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NATA 2020 CAAD BITESIZE

22.08.2020

DAILY PCQ/MCQ LESSONS



PREPARED BY

EXPERTS IN
ARCHITECTURE
EDUCATION

ANNA UNIVERSITY
COUNSELLING
CODE
1152

BITESIZE
21

B.Arch.,

9710 55 4545 / 9710 93 0025

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▪ **ELEMENTS OF DESIGN** -
Visual Principles in Composition

▪ **PRINCIPLES OF DESIGN**
Visual Principles of Composition

▪ **ORGANISING PRINCIPLES** -
Spatial Relationship between objects

▪ **GEOMETRY**
Spatial Intelligence & Graphical Similarities

▪ **COLOUR**
Colour Scheme Awareness & Knowledge

▪ **LIGHT & SHADOW**
Creative Expression

▪ **VISUAL COMPOSITION**
Visual Principles of Composition

▪ **PERSPECTIVES**
Visual images & Scenarios & Interpretation

01. Identify the elements of design in the given composition.



Source: Composition, Batch 2018, CAAD

A. Point, Line & Colour

C. Line, Plane & Volume

B. Line, Plane & Colour

D. Point, Line & volume

Answer Key:

B. Line, Plane and Colour

Theory:

LINE: A point that is extended along a direction. Conceptually, line has length. Line – describes the path of a point in motion.

PLANE: A line extended in a direction other than its intrinsic direction becomes a plane. A plane has length & width, but no depth.

COLOUR: Colour adds the magic element to a design. Each colour has a mood, an emotion and different levels of significance.

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02. Identify the principles of design visually seen in this famous Hawa Mahal, Jaipur.



Source: India.com.

1. Repetition	3. Hierarchy	5. Datum	7. Symmetry
2. Transformation	4. Rhythm	6. Emphasis	8. Axis
A. Options 1,2,4,7,8		C. Options – 1,2,5,6,8	
B. Options 1,3,4,7,8		D. Options – 1,2,4,5,6	

Answer Key:

B. Options 1,3,4,7,8

Theory:

Principle of Design are

- Axis
- Symmetry
- Asymmetry
- Hierarchy
- Rhythm
- Datum
- Transformation
- Repetition

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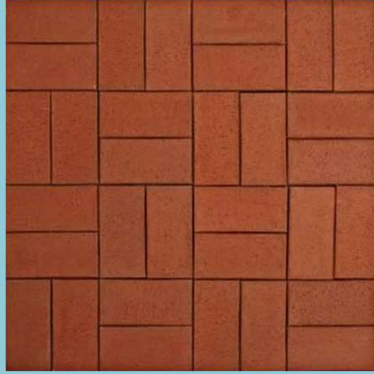


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03. In the following images, which brick arrangement represents the grid pattern?

<p>A.</p> 	<p>C.</p> 
<p>B.</p> 	<p>D.</p> 
<p>A. Options C & B</p>	<p>C. Options C</p>
<p>B. Options D</p>	<p>D. Options C & D</p>

Answer Key:

A. Options C & D

Theory:

GRID ORGANIZATION

- Space organized within the field of a structural grid or another 3 dimensional framework.
- A grid is established in architecture most often by a skeletal structural system of columns and beams.
- Within the field of this grid, spaces can occur as isolated events or as repetitions of the grid module.

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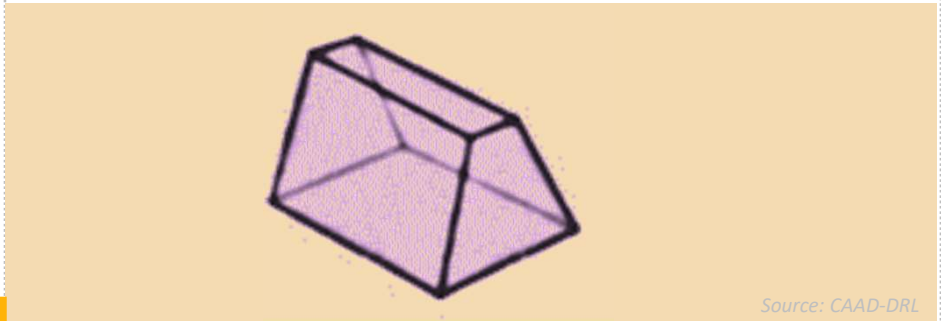
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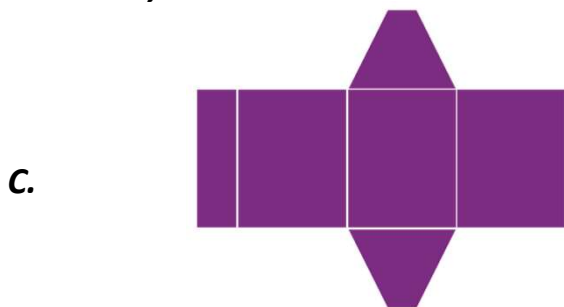
04. A chocolate box is made as shown in the image. If the box is opened out as a flat sheet, which one of the following layout is the resultant net.



Source: CAAD-DRL

<p>A.</p>	<p>C.</p>
<p>B.</p>	<p>D.</p>

Answer Key:



Theory:

SOLIDS IN TWO & THREE DIMENSIONS

These questions use irregular solid shapes as a layout and the question is to identify the three dimensional form arrived at by folding. This can be asked vice versa also.

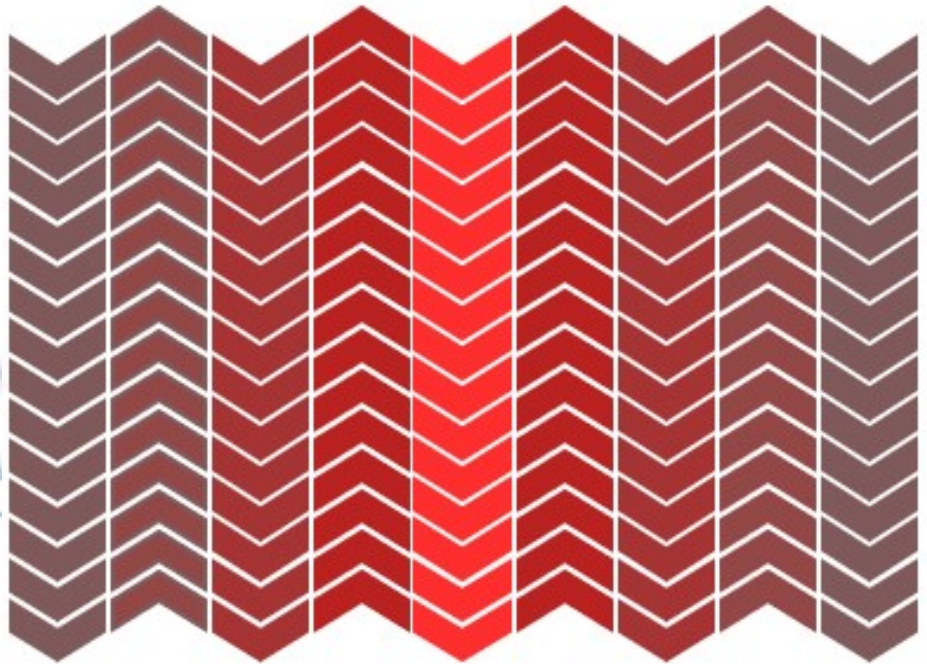
Key strategy - Use the process of elimination. Consider the connection between four visible faces.

