

UCEED Sample Paper

Duration: 180 Minutes

Maximum Marks: 300

Instructions

- This is a full-length UCEED practice paper. **Part A** (Q1–Q57, 200 marks, computer-based) has three sections: **Section 1** NAT, Numerical Answer Type (Q1–Q14); **Section 2** MSQ, Multiple Select Questions (Q15–Q29); **Section 3** MCQ, Multiple Choice Questions (Q30–Q57). **Part B** (Q58–Q59, 100 marks, pen and paper) tests drawing and design aptitude.
- **Marking - Part A:** NAT: +4, no negative marking. MSQ: +4 if all correct options and no wrong option are chosen; +1 for each correct option chosen when no wrong option is chosen; –1 if any wrong option is chosen. MCQ: +3 for correct, –0.71 for wrong.
- **Marking - Part B:** each of the two questions carries **50 marks**, evaluated on your drawing and design response. There is no negative marking in Part B.
- Tap **View Solution** (Part A) or **View Model Approach** (Part B) under any question to jump to its worked explanation. Calculators and electronic gadgets are not allowed.

Section 1: Numerical Answer Type (NAT)

Q1. In typography, 1 pica equals 12 points and 1 inch equals 72 points. A column of text is set to a width of 30 picas. What is the width of the column in inches?

(Numerical Answer Type - enter a numerical value; no options.)

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Q2. A mobile screen has a dimension of 10 cm x 4 cm (height x width). A mobile user is viewing a picture in portrait mode and it occupies the entire screen. The user rotates the screen to landscape mode. After rotation, the height of the picture is now the width of the screen and its width gets reduced proportionally, leaving equal blank spaces on both sides of the picture. What is the area (in square centimeters) of the blank space on the left-hand side of the picture?

(Numerical Answer Type - enter a numerical value; no options.)

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Q3. A photograph is to be printed 6 inches wide at a resolution of 300 dpi (dots per inch). How many pixels wide must the image file be?

(Numerical Answer Type - enter a numerical value; no options.)

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Q4. In the ISO A paper series, A0 has an area of exactly 1 square metre, and each next size (A1, A2, ...) has half the area of the one before it. What is the area of an A4 sheet in square centimetres?

(Numerical Answer Type - enter a numerical value; no options.)

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Q5. A painter mixes white and black paints to create different shades in two different buckets. He prepares 10 kg in one bucket with 20% black paint in it. He then prepares 20 kg of another shade in the second bucket with 20% black paint in it. He pours the second bucket into the first one. What is the percentage of black paint in the mixture?

(Numerical Answer Type - enter a numerical value; no options.)

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Q6. An architect draws a building to a scale of 1:50. A wall that is 6 metres long in reality is drawn at its scale length. How long is the wall on the drawing, in centimetres?

(Numerical Answer Type - enter a numerical value; no options.)

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Q7. A wooden cube of side 5 cm is painted on all six faces and then cut into 1 cm cubes. How many of the small cubes have exactly two painted faces?

(Numerical Answer Type - enter a numerical value; no options.)

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Q8. A tank with internal dimension 10 cm x 10 cm x 10 cm (length x width x height) is fully filled with spherical marbles, each marble having a diameter of 1 cm. Each layer of marbles should have equal number of marbles. Water is then poured into the tank. What is the volume of water in cubic centimeters required to fill the voids? (Use $\pi = \frac{22}{7}$)

(Numerical Answer Type - enter a numerical value; no options.)

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Q9. A cube of side 4 cm is painted on all faces and then cut into 1 cm cubes. How many of the small cubes have exactly one painted face?

(Numerical Answer Type - enter a numerical value; no options.)

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Q10. A rectangular poster is enlarged so that each of its sides increases by 20%. By what percentage does the total area of the poster increase?

(Numerical Answer Type - enter a numerical value; no options.)

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Q11. With a straight cut you can slice a circular piece of paper into two pieces. A second cut that crosses the first cut will produce a maximum of four pieces. What is the maximum number of pieces that you can get with a total of four straight cuts?

(Numerical Answer Type - enter a numerical value; no options.)

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Q12. Look at the sequence 2, 6, 12, 20, 30, ... What is the next number in the sequence?

(Numerical Answer Type - enter a numerical value; no options.)

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Q13. What is the angle, in degrees, between the hour hand and the minute hand of a clock at exactly 3:30?

(Numerical Answer Type - enter a numerical value; no options.)

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Q14. A closed cylindrical tin has a base radius of 7 cm and a height of 20 cm. What is its volume in cubic centimetres? (Use $\pi = \frac{22}{7}$)

(Numerical Answer Type - enter a numerical value; no options.)

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Section 2: Multiple Select Questions (MSQ)

Q15. Which of the following statements about colour theory are correct?

(One or more options may be correct.)



- (A) Red, green and blue are the primary colours of the subtractive (pigment) colour model.
- (B) Complementary colours lie directly opposite each other on the colour wheel.
- (C) Cyan, magenta and yellow are the standard primary colours used in colour printing.
- (D) Mixing cyan, magenta and yellow pigments in equal strong amounts produces pure white.

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Q16. Which of the following terms are related to Architecture?

(One or more options may be correct.)

- (A) Vernacular
- (B) Pragmatic
- (C) Arcade
- (D) Fenestration

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Q17. Which of the following statements about the Bauhaus are true?

(One or more options may be correct.)

- (A) It was founded by the architect Walter Gropius in 1919.
- (B) It was based in the Italian city of Milan.
- (C) It aimed to unite fine art with craft and industrial design.
- (D) Marcel Breuer, linked to the school, designed the tubular-steel Wassily chair.

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Q18. Which of the following statements about camera settings are correct?

(One or more options may be correct.)

- (A) Increasing the f-number, for example from f/4 to f/16, widens the lens aperture.
- (B) A smaller f-number means a larger aperture, letting in more light.
- (C) A higher ISO makes the camera sensor more sensitive to light.
- (D) A faster shutter speed helps freeze fast-moving subjects.

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Q19. Which of the following statements is/are true?

(One or more options may be correct.)

- (A) Lucknow is famous for Chikankari work which is a traditional art of embroidery.
- (B) Chikankari literally means embroidery.
- (C) It was originally done with a white thread on a white cloth, hence the name 'white embroidery'.
- (D) Only the embroidery, with white thread on white cloth, is called chikankari.

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Q20. Which of the following statements about typography are correct?

(One or more options may be correct.)

- (A) Helvetica is a serif typeface.
- (B) 'Leading' refers to the horizontal space between two adjacent letters.



- (C) 'Kerning' is the adjustment of space between a specific pair of letters.
- (D) A 'serif' is a small finishing stroke at the ends of a letter's strokes.

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Q21. Which of the following statements about materials and manufacturing are true?

(One or more options may be correct.)

- (A) Injection moulding is widely used to mass-produce plastic parts.
- (B) Thermoplastics can be softened by heat and reshaped many times.
- (C) Anodising forms a protective oxide layer on aluminium.
- (D) Plywood is an engineered wood made by gluing thin veneer layers together.

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Q22. Which of the following statements are TRUE for Ajrakh, Paithani, Kalamkari, Phulkari, Khes and Bandhani?

(One or more options may be correct.)

- (A) All of the above are related to textiles of India.
- (B) At least three of the above are painting techniques of India.
- (C) Three of the above are artforms from Punjab.
- (D) Two of the above are weaving crafts from India.

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Q23. Which of the following statements about Indian textile crafts are correct?

(One or more options may be correct.)



- (A) Pashmina shawls are traditionally woven in Tamil Nadu.
- (B) Kanchipuram (Kanjeevaram) is a silk-weaving tradition of Tamil Nadu.
- (C) Bandhani is a block-printing craft native to West Bengal.
- (D) Banarasi saris, known for their brocade work, come from Varanasi.

