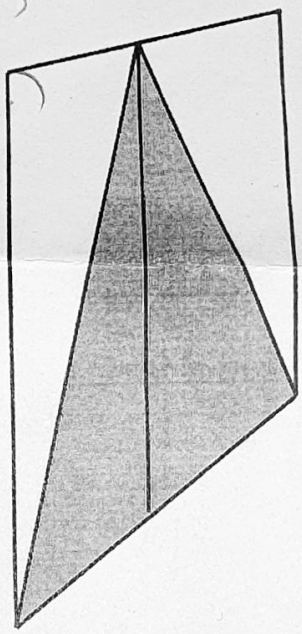


Figure for Question 3

Q4) Following is a skeleton graph of a window in one point perspective. The triangle is an isosceles triangle. Write down the steps required to duplicate window. Using the steps draw the duplicated window. **(9 ½ marks)**



Q5) In what perspective has the photograph of the Humanyun's tomb (Figure I) been taken? Find the vanishing point/s in the picture. Mention and explain at least three rules of perspective that can be verified from the picture. You can mark the vanishing points in the photograph and attach the sheet with your answer script. **(9 ½ marks)**

Q6) Consider the tile design from Alhambara given in the next sheet. Use the flowchart given at the back of this sheet to identify the kind of wallpaper. Mark and label the line of symmetry(s) and the rotocentre(s) (centre of rotational symmetry) if any on the wallapaper. You may ignore the color variations. (The page may be attached with your answer script with your name and roll number) **(9 ½ marks)**