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05. What type of colours are used to create the optical illusion given below?



Source: CAAD-DRL

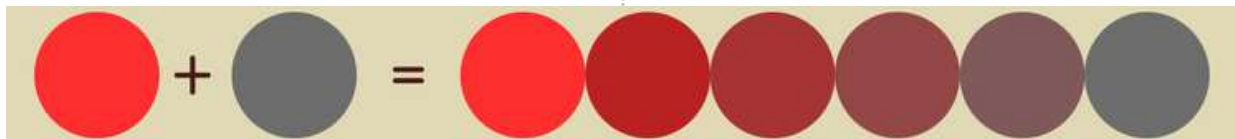
A. Complimentary Colours	C. Tones of Red
B. Triadic Colours	D. Tints of Red

Answer Key:

Theory:

C. Tones of Red

Tones of the colours are obtained by adding grey to the pure hue/ colour



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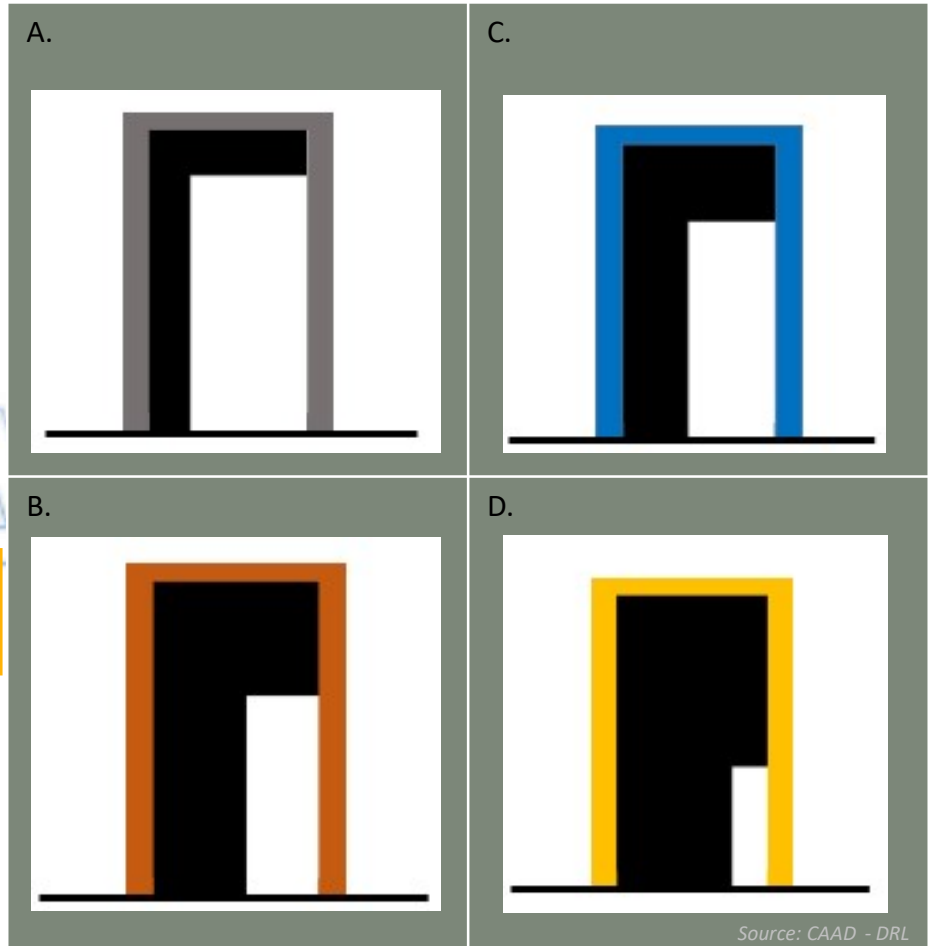


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06. Following are the shadows cast in the openings of walls with different thickness. Based on the shadow cast, identify the wall opening which has greater thickness.



Answer Key:



Theory:

Shadows are the relatively dark figures cast upon a surface by an opaque body or part of a body intercepting the rays from a light source.

The shape of the shadow is dependent on

- The position of shade line & the observer, The direction of the light and the form of the surfaces on which the plane of the shadow falls
- When the object is not in contact with the ground, the shadow will be seen detached from the object

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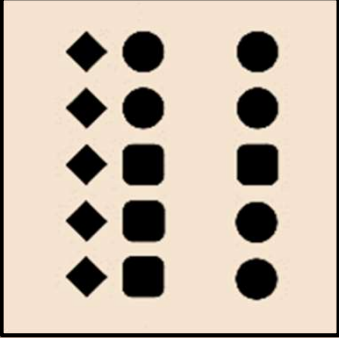
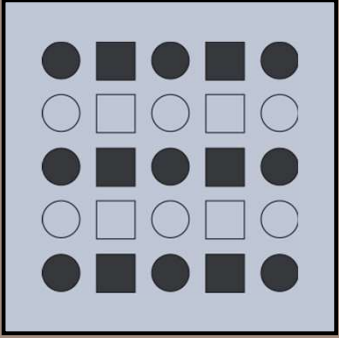
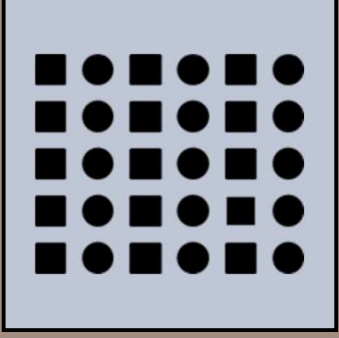
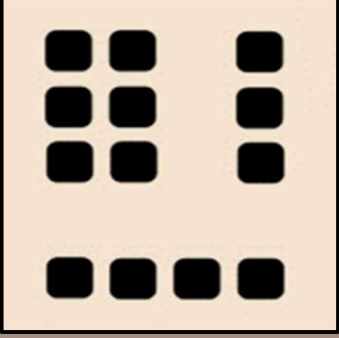
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07. Identify the visual principles that are governing the following compositions.

<p>1.</p> 	<p>3.</p> 
<p>2.</p> 	<p>4. <small>Source: CAAD-DRL</small></p> 
<p>A. 1 – Proximity 2- Similarity</p> <p>B. 1 & 4 – Proximity 2 & 3 – Similarity</p>	<p>C. 3 – Similarity 4 - Proximity</p> <p>D. 1,3 – Proximity 2,4 – Similarity</p>

Answer Key:

A, B and C

Theory:

Law of proximity (Gestalt principles):

The objects close to each other, tend to be perceived as a unified group

Law of Similarity (Gestalt principles)

The principle of similarity states that things which share visual characteristics such as shape, size, color, texture, value or orientation will be seen as belonging together (form groups).

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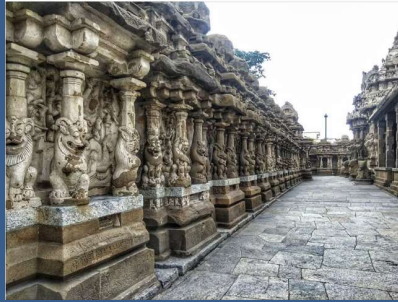
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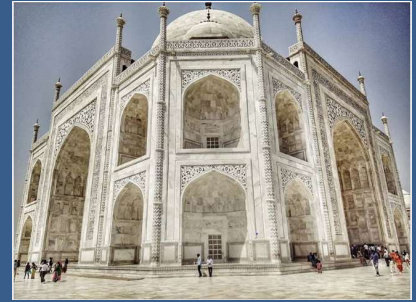
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08. Following are the images of famous buildings in India. Based on the converging lines, identify how the photographer captured the image.