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Q24. Which of the following statements about sustainable design and the environment are correct?

(One or more options may be correct.)

- (A) 'Upcycling' means fully breaking a product down into raw material before remaking it.
- (B) A product's 'carbon footprint' measures the greenhouse gases tied to its life cycle.
- (C) Biodegradable materials can be broken down naturally by microorganisms.
- (D) Single-use plastics are considered an environmentally sustainable choice.

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Q25. Which Indian city/cities is/are designated by UNESCO as a Creative City, until 2024?

(One or more options may be correct.)

- (A) Pune
- (B) Kozhikode
- (C) Gwalior



(D) Varanasi

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Q26. Which of the following statements about designers and their work is correct?

(One or more options may be correct.)

- (A) The Red and Blue chair was designed by Le Corbusier.
- (B) Raymond Loewy is best known as an Indian textile designer.
- (C) The Ambassador car was originally a Japanese design.
- (D) Dieter Rams, a German industrial designer, is known for his 'ten principles of good design'.

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Q27. Which of the following statements about art and design movements are true?

(One or more options may be correct.)

- (A) Art Nouveau is marked by flowing, organic lines inspired by natural forms.
- (B) Cubism, led by Picasso and Braque, is known for highly photorealistic portraits.
- (C) Minimalism favours heavy ornamentation and dense detail.
- (D) Art Deco, popular in the 1920s-30s, uses bold geometric shapes and rich colours.

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Q28. Which of the following statements about materials is correct?

(One or more options may be correct.)



- (A) Ceramics are generally ductile and can be bent easily without breaking.
- (B) Glass is a crystalline solid with a regular, ordered atomic structure.
- (C) Cast iron has a higher carbon content than mild steel.
- (D) Rubber is an example of a material with almost no elasticity.

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Q29. Which of the following statements about digital images are correct?

(One or more options may be correct.)

- (A) A JPEG uses lossless compression and never loses any image quality.
- (B) A PNG file supports transparency through an alpha channel.
- (C) Vector graphics can be scaled to any size without losing sharpness.
- (D) Raster (bitmap) images are made up of a grid of pixels.

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Section 3: Multiple Choice Questions (MCQ)

Q30. The Bauhaus, a school whose ideas strongly shaped modern art and design, was founded in Germany in 1919. Who was its founding director?

- (A) Walter Gropius
- (B) Le Corbusier
- (C) Wassily Kandinsky
- (D) Mies van der Rohe

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- Q31.** Which of the following statements is correct for a longitudinal marking provided at the centre of a road?
- (A) A broken longitudinal line allows overtaking.
 - (B) A solid longitudinal line always permits overtaking.
 - (C) Longitudinal markings are meant only for aesthetics.
 - (D) Double solid lines may be crossed when overtaking a slow-moving vehicle.

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- Q32.** On the traditional (RYB) colour wheel, which pair are complementary colours, sitting directly opposite each other?
- (A) Red and Orange
 - (B) Blue and Green
 - (C) Yellow and Violet
 - (D) Green and Orange

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- Q33.** A wooden cube of side 3 cm is painted red on all six faces and then cut into 1 cm cubes. How many of the small cubes have exactly two painted faces?
- (A) 8
 - (B) 12
 - (C) 6
 - (D) 24

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Q34. Samantha, Reema and Payal went late at night to visit an adventure place called The Mystery Spot. The place has a strange window-less room with white walls. One of the walls has a blue triangle and a red circle painted on it. The girls entered the room in turns. First, Samantha entered the room and came out telling that there were two shapes painted on the wall - one triangle and one circle. Then, Reema entered the same room and came out surprised as she saw only a triangle on the wall. Lastly, Payal entered the room and claimed that she saw only a circle on the wall. Which of the four statements is correct?

- (A) When Samantha entered, the room was lit by a blue light. When Reema entered the room, the light was changed to white light and when Payal entered the room, the light was changed to red.
- (B) When Samantha entered, the room was lit by a white light. When Reema entered the room, the light was changed to blue light and when Payal entered the room, the light was changed to red.
- (C) When Samantha entered, the room was lit by a white light. When Reema entered the room, the light was changed to red light and when Payal entered the room, the light was changed to blue.
- (D) When Samantha entered, the room was lit by a blue light. When Reema entered the room, the light was changed to red light and when Payal entered the room, the light was changed to white.

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Q35. In typography, the small finishing strokes at the ends of letter forms in fonts such as Times New Roman are called?

- (A) Kerning
- (B) Serifs



(C) Ligatures

(D) Baseline

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Q36. The master plan and several key government buildings of the city of Chandigarh were designed by which architect?

(A) Charles Correa

(B) B. V. Doshi

(C) Louis Kahn

(D) Le Corbusier

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Q37. Who is the first Indian to receive an Academy Award (Oscar)?

(A) Bhanu Athaiya

(B) A. R. Rahman

(C) Satyajit Ray

(D) M. Night Shyamalan

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Q38. The famous "I Love NY" logo, in which a red heart replaces the word "Love", was designed by which graphic designer?

(A) Paul Rand

(B) Saul Bass

(C) Milton Glaser

(D) Massimo Vignelli



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Q39. Which of the following is a renewable source of energy?

- (A) Coal
- (B) Natural gas
- (C) Petroleum
- (D) Solar energy

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Q40. If delulu = 010101, skibidi = 0010101, bussin = 010010, and ghosted = 0010010, then what is 010100?

- (A) boujee
- (B) mewing
- (C) pookie
- (D) cheugy

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Q41. Find the next number in the series: 2, 6, 12, 20, 30, ?

- (A) 40
- (B) 42
- (C) 44
- (D) 36

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Q42. In a certain code, CAT is written as DBU. Using the same rule, how is DOG written?



- (A) EPH
- (B) CPF
- (C) EPI
- (D) FQI

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Q43. What is the main purpose for the presence of water in a toilet bowl (Western Commode/Water Closet)?

- (A) To prevent back flow of sewer gases.
- (B) To efficiently flush solid, semi-solid fecal matter.
- (C) To regulate water temperature in plumbing lines.
- (D) To neutralize acidic waste materials.

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Q44. A person walks 5 km towards North, then turns right and walks 3 km, then turns right again and walks 5 km. How far and in which direction is the person now from the starting point?

- (A) 3 km West
- (B) 8 km North
- (C) 3 km East
- (D) 5 km South

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Q45. Which one does not belong with the others?

- (A) Circle
- (B) Square



- (C) Triangle
- (D) Sphere

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Q46. What is the length of the edge of the largest cube that can be placed inside a sphere of radius 10 cm?

- (A) $10/(\sqrt{2})$ cm
- (B) $10/(\sqrt{3})$ cm
- (C) $20/(\sqrt{2})$ cm
- (D) $20/(\sqrt{3})$ cm

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Q47. In ergonomic and product design, the term "anthropometry" refers to which of the following?

- (A) The study of colour perception by the eye
- (B) The measurement of human body dimensions
- (C) The testing of material strength
- (D) The study of room acoustics

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Q48. The early twentieth-century art movement led by artists such as Salvador Dali and Rene Magritte, which explored dreams and the unconscious mind, is known as?

- (A) Cubism
- (B) Impressionism
- (C) Surrealism



(D) Fauvism

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Q49. Which option is the odd one out?

(A) WOW MADAM

(B) CIVIC ROTATOR

(C) SOLO LEVEL

(D) NOON SAGAS

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Q50. The three additive primary colours of light, mixed on television and computer screens, are?

(A) Red, Green, Blue

(B) Red, Yellow, Blue

(C) Cyan, Magenta, Yellow

(D) Red, Green, Yellow

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Q51. Madhubani (Mithila) painting is a well-known traditional folk art that originates from which Indian state?

(A) Bihar

(B) Rajasthan

(C) Odisha

(D) West Bengal

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Q52. Phulkari, Chikankari, Sambalpuri and Paithani are weaving and embroidery traditions from different states of India. Which option lists the states in the correct sequence?

- (A) Uttar Pradesh, Maharashtra, Assam, Punjab
- (B) Punjab, Uttar Pradesh, Odisha, Maharashtra
- (C) Uttar Pradesh, Odisha, Punjab, Maharashtra
- (D) Odisha, Uttar Pradesh, Assam, Punjab

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Q53. The famous house "Fallingwater", built partly over a waterfall, was designed by which architect?

- (A) Le Corbusier
- (B) Frank Gehry
- (C) Zaha Hadid
- (D) Frank Lloyd Wright

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Q54. In manufacturing, the process of forcing molten plastic into a closed mould to produce many identical parts is called?

- (A) Forging
- (B) Injection moulding
- (C) Welding
- (D) Turning

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Q55. Which of the following image file formats is a vector format, so it can be scaled to any size without losing quality?



- (A) JPEG
- (B) PNG
- (C) GIF
- (D) SVG

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Q56. In typography and print, how many points make up one inch?

- (A) 12
- (B) 96
- (C) 72
- (D) 100

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Q57. The golden ratio, often used in art and design composition, is approximately equal to?

- (A) 1.414
- (B) 2.718
- (C) 3.142
- (D) 1.618

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Part B: Drawing and Design
Aptitude (Pen and Paper)

Q58. [Drawing - 50 Marks]

The competitive examinations are finally over and you are going on a holiday. You are at the nearest railway station with your family and



relatives, waiting for the train that you can see arriving. The platform is bustling with activity. Other travellers with luggage, vendors and porters (and whatever else you are likely to observe) are also on the platform. Imagine and draw what you see, giving prominence to your family and relatives.

Note: Make pencil sketches only. Do not use colour.

Evaluation criteria: observation; composition of figures and objects; sense of perspective and proportion; quality of lines; attention to detail.

[View Model Approach](#)

Q59. [Design Aptitude - 50 Marks]

A visit to a museum or a zoo is always something we look forward to with much excitement. But such visits are very tiring too; after about an hour or so we look for a place to sit - a chair or bench - that is never nearby. What if we could carry our own chair everywhere?

Design a portable seating device that you could carry in your backpack or hand bag. It should be light enough to carry around, small enough to fit into your bag, easy to use, and good to look at. Show the seating device (1) when it has just been taken out of the bag, and (2) when it is ready to sit on.

Note: Make pencil sketches only. Do not use colour. Explain your design only through visuals and short labels; do not write separate explanations.

[View Model Approach](#)



Detailed Solutions**Q1.**

Q. In typography, 1 pica equals 12 points and 1 inch equals 72 points. A column of text is set to a width of 30 picas. What is the width of the column in inches?

Solution

Concept - Typographic units: A pica is 12 points and there are 72 points in one inch, so 6 picas make one inch.

Step 1 - Picas to points: $30 \times 12 = 360$ points.

Step 2 - Points to inches: $360 \div 72 = 5$ inches.

Tip: Since 6 picas make an inch, just divide the picas by 6: $30 \div 6 = 5$.

Answer: 5 [Go Back to Q1](#)

Q2.

Q. A mobile screen has a dimension of 10 cm x 4 cm (height x width). A mobile user is viewing a picture in portrait mode and it occupies the entire screen. The user rotates the screen to landscape mode. After rotation, the height of the picture is now the width of the screen and its width gets reduced proportionally, leaving equal blank spaces on both sides of the picture. What is the area (in square centimeters) of the blank space on the left-hand side of the picture?



Solution

Concept - Aspect ratio kept on rotation: The picture keeps its height-to-width ratio; the leftover screen width becomes two equal blank margins.

Step 1 - Portrait picture: It fills 10×4 , so height : width = $10 : 4 = 2.5 : 1$.

Step 2 - After rotation: The landscape screen is 10 wide and 4 tall. The picture height equals the screen height = 4 cm, so picture width = $4 \div 2.5 = 1.6$ cm.

Step 3 - Blank space: Total blank width = $10 - 1.6 = 8.4$ cm, split equally gives 4.2 cm per side. Blank height = 4 cm, so left blank area = $4.2 \times 4 = 16.8$ sq cm.

Tip: Fix the aspect ratio first, then let the leftover width form the two equal side margins.

Answer: 16.8 [Go Back to Q2](#)

Q3.

Q. A photograph is to be printed 6 inches wide at a resolution of 300 dpi (dots per inch). How many pixels wide must the image file be?

Solution

Concept - Print resolution: Pixel width equals print width in inches multiplied by the dpi.

Step 1 - Multiply: $6 \times 300 = 1800$ pixels.



Tip: At 300 dpi every printed inch needs 300 pixels for a sharp result.

Answer: 1800 [Go Back to Q3](#)

Q4.

Q. In the ISO A paper series, A0 has an area of exactly 1 square metre, and each next size (A1, A2, ...) has half the area of the one before it. What is the area of an A4 sheet in square centimetres?

Solution

Concept - Halving series: The area of A_n is $1 \text{ m}^2 \div 2^n$.

Step 1 - Find A4: $A_4 = 1 \div 2^4 = \frac{1}{16} \text{ m}^2$.

Step 2 - Convert: $1 \text{ m}^2 = 10000 \text{ cm}^2$, so $A_4 = \frac{10000}{16} = 625 \text{ cm}^2$.

Tip: Each step down the A-series halves the area, so A0 to A4 is four halvings.

Answer: 625 [Go Back to Q4](#)

Q5.

Q. A painter mixes white and black paints to create different shades in two different buckets. He prepares 10 kg in one bucket with 20% black paint in it. He then prepares 20 kg of another shade in the second bucket with 20% black paint in it. He pours the second bucket into the first one. What is the percentage of black paint in the mixture?



Solution

Concept - Mixing equal concentrations: Blending two batches that both have the same percentage keeps that same percentage.

Step 1 - Black in each bucket: Bucket 1: 20% of 10 = 2 kg.

Bucket 2: 20% of 20 = 4 kg.

Step 2 - Combine: Total black = 6 kg in 30 kg, so $\frac{6}{30} = 20\%$.

Tip: If both parts share the same percentage, the mixture keeps it no matter the amounts.

Answer: 20 [Go Back to Q5](#)

Q6.

Q. An architect draws a building to a scale of 1:50. A wall that is 6 metres long in reality is drawn at its scale length. How long is the wall on the drawing, in centimetres?

Solution

Concept - Scale ratio: Drawing length equals real length divided by the scale factor.

Step 1 - Same units: 6 m = 600 cm.

Step 2 - Divide: $600 \div 50 = 12$ cm.

Tip: Always convert both lengths to the same unit before dividing by the scale.

Answer: 12 [Go Back to Q6](#)

Q7.



Q. A wooden cube of side 5 cm is painted on all six faces and then cut into 1 cm cubes. How many of the small cubes have exactly two painted faces?

Solution

Concept - Painted-cube edges: Small cubes with exactly two painted faces sit along the edges, between the corners. The count is $12 \times (n - 2)$.

Step 1 - Per edge: With $n = 5$, each edge has $5 - 2 = 3$ such cubes.

Step 2 - All edges: $12 \times 3 = 36$.

Tip: Two-face cubes are always the edge cubes lying between two corners.

Answer: 36 [Go Back to Q7](#)

Q8.