1.

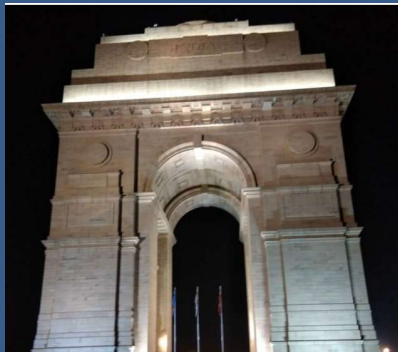


3.

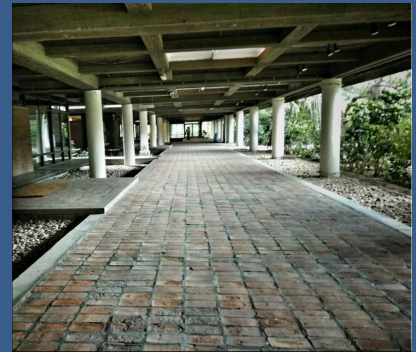


Source: Photo Credits – Muralitharan M S, Batch 2015, CAAD.

2.



4.



A. One Point perspective – 1,2
Three point perspective -3,4

C. One point perspective – 1,4
Three point perspective – 2,3

B. Two point perspective - 1,3
Three Point perspective – 2,4

D. One point perspective – 3,4
Three point perspective - 1,2

Answer Key:

**C. One point perspective – 1,4
Three point perspective – 2,3**

Theory:

One point perspective: One point perspective (frontal or central perspective) has only one vanishing point on the horizon line located somewhere within the picture plane and all the orthogonal converge towards it.

Three-point perspective: Three point perspective uses three vanishing points where two of them are on the horizon line and the third is either high above the horizon line or way below it.

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EXPLANATORY
NOTES
ATTACHED BELOW
WILL HELP YOU
SOLVE SIMILAR
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QUESTIONS

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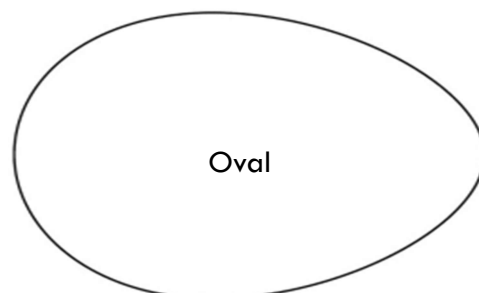
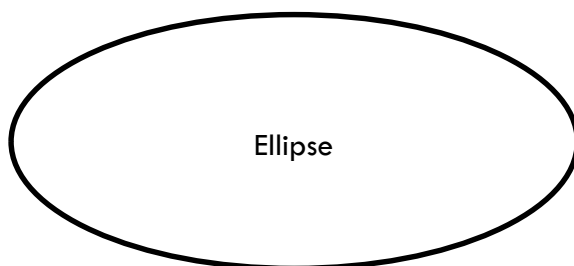
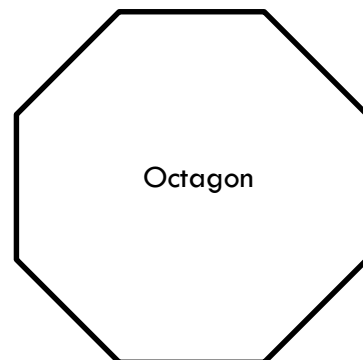
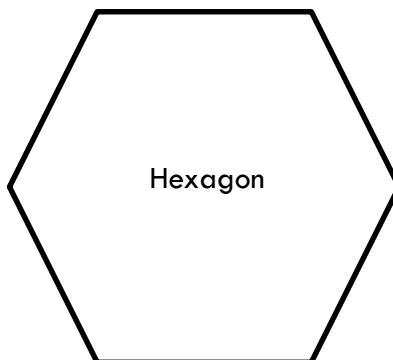
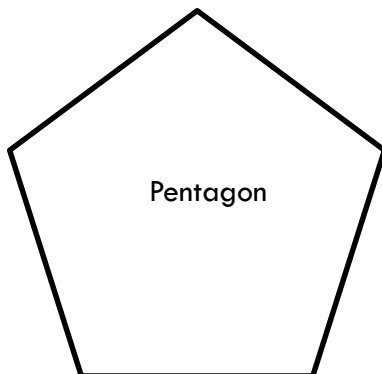
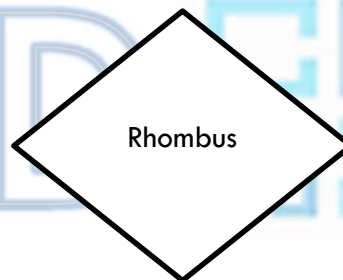
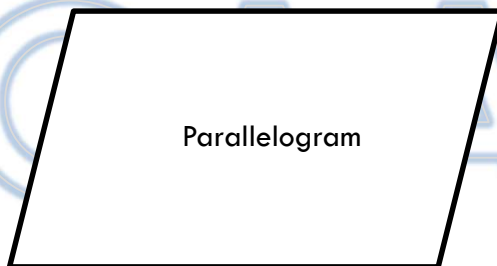
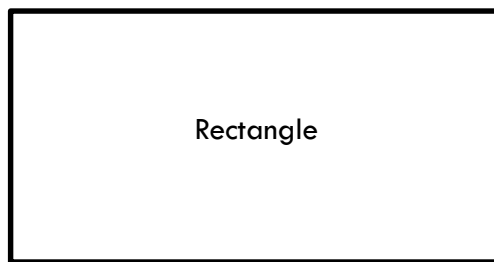
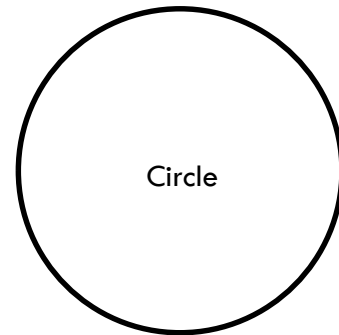
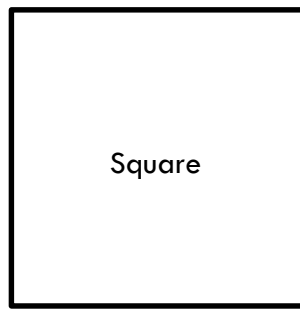
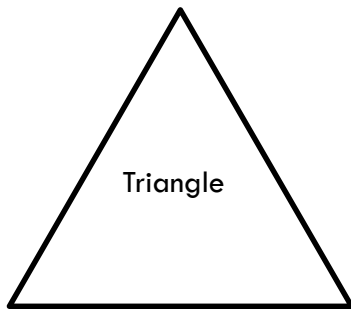
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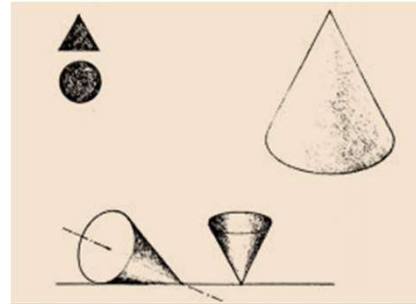
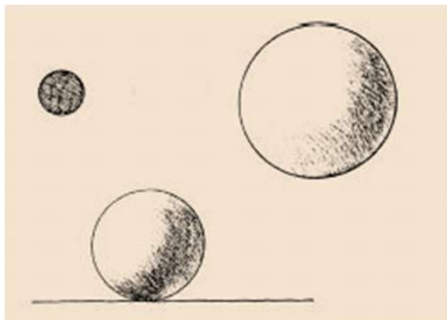
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INTRODUCTION TO BASIC SHAPES