Q. A tank with internal dimension 10 cm x 10 cm x 10 cm (length x width x height) is fully filled with spherical marbles, each marble having a diameter of 1 cm. Each layer of marbles should have equal number of marbles. Water is then poured into the tank. What is the volume of water in cubic centimeters required to fill the voids? (Use $\pi = \frac{22}{7}$)

Solution

Concept - Voids = tank volume minus marble volume: Water only fills the empty gaps left between the marbles.



Step 1 - Count marbles: Simple stacking gives 10 per row, 10 rows per layer, 10 layers = 1000 marbles.

Step 2 - Marble volume: Radius = 0.5 cm, so one marble = $\frac{4}{3}\pi r^3 = \frac{4}{3} \times \frac{22}{7} \times 0.125 = \frac{11}{21} \text{ cm}^3$. Total = $1000 \times \frac{11}{21} = \frac{11000}{21} \approx 523.81 \text{ cm}^3$.

Step 3 - Water needed: $1000 - \frac{11000}{21} = \frac{10000}{21} \approx 476.19 \text{ cm}^3$.

Tip: Subtract the total marble volume from the tank volume to get the void space.

Answer: 476.19 [Go Back to Q8](#)

Q9.

Q. A cube of side 4 cm is painted on all faces and then cut into 1 cm cubes. How many of the small cubes have exactly one painted face?

Solution

Concept - Painted-cube faces: One-face cubes sit in the middle region of each face. The count is $6 \times (n - 2)^2$.

Step 1 - Per face: With $n = 4$, $(n - 2)^2 = 2^2 = 4$.

Step 2 - All faces: $6 \times 4 = 24$.

Tip: One-face cubes form the inner square on each of the six faces.

Answer: 24 [Go Back to Q9](#)

Q10.



Q. A rectangular poster is enlarged so that each of its sides increases by 20%. By what percentage does the total area of the poster increase?

Solution

Concept - Area scales as the square of the linear factor: If each side is multiplied by k , the area is multiplied by k^2 .

Step 1 - Linear factor: Each side becomes 1.20 times, so area becomes $(1.20)^2 = 1.44$ times.

Step 2 - Increase: $1.44 - 1 = 0.44 = 44\%$.

Tip: A $p\%$ side rise raises area by $\left(2p + \frac{p^2}{100}\right)\%$; here $40 + 4 = 44$.

Answer: 44 [Go Back to Q10](#)

Q11.

Q. With a straight cut you can slice a circular piece of paper into two pieces. A second cut that crosses the first cut will produce a maximum of four pieces. What is the maximum number of pieces that you can get with a total of four straight cuts?

Solution

Concept - Maximum regions from straight cuts: Each new cut should cross all earlier cuts. The maximum after n cuts is $1 + \frac{n(n+1)}{2}$.

Step 1 - Build up: 1 cut gives 2, 2 cuts give 4, 3 cuts give 7, 4 cuts give 11 (each new cut adds one more piece than the last).

Step 2 - Formula check: For $n = 4$: $1 + \frac{4 \times 5}{2} = 1 + 10 = 11$.



Tip: The k -th cut adds k new pieces when it crosses every earlier cut.

Answer: 11 [Go Back to Q11](#)

Q12.

Q. Look at the sequence 2, 6, 12, 20, 30, ...

What is the next number in the sequence?

Solution

Concept - Second differences: The gaps between terms grow by a fixed amount.

Step 1 - Differences: 4, 6, 8, 10 (each 2 more than the last).

Step 2 - Next term: Next gap = 12, so $30 + 12 = 42$.

Tip: These terms are $n(n + 1)$: $1 \times 2, 2 \times 3, 3 \times 4, \dots$, so the sixth is $6 \times 7 = 42$.

Answer: 42 [Go Back to Q12](#)

Q13.

Q. What is the angle, in degrees, between the hour hand and the minute hand of a clock at exactly 3:30?

Solution

Concept - Clock angles: The minute hand moves 6° per minute and the hour hand 0.5° per minute.

Step 1 - Minute hand: At 30 minutes it is at $30 \times 6 = 180^\circ$.



Step 2 - Hour hand: At 3:30 it is at $3 \times 30 + 30 \times 0.5 = 90 + 15 = 105^\circ$.

Step 3 - Difference: $180 - 105 = 75^\circ$.

Tip: Remember the hour hand drifts past the hour mark as the minutes pass.

Answer: 75 [Go Back to Q13](#)

Q14.

Q. A closed cylindrical tin has a base radius of 7 cm and a height of 20 cm. What is its volume in cubic centimetres? (Use $\pi = \frac{22}{7}$)

Solution

Concept - Cylinder volume: $V = \pi r^2 h$.

Step 1 - Substitute: $r^2 = 49$, so $V = \frac{22}{7} \times 49 \times 20$.

Step 2 - Compute: $\frac{22}{7} \times 49 = 154$; then $154 \times 20 = 3080 \text{ cm}^3$.

Tip: Cancel the 7 in π against the 49 first to keep the arithmetic simple.

Answer: 3080 [Go Back to Q14](#)

Q15.

Q. Which of the following statements about colour theory are correct?

- (A) Red, green and blue are the primary colours of the subtractive (pigment) colour model.
- (B) Complementary colours lie directly opposite each other on the colour wheel.



- (C) Cyan, magenta and yellow are the standard primary colours used in colour printing.
- (D) Mixing cyan, magenta and yellow pigments in equal strong amounts produces pure white.

Solution

Concept - Additive vs subtractive colour: Mixing light (RGB) is additive; mixing pigments or inks (CMY) is subtractive.

Step 1 - Check each option: A: Red, green and blue are the additive (light) primaries, not the subtractive ones. False. B: Complementary colours sit opposite one another on the wheel. True. C: Colour printing uses cyan, magenta and yellow (with black) as primaries. True. D: Strongly mixing cyan, magenta and yellow pigments gives a dark near-black, not white. False.

Step 2 - Conclusion: Correct options are B and C.

Tip: Light adds up towards white; pigments subtract towards black.

Answer: B, C [Go Back to Q15](#)

Q16.

Q. Which of the following terms are related to Architecture?

- (A) Vernacular
- (B) Pragmatic
- (C) Arcade
- (D) Fenestration



Solution

Concept - Architecture vocabulary: Several of these are standard building terms; one is a general adjective.

Step 1 - Check each option: A: Vernacular architecture uses local materials and traditions. Related. True. B: Pragmatic means practical or matter-of-fact - a general word, not a building term. False. C: An arcade is a covered walk lined with arches. Related. True. D: Fenestration is the arrangement of windows and openings in a building. Related. True.

Step 2 - Conclusion: Correct options are A, C and D.

Tip: 'Pragmatic' is the odd one out - a general adjective rather than an architecture term.

Answer: A, C, D [Go Back to Q16](#)

Q17.

Q. Which of the following statements about the Bauhaus are true?

- (A) It was founded by the architect Walter Gropius in 1919.
- (B) It was based in the Italian city of Milan.
- (C) It aimed to unite fine art with craft and industrial design.
- (D) Marcel Breuer, linked to the school, designed the tubular-steel Wassily chair.

Solution

Concept - Bauhaus design school: A German school (1919) that fused art, craft and industry.



Step 1 - Check each option: A: The Bauhaus was founded by Walter Gropius in 1919. True. B: It was based in Germany (Weimar, later Dessau), not Milan. False. C: Its core aim was to bring art, craft and technology together. True. D: Marcel Breuer designed the tubular-steel Wassily (Model B3) chair. True.

Step 2 - Conclusion: Correct options are A, C and D.

Tip: Remember Bauhaus = Germany, and art plus craft plus industry.

Answer: A, C, D [Go Back to Q17](#)

Q18.