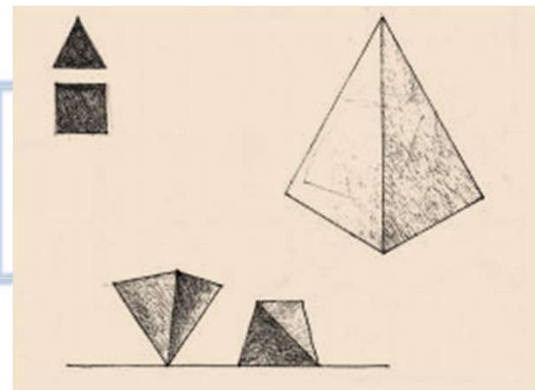


INTRODUCTION TO PRIMARY SOLIDS**SPHERE**

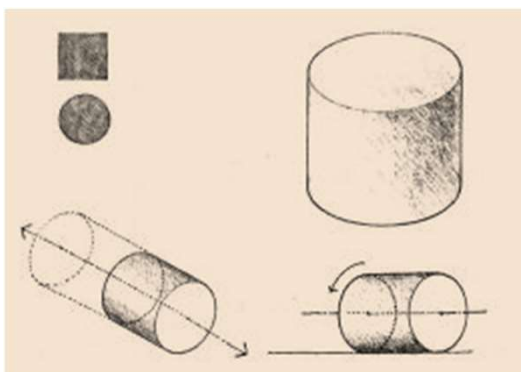
A solid generated by the revolution of a circle about its diameter. It has no directional quality, neither horizontal nor vertical, but simply static. A sphere is a centralized and highly concentrated form. It is self-centred & normally stable in its environment. In any point it retains its circular shape.

**PYRAMID**

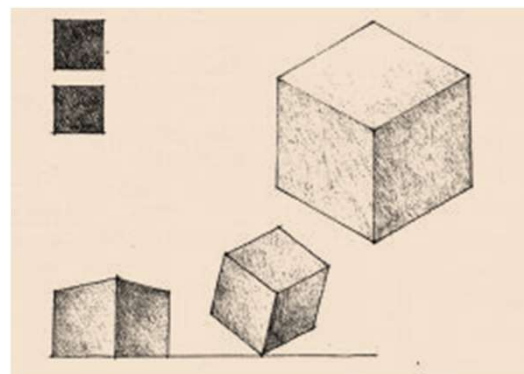
A polyhedron having a polygonal base and triangular faces meeting at a common point or vertex. The pyramid has properties similar to those of the cone. Because all of its sides are flat planes. However its stable on all its faces.

**CYLINDER**

A solid generated by the revolution of a rectangle about one of its sides. A cylinder is centralized about the axis passing through the centres of two circular faces. A cylinder is stable if it rests on its one of the circular faces.

**CUBE**

Prismatic solid bounded by six equal square sides, the angle between any two adjacent faces being a right angle. It is stable on all its sides excepts when it stand on its edges.

**CONE**

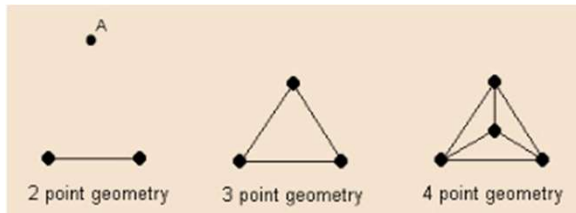
A solid generated by the revolution of a right triangle about one of its sides. Like the cylinder, the cone is a highly stable form when resting on its circular base. It can also rest on its apex in a precarious state of balance.

Reference: Architecture Form, Space and Order - FRANCIS D.K CHING

INTRODUCTION TO ELEMENTS IN ARCHITECTURE

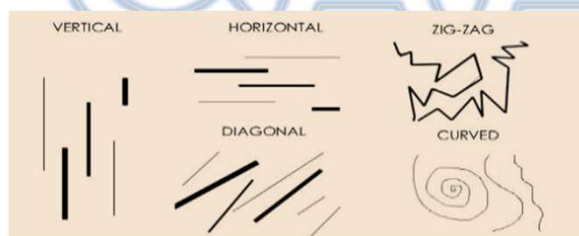
POINT

A point or mark is the smallest and most basic element. The single point represents a visual stop. Two points represent a direction. Three points makes the eyes move in a closed path. They signify a shape.



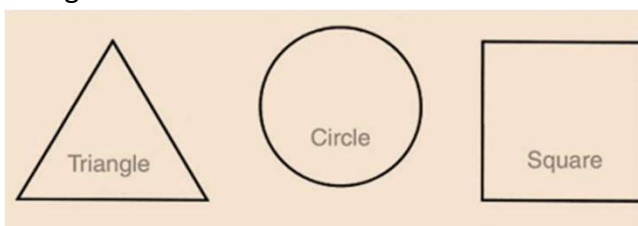
LINE

Point that is extended along a direction. Line has length and describes a point in motion. Expresses direction, movement and growth. Line also defines the edges of planes and give them the shape. A Line can articulate the surfaces of planes. A line is a form with width and length, but no depth. The direction, weight, and character of line convey many different states and emotions.



SHAPE

Shape is an area that is contained within implied lines. Shapes have two dimensions-length and width, and can be geometric or free-form. A shape is formed when the lines encloses an area. Shapes whether geometric or organic it adds interest to the design.



Reference: Architecture Form, Space and Order - FRANCIS D.K CHING

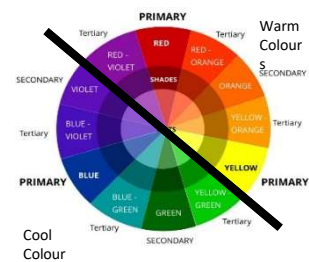
SPACE

Space is three-dimensional volume that can be empty or filled with objects. It has width, height, and depth. The form defines the space.

COLOUR

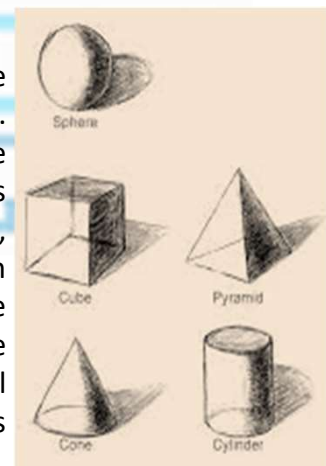
Colour adds the magic element to a design. Each colour has a mood, an emotion and different levels of significance.

Colours can reflect warm or cool, hard or soft, light or dark, passive or active, all of which when used individually or in combination of one another greatly affects the mood.



FORM

Form is any three dimensional object. They can be measured in terms of height, width, breadth. Form describes volume and mass, or the three dimensional aspects of objects that take up space.



TEXTURE

Texture refers to the surface quality. Textures can create a more three-dimensional appearance on this two-dimensional surface. it can be categorized as visual and tactile texture.