Q. Which of the following statements about camera settings are correct?

- (A) Increasing the f-number, for example from $f/4$ to $f/16$, widens the lens aperture.
- (B) A smaller f-number means a larger aperture, letting in more light.
- (C) A higher ISO makes the camera sensor more sensitive to light.
- (D) A faster shutter speed helps freeze fast-moving subjects.

Solution

Concept - Exposure triangle: Aperture (f-number), ISO and shutter speed together control exposure.

Step 1 - Check each option: A: A higher f-number gives a smaller aperture, not a wider one. False. B: A smaller f-number means a wider aperture and more light. True. C: Raising the ISO increases



the sensor's sensitivity to light. True. D: A faster shutter speed freezes fast motion. True.

Step 2 - Conclusion: Correct options are B, C and D.

Tip: The f-number and the actual aperture size move in opposite directions.

Answer: B, C, D [Go Back to Q18](#)

Q19.

Q. Which of the following statements is/are true?

- (A) Lucknow is famous for Chikankari work which is a traditional art of embroidery.
- (B) Chikankari literally means embroidery.
- (C) It was originally done with a white thread on a white cloth, hence the name 'white embroidery'.
- (D) Only the embroidery, with white thread on white cloth, is called chikankari.

Solution

Concept - Chikankari embroidery: A delicate hand-embroidery tradition of Lucknow.

Step 1 - Check each option: A: Lucknow is famous for Chikankari, a traditional embroidery art. True. B: 'Chikan' means embroidery, so Chikankari literally means embroidery. True. C: It began as white thread on white cloth, hence 'white embroidery'. True. D: Chikankari is now also worked in coloured threads, so limiting it to only white on white is too narrow. False.



Step 2 - Conclusion: Correct options are A, B and C.

Tip: Option D is the trap - it over-restricts a craft that has since added colour.

Answer: A, B, C [Go Back to Q19](#)

Q20.

Q. Which of the following statements about typography are correct?

- (A) Helvetica is a serif typeface.
- (B) 'Leading' refers to the horizontal space between two adjacent letters.
- (C) 'Kerning' is the adjustment of space between a specific pair of letters.
- (D) A 'serif' is a small finishing stroke at the ends of a letter's strokes.

Solution

Concept - Typography terms: Serifs, kerning and leading each describe a specific type feature.

Step 1 - Check each option: A: Helvetica is a sans-serif typeface. False. B: Leading is the vertical spacing between lines of text, not horizontal letter spacing. False. C: Kerning adjusts the space between a specific pair of letters. True. D: A serif is the small finishing stroke at the end of a letter's strokes. True.

Step 2 - Conclusion: Correct options are C and D.



Tip: Leading is vertical (line spacing); kerning and tracking are horizontal (letter spacing).

Answer: C, D [Go Back to Q20](#)

Q21.

Q. Which of the following statements about materials and manufacturing are true?

- (A) Injection moulding is widely used to mass-produce plastic parts.
- (B) Thermoplastics can be softened by heat and reshaped many times.
- (C) Anodising forms a protective oxide layer on aluminium.
- (D) Plywood is an engineered wood made by gluing thin veneer layers together.

Solution

Concept - Materials and processes: Common making processes and material behaviours in product design.

Step 1 - Check each option: A: Injection moulding forces molten plastic into a mould for mass production. True. B: Thermoplastics soften on heating and can be remoulded repeatedly. True. C: Anodising builds a protective oxide layer on aluminium surfaces. True. D: Plywood is made from thin veneer layers glued with alternating grain. True.

Step 2 - Conclusion: All four are correct - A, B, C and D.

Tip: When every statement is a standard, correct fact, the answer is



all four.

Answer: A, B, C, D [Go Back to Q21](#)

Q22.

Q. Which of the following statements are TRUE for Ajrakh, Paithani, Kalamkari, Phulkari, Khes and Bandhani?

- (A) All of the above are related to textiles of India.
- (B) At least three of the above are painting techniques of India.
- (C) Three of the above are artforms from Punjab.
- (D) Two of the above are weaving crafts from India.

Solution

Concept - Indian textile crafts: Ajrakh (block print), Paithani (woven silk), Kalamkari (hand-painted or printed), Phulkari (embroidery, Punjab), Khes (woven cotton), Bandhani (tie-dye).

Step 1 - Check each option: A: All six are Indian textile crafts. True. B: Only Kalamkari is really a painting technique, so not three. False. C: Phulkari and Khes are from the Punjab region, but that is two, not three. False. D: Paithani and Khes are weaving crafts, so two of them are weaving crafts. True.

Step 2 - Conclusion: Correct options are A and D.

Tip: Sort each craft by technique - print, paint, weave, embroider, tie-dye - then count.

Answer: A, D [Go Back to Q22](#)

Q23.



Q. Which of the following statements about Indian textile crafts are correct?

- (A) Pashmina shawls are traditionally woven in Tamil Nadu.
- (B) Kanchipuram (Kanjeevaram) is a silk-weaving tradition of Tamil Nadu.
- (C) Bandhani is a block-printing craft native to West Bengal.
- (D) Banarasi saris, known for their brocade work, come from Varanasi.

Solution

Concept - Craft geography: Each textile tradition belongs to a particular region of India.

Step 1 - Check each option: A: Pashmina is woven in Kashmir, not Tamil Nadu. False. B: Kanchipuram (Kanjeevaram) silk saris are a Tamil Nadu weaving tradition. True. C: Bandhani is a tie-and-dye craft of Gujarat and Rajasthan, not a West Bengal block print. False. D: Banarasi brocade saris come from Varanasi (Banaras). True.

Step 2 - Conclusion: Correct options are B and D.

Tip: Match each craft to its home state to spot the false claims.

Answer: B, D [Go Back to Q23](#)

Q24.

Q. Which of the following statements about sustainable design and the environment are correct?

- (A) 'Upcycling' means fully breaking a product down into raw



material before remaking it.

- (B) A product's 'carbon footprint' measures the greenhouse gases tied to its life cycle.
- (C) Biodegradable materials can be broken down naturally by microorganisms.
- (D) Single-use plastics are considered an environmentally sustainable choice.

Solution

Concept - Sustainability terms: Upcycling, carbon footprint and biodegradability describe how products affect the environment.

Step 1 - Check each option: A: Upcycling reuses or reworks an item into something of higher value without breaking it down to raw material; that description fits recycling. False. B: Carbon footprint is the total greenhouse gas linked to a product's life cycle. True. C: Biodegradable materials are broken down naturally by microorganisms. True. D: Single-use plastics are widely regarded as unsustainable. False.

Step 2 - Conclusion: Correct options are B and C.

Tip: Upcycling adds value without destroying the object; recycling reprocesses the raw material.

Answer: B, C [Go Back to Q24](#)

Q25.

Q. Which Indian city/cities is/are designated by UNESCO as a Creative City, until 2024?



- (A) Pune
- (B) Kozhikode
- (C) Gwalior
- (D) Varanasi

Solution

Concept - UNESCO Creative Cities Network (India, up to 2024):

Cities recognised for crafts, music, literature, film, design or gastronomy.

Step 1 - Check each option: A: Pune is not a UNESCO Creative City. False. B: Kozhikode was named a City of Literature (2023). True. C: Gwalior was named a City of Music (2023). True. D: Varanasi is a City of Music (2015). True.

Step 2 - Conclusion: Correct options are B, C and D.

Tip: India's Creative Cities include Jaipur, Varanasi, Chennai, Mumbai, Hyderabad, Srinagar, Gwalior and Kozhikode - but not Pune.

Answer: B, C, D [Go Back to Q25](#)

Q26.

Q. Which of the following statements about designers and their work is correct?

- (A) The Red and Blue chair was designed by Le Corbusier.
- (B) Raymond Loewy is best known as an Indian textile designer.
- (C) The Ambassador car was originally a Japanese design.
- (D) Dieter Rams, a German industrial designer, is known for his



'ten principles of good design'.

Solution

Concept - Designers and their work: Matching iconic objects to the correct designer or origin.

Step 1 - Check each option: A: The Red and Blue chair was designed by Gerrit Rietveld, not Le Corbusier. False. B: Raymond Loewy was a French-American industrial designer, not an Indian textile designer. False. C: The Ambassador (Hindustan Motors) was based on the British Morris Oxford, not a Japanese design. False. D: Dieter Rams is famous for his ten principles of good design. True.

Step 2 - Conclusion: Only D is correct.

Tip: Link each object to its real designer - Rietveld, Loewy, Morris Oxford - to eliminate the wrong claims.

Answer: D [Go Back to Q26](#)

Q27.

Q. Which of the following statements about art and design movements are true?

- (A) Art Nouveau is marked by flowing, organic lines inspired by natural forms.
- (B) Cubism, led by Picasso and Braque, is known for highly photorealistic portraits.
- (C) Minimalism favours heavy ornamentation and dense detail.
- (D) Art Deco, popular in the 1920s-30s, uses bold geometric



shapes and rich colours.

Solution

Concept - Design movements: Each movement has a recognisable visual style.

Step 1 - Check each option: A: Art Nouveau uses flowing, organic, nature-inspired lines. True. B: Cubism breaks subjects into fragmented geometric planes, the opposite of photorealism. False. C: Minimalism strips away ornament and detail. False. D: Art Deco is defined by bold geometry and rich colour. True.

Step 2 - Conclusion: Correct options are A and D.

Tip: Art Nouveau means organic curves; Art Deco means bold geometry.

Answer: A, D [Go Back to Q27](#)

Q28.

Q. Which of the following statements about materials is correct?

- (A) Ceramics are generally ductile and can be bent easily without breaking.
- (B) Glass is a crystalline solid with a regular, ordered atomic structure.
- (C) Cast iron has a higher carbon content than mild steel.
- (D) Rubber is an example of a material with almost no elasticity.

Solution



Concept - Material properties: Ductility, atomic structure and composition define how materials behave.

Step 1 - Check each option: A: Ceramics are brittle, not ductile. False. B: Glass is amorphous (no long-range order), not crystalline. False. C: Cast iron holds more carbon (about 2 to 4%) than mild steel (under about 0.3%). True. D: Rubber is highly elastic. False.

Step 2 - Conclusion: Only C is correct.

Tip: Brittle ceramics, amorphous glass and elastic rubber are the three traps here.

Answer: C [Go Back to Q28](#)

Q29.

Q. Which of the following statements about digital images are correct?

- (A) A JPEG uses lossless compression and never loses any image quality.
- (B) A PNG file supports transparency through an alpha channel.
- (C) Vector graphics can be scaled to any size without losing sharpness.
- (D) Raster (bitmap) images are made up of a grid of pixels.

Solution

Concept - Image file formats: Raster vs vector, and how each format handles compression and transparency.

Step 1 - Check each option: A: JPEG uses lossy compression,



so quality drops as it is compressed. False. B: PNG supports transparency through an alpha channel. True. C: Vector graphics are defined by maths, so they scale cleanly to any size. True. D: Raster images are grids of pixels. True.

Step 2 - Conclusion: Correct options are B, C and D.

Tip: JPEG is lossy for photos; PNG keeps transparency; vectors scale without blur.

Answer: B, C, D [Go Back to Q29](#)

Q30.

Q. The Bauhaus, a school whose ideas strongly shaped modern art and design, was founded in Germany in 1919. Who was its founding director?

- (A) Walter Gropius
- (B) Le Corbusier
- (C) Wassily Kandinsky
- (D) Mies van der Rohe

Solution

Concept - Design history, the Bauhaus: The Bauhaus (1919-1933) merged craft and fine art and defined modernist design. It was founded and first led by the architect Walter Gropius.

Step 1 - Place the others: Kandinsky taught there but did not found it. Mies van der Rohe was its last director. Le Corbusier was never part of the Bauhaus.



Step 2 - Conclude: The founding director was Walter Gropius.

Tip: Remember the leadership order: Gropius, then Meyer, then Mies van der Rohe.

Answer: A [Go Back to Q30](#)

Q31.

Q. Which of the following statements is correct for a longitudinal marking provided at the centre of a road?

- (A) A broken longitudinal line allows overtaking.
- (B) A solid longitudinal line always permits overtaking.
- (C) Longitudinal markings are meant only for aesthetics.
- (D) Double solid lines may be crossed when overtaking a slow-moving vehicle.

Solution

Concept - Road marking rules: Centre-line markings tell drivers when it is safe to cross or overtake. A broken (dashed) line means crossing and overtaking are allowed when the road ahead is clear.

Step 1 - Test each option: A solid line means do not cross, so overtaking is not permitted. Markings are functional, not decorative. Double solid lines must not be crossed at all.

Step 2 - Conclude: Only the broken-line statement is correct.

Tip: Broken means free to cross; solid means stay in lane.

Answer: A [Go Back to Q31](#)

Q32.



Q. On the traditional (RYB) colour wheel, which pair are complementary colours, sitting directly opposite each other?

- (A) Red and Orange
- (B) Blue and Green
- (C) Yellow and Violet
- (D) Green and Orange

Solution

Concept - Colour theory, complementary pairs: On the artists' RYB wheel, a primary colour sits opposite the secondary colour made from the other two primaries. Yellow (primary) is opposite Violet (red + blue).

Step 1 - Check the pairs: Red-Orange and Blue-Green are neighbours (analogous), not opposites. Green-Orange are also not opposite.

Step 2 - Conclude: Yellow and Violet form a complementary pair.

Tip: The three classic complementary pairs are red-green, blue-orange and yellow-violet.

Answer: C [Go Back to Q32](#)

Q33.

Q. A wooden cube of side 3 cm is painted red on all six faces and then cut into 1 cm cubes. How many of the small cubes have exactly two painted faces?

- (A) 8



- (B) 12
(C) 6
(D) 24

Solution

Concept - Cube painting, edge cubes: When a painted cube of side n is cut into unit cubes, the small cubes with exactly two painted faces lie along the edges (but not corners). Their count is $12(n - 2)$.

Step 1 - Substitute $n = 3$: $12 \times (3 - 2) = 12 \times 1 = 12$.

Step 2 - Sanity check: A cube has 12 edges, each contributing one middle cube here, giving 12.

Tip: Corners give 3 faces (always 8), edges give 2, face-centres give 1, interior gives 0.

Answer: B [Go Back to Q33](#)

Q34.

Q. Samantha, Reema and Payal went late at night to visit an adventure place called The Mystery Spot. The place has a strange window-less room with white walls. One of the walls has a blue triangle and a red circle painted on it. The girls entered the room in turns. First, Samantha entered the room and came out telling that there were two shapes painted on the wall - one triangle and one circle. Then, Reema entered the same room and came out surprised as she saw only a triangle on the wall. Lastly, Payal entered the room and claimed that she saw only a circle on the



wall. Which of the four statements is correct?

- (A) When Samantha entered, the room was lit by a blue light.
When Reema entered the room, the light was changed to white light and when Payal entered the room, the light was changed to red.
- (B) When Samantha entered, the room was lit by a white light.
When Reema entered the room, the light was changed to blue light and when Payal entered the room, the light was changed to red.
- (C) When Samantha entered, the room was lit by a white light.
When Reema entered the room, the light was changed to red light and when Payal entered the room, the light was changed to blue.
- (D) When Samantha entered, the room was lit by a blue light.
When Reema entered the room, the light was changed to red light and when Payal entered the room, the light was changed to white.