INTRODUCTION TO PRINCIPLES IN ARCHITECTURE

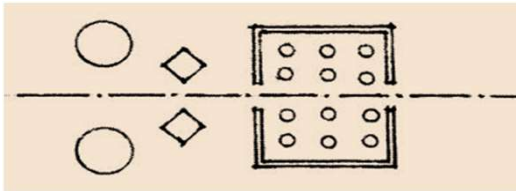
AXIS

A Line established by two point in space about which form and spaces can be arranged in symmetrical and balanced manner



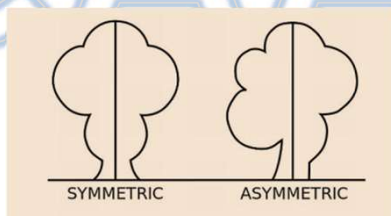
SYMMETRY

The balanced distribution and arrangement of equivalent forms and spaces on opposite sides of dividing plane or about a centre axis



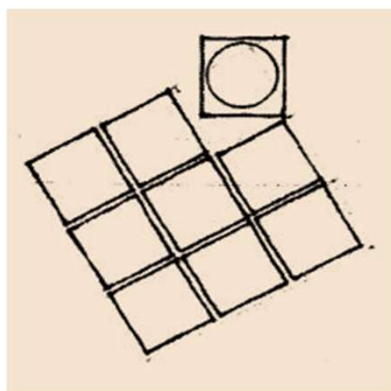
ASYMMETRY

Asymmetrical or Informal Balance Parts of the design are not identical but are equal in visual weight on opposite sides of dividing plane or about a centre axis



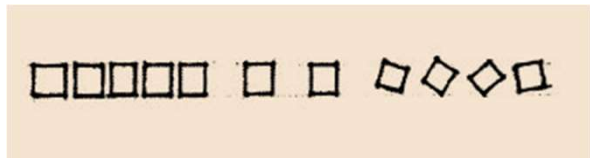
HIERARCHY

The articulation of importance and significance of form or space by its size shape and placement relative to other forms and spaces of organization



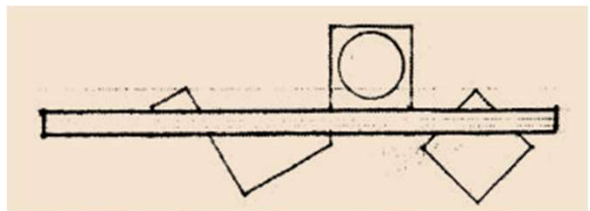
RHYTHM

Unifying movement characterized by patterned repetition or alteration of formal elements or motifs in same or modified forms



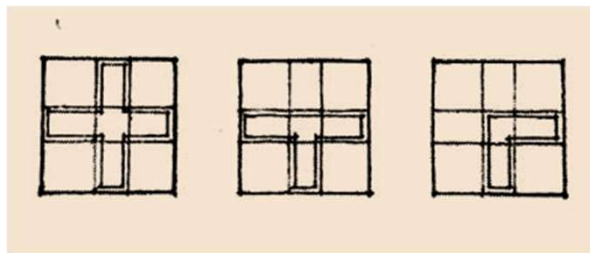
DATUM

A line plane or volume that, by its continuity and regularity, serves together, measure and organize a pattern of form and spaces.



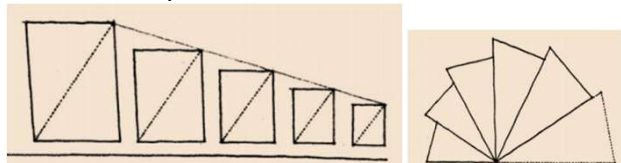
TRANSFORMATION

The principle that an architectural concept or organization can be retained, strengthened and built upon through a series of discrete manipulation and transformations.

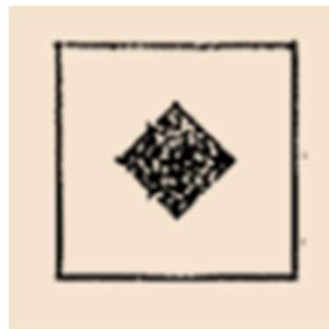


REPETITION

Repetition refers to one object or shape repeated; pattern is a combination of elements or shapes repeated in a recurring and regular arrangement; Rhythm is a combination of elements repeated, but with variations



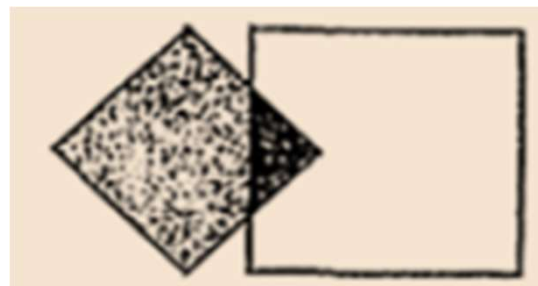
Reference: Architecture Form, Space and Order - FRANCIS D.K CHING

INTRODUCTION TO SPATIAL RELATIONSHIPS**SPACE WITHIN A SPACE**

A large space can envelope and contain a similar space within its volume. Visual and spatial continuity between the two spaces can be easily accommodated

INTERLOCKING SPACES

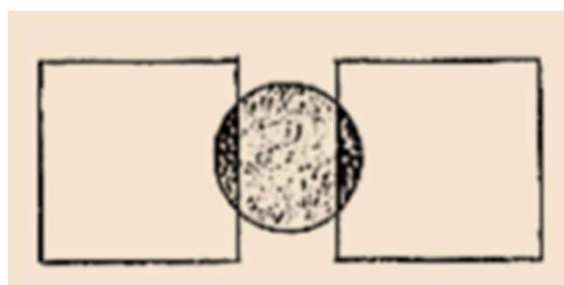
An interlocking spatial relationship results from the overlapping of two spatial fields and the emergence of a zone of a shared space. Each space interlocking retains its identity. But the intersection of two spaces is subjected to a number of interpretations

**ADJACENT SPACES**

Two spaces may abut each other or share a common border. It allows each space to be clearly defined and to respond, each in its own way to functional or symbolic requirements

SPACES LINKED BY A COMMON SPACE

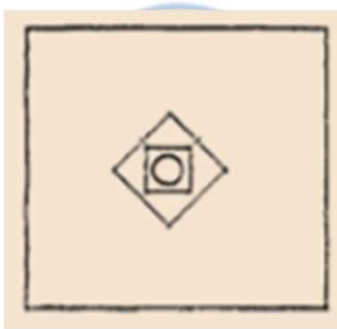
Two spaces which are separated by a distance can be linked or related to each other by a third, intermediate space. The visual and the spatial relationship between the two spaces depends on the nature of the third space.



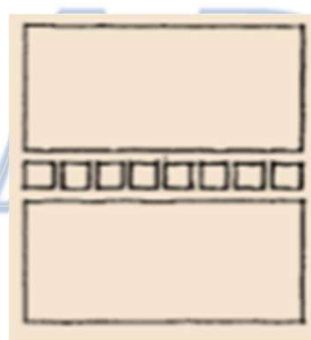
Reference: Architecture Form, Space and Order - FRANCIS D.K CHING

INTRODUCTION TO SPATIAL ORGANIZATION**CENTRALIZED ORGANIZATION**

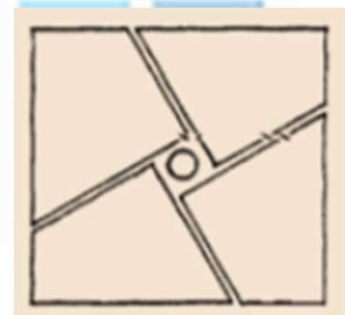
A centralized organization is a stable, concentrated composition that consists of a number of secondary spaces grouped around a large, dominant central space. The central unifying space of the organization is generally regular in form and large enough in size to gather a number of secondary spaces about its perimeter.

**LINEAR ORGANIZATION**

A linear organization consists essentially of a series of spaces. These spaces can either be directly related to one another or be linked through a separate and distant linear space. It usually consists of repetitive spaces which are similar in size, form and function. It may consist of a single linear space that organizes along its length a series of spaces that differ in size, form and function.

**RADIAL ORGANIZATION**

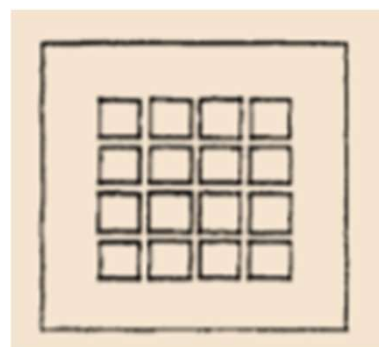
A radial organization of space combines elements of both centralized and linear organizations. It consists of a dominant central space from which a number of linear organizations extend in a radial manner. Whereas a centralized organization is an introvert scheme that focuses inward on its central space a radial organization is an extrovert plan that reaches out to its context.

**CLUSTERED ORGANIZATION**

A clustered organization grouped by proximity or the sharing of a common visual trait or relationship

**GRID ORGANIZATION**

Space organized within the field of a structural grid or another three dimensional framework

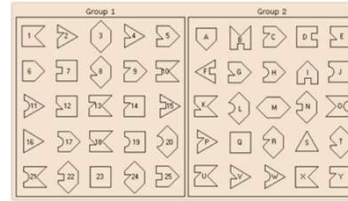


Reference: Architecture Form, Space and Order - FRANCIS D.K CHING

INTRODUCTION TO SPATIAL ABILITY ASSESSMENT (Few Samples)

01. SHAPE MATCHING (TWO DIMENSIONAL)

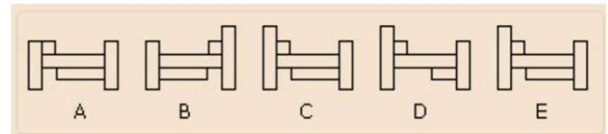
In this method, two groups of simple, flat objects are given and the question is to match the pairs by same size and shape. Each drawing in the first group is exactly the same as a drawing in the second group. The objects in the second group may have been moved and some may have been rotated.



Answers: 1. X; 2. P; 3. M; 4. V; 5. G; 6. A; 7. D; 8. T; 9. C; 10. B; 11. W; 12. E; 13. U; 14. Y; 15. F; 16. S; 17. H; 18. K; 19. J; 20. L; 21. O; 22. N; 23. Q; 24. R; 25. I

02. VISUAL COMPARISON (TWO DIMENSIONAL)

Several objects will be grouped together in the question and the identical pair has to be marked out.

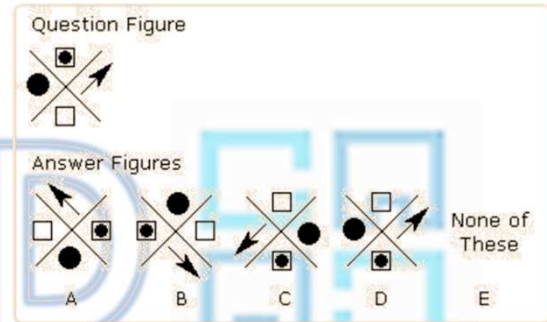


Answer: C and E are the only two pictures that are identical

03. GROUP ROTATION (TWO DIMENSIONAL)

In this method, the task is to identify the choices to the original shape/pattern. The multiple choices comprise of the original shape/pattern after single/multiple rotations.

Key Strategy - Choose the asymmetrical shape in the group and determine how the shape would look when rotated clockwise or anticlockwise.

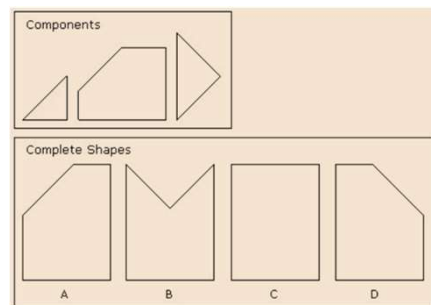


Answer: C

04. COMBINING TWO-DIMENSIONAL SHAPES

In this pattern, question comprise of series of two dimensional shapes which are cut from a parent shape. The question is to identify the parent shape.

Key Strategy: Observe parent shape from the choices and look for distinct features that matches with the element. Also parent shape does not have elements sticking out.

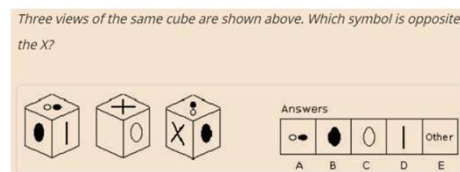


Answer: B

05. CUBE VIEWS IN THREE DIMENSIONS

These questions comprise of different views of a patterned cube. Question will be to identify the pattern on a particular face of the cube.

Key Strategy: Use the process of elimination



Answer: D

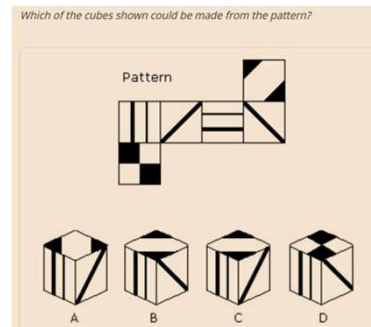
Reference: www.wikijob.co.uk.

INTRODUCTION TO SPATIAL ABILITY ASSESSMENT

06. CUBES IN TWO & THREE DIMENSIONS

These type of questions have the layout of the cube in two dimension and is to identify the right cube when the layout is folded. The question can be vice-versa too.

Key Strategy - Mark the faces of the cube as Front, Back, Top, Bottom, Right side and Left side in the layout and work on the cube formation.

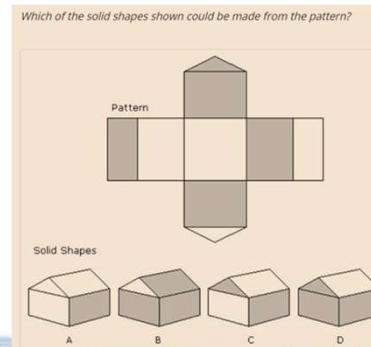


Answer: A

07. OTHER SOLIDS IN TWO & THREE DIMENSIONS

These questions use irregular solid shapes as a layout and the question is to identify the three dimensional form arrived at by folding. This is similar to cube exercise (Point no 6)

Key strategy - Use the process of elimination. Consider the connection between four visible faces and look out for patterns / shades.

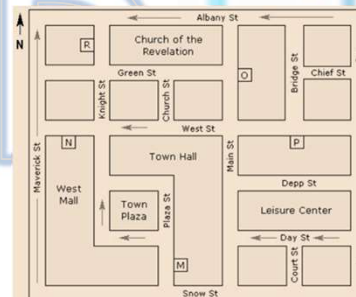


Answer: D

08. TWO-DIMENSIONAL MAPS

Simple two-dimensional maps will be given in the question to test the ability to follow instructions and visualizing a route.