Solution

Concept - Coloured light and reflection: An object appears to vanish against a white wall when the light is its own colour (both reflect that colour), and appears dark when the light is a colour it cannot reflect.

Step 1 - Samantha sees both: All colours are present, so the light is white and both shapes show.

Step 2 - Reema sees only the triangle: Under red light the white wall looks red and the red circle blends in and disappears; the blue



triangle looks dark and stays visible.

Step 3 - Payal sees only the circle: Under blue light the blue triangle blends into the wall while the red circle looks dark and stays visible.

Tip: Same-colour light hides a coloured mark against a white ground.

Answer: C [Go Back to Q34](#)

Q35.

Q. In typography, the small finishing strokes at the ends of letter forms in fonts such as Times New Roman are called?

- (A) Kerning
- (B) Serifs
- (C) Ligatures
- (D) Baseline

Solution

Concept - Typography vocabulary: Serifs are the small projecting strokes at the ends of the main strokes of a letter. Fonts with them are serif fonts; those without are sans-serif.

Step 1 - Rule out others: Kerning is spacing between two letters, a ligature joins two letters into one glyph, and the baseline is the line the letters sit on.

Step 2 - Conclude: The finishing strokes are serifs.

Tip: Times New Roman is serif; Helvetica and Arial are sans-serif.



Answer: B [Go Back to Q35](#)

Q36.

Q. The master plan and several key government buildings of the city of Chandigarh were designed by which architect?

- (A) Charles Correa
- (B) B. V. Doshi
- (C) Louis Kahn
- (D) Le Corbusier

Solution

Concept - Modern Indian architecture: Chandigarh, planned in the 1950s, was designed by the Swiss-French architect Le Corbusier, who also designed the Capitol Complex buildings there.

Step 1 - Place the others: Correa and Doshi are major Indian modern architects but did not plan Chandigarh; Louis Kahn designed the IIM Ahmedabad campus.

Step 2 - Conclude: Chandigarh was designed by Le Corbusier.

Tip: The Open Hand Monument is Le Corbusier's symbol for Chandigarh.

Answer: D [Go Back to Q36](#)

Q37.

Q. Who is the first Indian to receive an Academy Award (Oscar)?

- (A) Bhanu Athaiya



- (B) A. R. Rahman
- (C) Satyajit Ray
- (D) M. Night Shyamalan

Solution

Concept - Indian design and cinema history: Bhanu Athaiya won the Academy Award for Best Costume Design for the film Gandhi (1982), becoming the first Indian to win a competitive Oscar.

Step 1 - Place the others: A. R. Rahman won later (2009, Slumdog Millionaire). Satyajit Ray received an honorary Oscar in 1992, after Athaiya. M. Night Shyamalan has not won.

Step 2 - Conclude: The first Indian Oscar winner is Bhanu Athaiya.

Tip: Costume design is a design discipline, which is why this fits a design entrance.

Answer: A [Go Back to Q37](#)

Q38.

Q. The famous "I Love NY" logo, in which a red heart replaces the word "Love", was designed by which graphic designer?

- (A) Paul Rand
- (B) Saul Bass
- (C) Milton Glaser
- (D) Massimo Vignelli

Solution



Concept - Famous logos and designers: The "I Love NY" mark (1977) was created by the American graphic designer Milton Glaser as part of a state tourism campaign.

Step 1 - Place the others: Paul Rand designed the IBM and ABC logos, Saul Bass made the AT&T and Bell logos and film titles, and Massimo Vignelli designed the New York subway map.

Step 2 - Conclude: The designer is Milton Glaser.

Tip: Glaser also created the psychedelic Bob Dylan poster.

Answer: C [Go Back to Q38](#)

Q39.

Q. Which of the following is a renewable source of energy?

- (A) Coal
- (B) Natural gas
- (C) Petroleum
- (D) Solar energy

Solution

Concept - Environment, energy sources: Renewable sources refresh naturally on a human timescale. Solar energy comes from sunlight and does not run out.

Step 1 - Rule out others: Coal, natural gas and petroleum are fossil fuels, formed over millions of years and finite, so they are non-renewable.

Step 2 - Conclude: Solar energy is the renewable source.



Tip: Other renewables include wind, hydro, tidal, geothermal and biomass.

Answer: D [Go Back to Q39](#)

Q40.

Q. If delulu = 010101, skibidi = 0010101, bussin = 010010, and ghosted = 0010010, then what is 010100?

- (A) boujee
- (B) mewing
- (C) pookie
- (D) cheugy

Solution

Concept - Coding and decoding: Map each letter to a bit: consonant = 0 and vowel = 1, keeping the letter order.

Step 1 - Verify the rule: delulu gives d,e,l,u,l,u = 0,1,0,1,0,1 which matches 010101. bussin gives b,u,s,s,i,n = 0,1,0,0,1,0 = 010010, also matching.

Step 2 - Decode 010100: The pattern is consonant, vowel, consonant, vowel, consonant, consonant. Test the options: mewing = m,e,w,i,n,g = 0,1,0,1,0,0 = 010100.

Step 3 - Reject others: boujee and pookie give 011011; cheugy does not match.

Tip: Convert each option to its vowel-consonant bit string and compare.



Answer: B [Go Back to Q40](#)

Q41.

Q. Find the next number in the series: 2, 6, 12, 20, 30, ?

- (A) 40
- (B) 42
- (C) 44
- (D) 36

Solution

Concept - Number series, growing differences: The gaps between terms increase by a fixed amount each time.

Step 1 - Find the differences: $6 - 2 = 4$, $12 - 6 = 6$, $20 - 12 = 8$, $30 - 20 = 10$. The differences are 4, 6, 8, 10.

Step 2 - Extend: The next difference is 12, so the next term is $30 + 12 = 42$.

Tip: These are products $n(n + 1)$: $1 \cdot 2, 2 \cdot 3, \dots, 6 \cdot 7 = 42$.

Answer: B [Go Back to Q41](#)

Q42.

Q. In a certain code, CAT is written as DBU. Using the same rule, how is DOG written?

- (A) EPH
- (B) CPF
- (C) EPI



(D) FQI

Solution

Concept - Letter-shift coding: Each letter of the word moves forward by one position in the alphabet.

Step 1 - Verify with CAT: C to D, A to B, T to U gives DBU, so the shift is +1.

Step 2 - Apply to DOG: D to E, O to P, G to H gives EPH.

Tip: Always confirm the shift on the given word before coding the new one.

Answer: A [Go Back to Q42](#)

Q43.

Q. What is the main purpose for the presence of water in a toilet bowl (Western Commode/Water Closet)?

- (A) To prevent back flow of sewer gases.
- (B) To efficiently flush solid, semi-solid fecal matter.
- (C) To regulate water temperature in plumbing lines.
- (D) To neutralize acidic waste materials.

Solution

Concept - Product design, the water trap: The curved pipe below a commode holds a small pool of water called a trap seal. This water forms a barrier.



Step 1 - Function of the seal: The standing water blocks foul sewer gases from rising back through the bowl into the room.

Step 2 - Reject others: Flushing is done by the incoming rush of water, not the standing water; the water does not control temperature or neutralise acids.

Tip: The same trap-seal idea is used under sinks and floor drains.

Answer: A [Go Back to Q43](#)

Q44.

Q. A person walks 5 km towards North, then turns right and walks 3 km, then turns right again and walks 5 km. How far and in which direction is the person now from the starting point?