Key Strategy - Basic sense of direction and imagine yourself following the instructions.



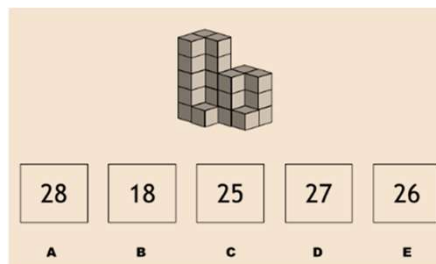
Answer: B

Officer Wilkinson is in Depp St and can see the Town Hall to her right. What direction is she facing?

09. BLOCK COUNTING IN THREE DIMENSIONS

This type of question will be having a three dimensional form made up of multiple units/ blocks, some of which may be hidden. The question will be to quantify the hidden elements that comprise the three-dimensional form.

Key Strategy - Count the number of units as rows and columns and calculate the hidden blocks numerically.



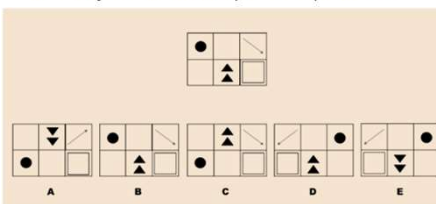
Answer: E

How many blocks make up the shape below?

10 TWO -DIMENSIONAL MIRROR REFLECTIONS

This question presents an image and will be asked to identify its mirror image.

Key Strategy - Use the process of elimination



Answer: D

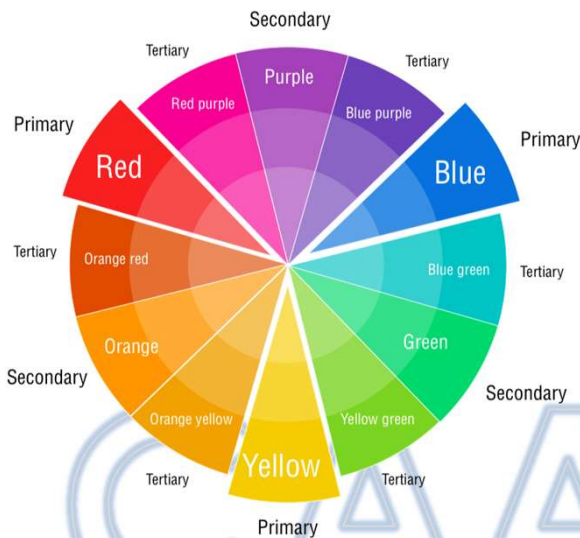
Which answer shows a reflection of the image below?

Reference: www.wikijob.co.uk.

INTRODUCTION TO COLOUR THEORY

A colour circle, based on red, yellow and blue, is traditional in the field of art. Sir Isaac Newton developed the first circular diagram of colours in 1666. Since then scientists and artists have studied and designed numerous variations of this concept. Colour theory is a body of practical guidance to colour mixing and the visual effects of a specific colour combination. There are also definitions (or categories) of colours based on the colour wheel: primary colour, secondary colour, and tertiary colour.

COLOUR WHEEL



PRIMARY COLOURS

These are the three pigment colours that cannot be mixed or formed by any combination of other colours. All other colours are derived from these three hues.

SECONDARY COLOURS

These are the colours formed by mixing the primary colours.

TERTIARY COLOURS

These are the colours formed by mixing a primary and a secondary colour. So it is referred as a two word name, such as blue-green, red-violet, and yellow-orange.

WARM & COOL COLOURS

Warm colours, such as red, yellow, and orange evoke warmth when observed.

Cool colours, such as blue, green, and purple (violet) evoke a cool feeling when observed.

NEUTRAL COLOURS

Grey, Brown. These are not on most colour wheels, but they're considered neutral because they don't contrast with much of anything.

TINTS, SHADES AND TONES

Tint – adding white to pure colour



Shade – adding black to pure colour



Tone – adding grey to pure colour



COLOUR SCHEME/HARMONY

Complimentary colours

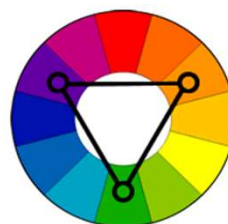
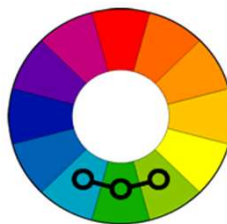
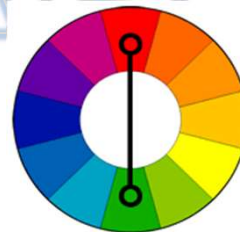
Red and Green, Blue and Orange, Purple and Yellow - located directly opposite to each other on the colour wheel.

Analogous Colours

Red and Orange, Blue and Green, etc. – located right next to each other on the colour wheel.

Triad Colours

Uses colours that are evenly spaced around the colour wheel.

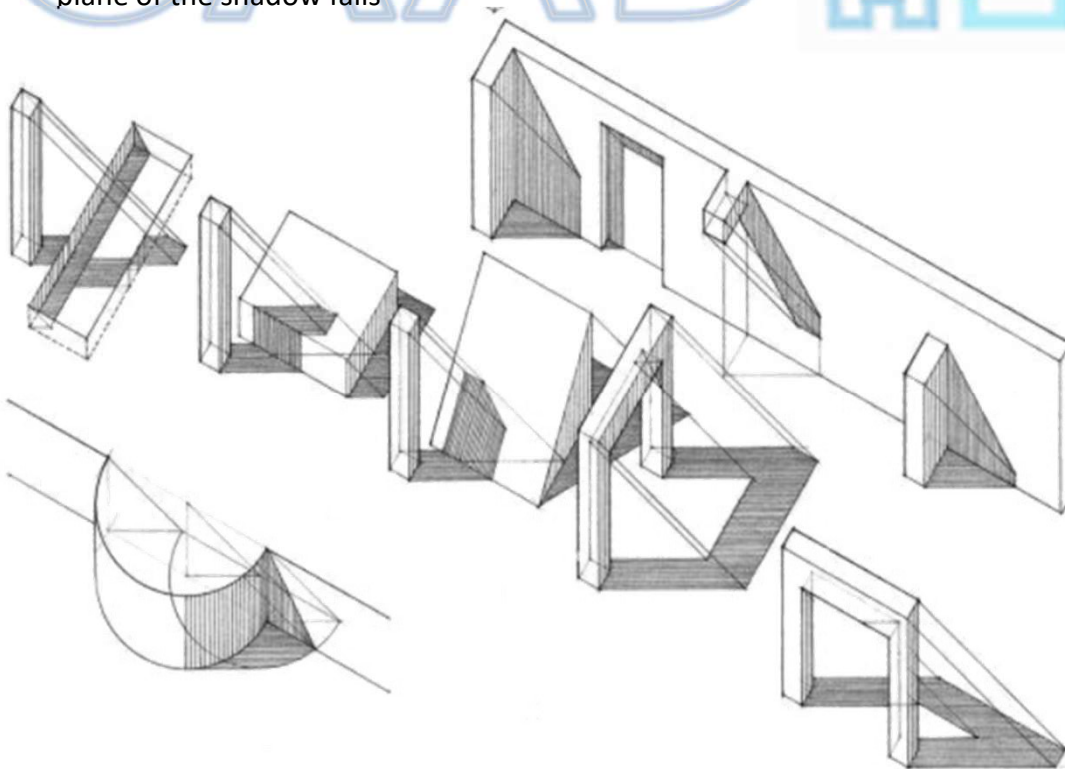
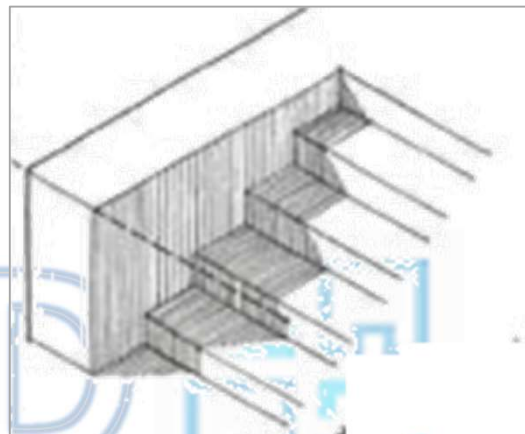
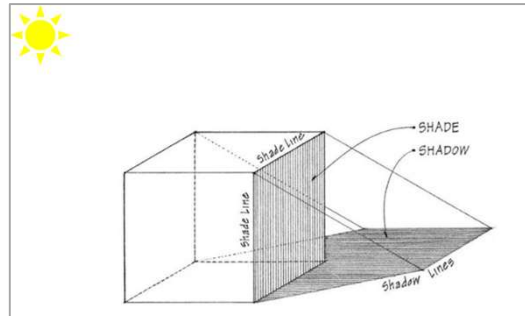


INTRODUCTION TO SCIOGRAPHY (SHADE & SHADOWS)

Sciography is a science of perspective dealing with the projection of shadows or delineation of an object in perspective with its gradations of light and shade.

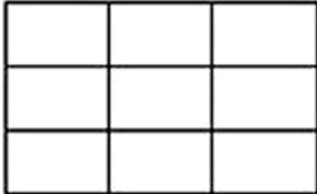
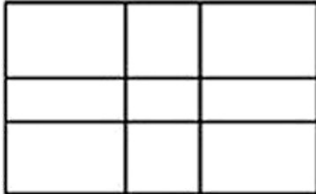

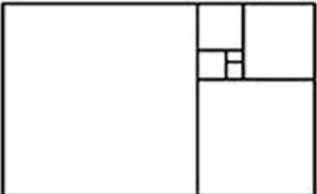
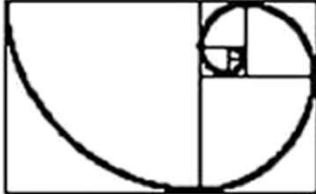

SHADE & SHADOWS:










- Shade refers to the relatively dark area on those parts of a solid that are tangent to or turned away from a light source.
- Shadows are the relatively dark figures cast upon a surface by an opaque body or part of a body intercepting the rays from a light source.
- A shade line or casting edge separates an illuminated surface from one in shade.
- A shadow line is the shadow cast by a shade line on a receiving surface
- The shape of the shadow is dependent on
 - The position of shade line
 - The position of the observer
 - The direction of the light and
 - The form of the surfaces on which the plane of the shadow falls



COMMON METHODS OF VISUAL COMPOSITION

GOLDEN PROPORTIONS

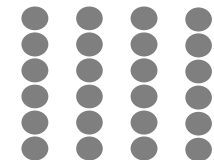
		
Rule of Thirds	Golden Section	Golden Triangles
		
Spiral Section	Golden Spiral	Harmonious Triangles

		
Cross	Diagonal	Compound curve
		
Focal mass	Radial	Pyramid
		
V- arrangement	L- arrangement	Circular

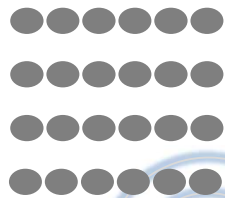
INTRODUCTION TO GESTALT'S THEORY

LAW OF PROXIMITY:

The closer objects are to each other, the more likely they are to be perceived as a group.



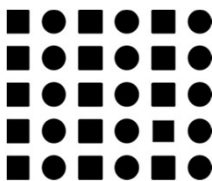
The above image is perceived as columns rather than rows



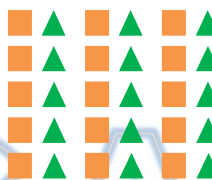
The above image is perceived as rows rather than columns

LAW OF SIMILARITY:

The principle of similarity states that things which share visual characteristics such as shape, size, color, texture, value or orientation will be seen as belonging together (form groups).



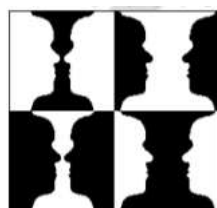
This image is grouped together by shapes



This image is grouped together by colours

LAW OF FIGURE – GROUND:

Figure and Ground explains how different elements are put together to make one scene or a whole image. "Figure" is the more dominant shape. "Ground" can be referred to as the background. Once the figure is identified, the rest of the image becomes the ground.



LAW OF CLOSURE:

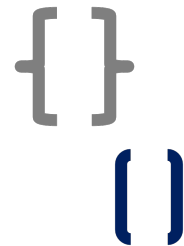
In perception there is the tendency to complete unfinished or partially obscured objects. (If a large pattern is with missing components, the eye tends to fill in the missing parts to create the actual image)



The eye perceives the square

LAW OF SYMMETRY

The human brain perceives symmetrical objects as parts of the same group. They create an impression of stability and order.



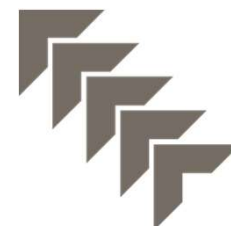
LAW OF GOOD CONTINUATION:

Objects will be grouped as a whole if they are co-linear, or follow a direction. Objects arranged in either a straight line or a smooth curve tends to be seen as an unit. In cases where there is an intersection between objects, individuals tend to perceive the two objects as two single uninterrupted entities.



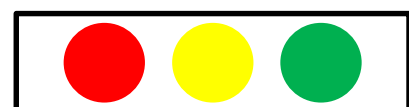
LAW OF COMMON FATE

It states that humans perceive visual elements that move in the same speed and/or direction as parts of a single stimulus. A common example of this is a flock of birds.



LAW OF PAST EXPERIENCE

Elements or objects frequently seen together in the past experience of a person are perceived to be as a group or in one single entity. The below three colours are perceived as traffic lights



INTRODUCTION TO PERSPECTIVES

The way one see the world is driven by rules of perspective. Perspective in sketching is a tool to create a realistic illusion of three-dimensional space. Everything that is drawn, from an apple to a spaceship, needs to follow the rules of perspective in order to look realistic.

ONE-POINT PERSPECTIVE:

One-point perspective (frontal or central perspective) has only one vanishing point on the horizon line located somewhere within the picture plane (PP) and all the planes converge towards it.

TWO-POINT PERSPECTIVE:

Two-point perspective (angular perspective) has two vanishing points on the horizon line, which do not necessarily need to be within the picture plane (PP)

THREE-POINT PERSPECTIVE:

Three-point perspective uses three vanishing points where two of them are on the horizon line and the third is either high above the horizon line or below it. There are two basic types of three-point perspective based on the position of the horizon line:

- Worm’s Eye View

The view perceived when a person looking high up, the horizon line is situated very low.

- Bird’s Eye View

The view perceived when a bird views over a city and looking down, the horizon line is situated above.