- (A) 3 km West
- (B) 8 km North
- (C) 3 km East
- (D) 5 km South

Solution

Concept - Direction sense: Track each leg on a mental grid, using that a right turn from North faces East, and a right turn from East faces South.

Step 1 - First two legs: 5 km North then 3 km East places the person 5 km up and 3 km right of start.

Step 2 - Last leg: Turning right again faces South; walking 5 km cancels the northward 5 km, leaving only the 3 km eastward shift.



Step 3 - Conclude: The person is 3 km East of the start.

Tip: Two right turns reverse the first direction, so those legs can cancel.

Answer: C [Go Back to Q44](#)

Q45.

Q. Which one does not belong with the others?

- (A) Circle
- (B) Square
- (C) Triangle
- (D) Sphere

Solution

Concept - Odd one out, dimension: Group the items by a shared property and find the exception.

Step 1 - Classify: Circle, square and triangle are flat two-dimensional shapes.

Step 2 - Spot the exception: A sphere is a three-dimensional solid, so it does not belong.

Tip: When shapes are mixed, check for the 2D versus 3D split first.

Answer: D [Go Back to Q45](#)

Q46.

Q. What is the length of the edge of the largest cube that can be placed inside a sphere of radius 10 cm?



- (A) $10/(\sqrt{2})$ cm
- (B) $10/(\sqrt{3})$ cm
- (C) $20/(\sqrt{2})$ cm
- (D) $20/(\sqrt{3})$ cm

Solution

Concept - Cube inscribed in a sphere: For the largest cube inside a sphere, the cube's space diagonal equals the sphere's diameter.

Step 1 - Write the relation: If the edge is a , the space diagonal is $a\sqrt{3}$. The diameter is $2 \times 10 = 20$ cm.

Step 2 - Solve: $a\sqrt{3} = 20 \Rightarrow a = \frac{20}{\sqrt{3}}$ cm.

Tip: A cube's space diagonal is $a\sqrt{3}$; its face diagonal is $a\sqrt{2}$.

Answer: D [Go Back to Q46](#)

Q47.

Q. In ergonomic and product design, the term "anthropometry" refers to which of the following?

- (A) The study of colour perception by the eye
- (B) The measurement of human body dimensions
- (C) The testing of material strength
- (D) The study of room acoustics

Solution

Concept - Ergonomics vocabulary: Anthropometry is the systematic measurement of the size, shape and proportions of the



human body.

Step 1 - Use in design: Designers use anthropometric data (heights, reach, grip) to size chairs, tools and controls so they fit users comfortably and safely.

Step 2 - Reject others: Colour perception, material strength and acoustics are separate fields.

Tip: Design for a range such as the 5th to 95th percentile, not just the average.

Answer: B [Go Back to Q47](#)

Q48.

Q. The early twentieth-century art movement led by artists such as Salvador Dali and Rene Magritte, which explored dreams and the unconscious mind, is known as?

- (A) Cubism
- (B) Impressionism
- (C) Surrealism
- (D) Fauvism

Solution

Concept - Art movements: Surrealism (from the 1920s) placed dreamlike, irrational images in realistic settings to reveal the unconscious. Dali and Magritte are its best-known painters.

Step 1 - Place the others: Cubism (Picasso, Braque) broke objects into geometric planes; Impressionism captured light and fleeting



moments; Fauvism used wild, non-natural colour.

Step 2 - Conclude: The movement is Surrealism.

Tip: Dali's melting clocks are the classic Surrealist image.

Answer: C [Go Back to Q48](#)

Q49.

Q. Which option is the odd one out?

- (A) WOW MADAM
- (B) CIVIC ROTATOR
- (C) SOLO LEVEL
- (D) NOON SAGAS

Solution

Concept - Palindromes: A palindrome reads the same forwards and backwards. Check whether both words in each pair are palindromes.

Step 1 - Test the pairs: WOW and MADAM are palindromes; CIVIC and ROTATOR are palindromes; NOON and SAGAS are palindromes.

Step 2 - Find the exception: In SOLO LEVEL, LEVEL is a palindrome but SOLO reversed is OLOS, so SOLO is not a palindrome.

Tip: One non-palindrome word is enough to break the pattern.

Answer: C [Go Back to Q49](#)



Q50.

Q. The three additive primary colours of light, mixed on television and computer screens, are?

- (A) Red, Green, Blue
- (B) Red, Yellow, Blue
- (C) Cyan, Magenta, Yellow
- (D) Red, Green, Yellow

Solution

Concept - Additive colour (light): Screens emit light, so they use additive mixing. The additive primaries are Red, Green and Blue (RGB); together they make white.

Step 1 - Reject others: Red, Yellow, Blue are the traditional artists' primaries; Cyan, Magenta, Yellow are the subtractive primaries used in printing.

Step 2 - Conclude: The additive primaries are Red, Green, Blue.

Tip: Additive (light) makes white; subtractive (ink) mixes toward black.

Answer: A [Go Back to Q50](#)

Q51.

Q. Madhubani (Mithila) painting is a well-known traditional folk art that originates from which Indian state?

- (A) Bihar
- (B) Rajasthan



- (C) Odisha
(D) West Bengal

Solution

Concept - Indian folk art traditions: Madhubani, also called Mithila painting, comes from the Mithila region of Bihar. It uses bold outlines, natural dyes and filled patterns with no empty space.

Step 1 - Reject others: Rajasthan is known for Phad and miniature painting, Odisha for Pattachitra, and West Bengal for Kalighat painting.

Step 2 - Conclude: Madhubani originates from Bihar.

Tip: Link Mithila to Bihar to recall this quickly.

Answer: A [Go Back to Q51](#)

Q52.

Q. Phulkari, Chikankari, Sambalpuri and Paithani are weaving and embroidery traditions from different states of India. Which option lists the states in the correct sequence?

- (A) Uttar Pradesh, Maharashtra, Assam, Punjab
(B) Punjab, Uttar Pradesh, Odisha, Maharashtra
(C) Uttar Pradesh, Odisha, Punjab, Maharashtra
(D) Odisha, Uttar Pradesh, Assam, Punjab

Solution

Concept - Indian textiles and their regions: Match each craft to



its home state in the given order Phulkari, Chikankari, Sambalpuri, Paithani.

Step 1 - Identify each: Phulkari embroidery is from Punjab; Chikankari embroidery is from Lucknow, Uttar Pradesh; Sambalpuri ikat is from Odisha; Paithani sarees are from Maharashtra.

Step 2 - Match the sequence: This gives Punjab, Uttar Pradesh, Odisha, Maharashtra.

Tip: Chikankari maps to Lucknow, which fixes Uttar Pradesh in the second slot.

Answer: B [Go Back to Q52](#)

Q53.

Q. The famous house "Fallingwater", built partly over a waterfall, was designed by which architect?

- (A) Le Corbusier
- (B) Frank Gehry
- (C) Zaha Hadid
- (D) Frank Lloyd Wright

Solution

Concept - Modern world architecture: Fallingwater (1935, Pennsylvania, USA) is an icon of organic architecture, designed by the American architect Frank Lloyd Wright to sit over a stream and waterfall.

Step 1 - Place the others: Frank Gehry designed the Guggenheim



Bilbao, Zaha Hadid the Heydar Aliyev Center, and Le Corbusier the Villa Savoye.

Step 2 - Conclude: Fallingwater is by Frank Lloyd Wright.

Tip: Wright's idea of blending a building with its site is called organic architecture.

Answer: D [Go Back to Q53](#)

Q54.

Q. In manufacturing, the process of forcing molten plastic into a closed mould to produce many identical parts is called?

- (A) Forging
- (B) Injection moulding
- (C) Welding
- (D) Turning

Solution

Concept - Materials and processes: Injection moulding melts plastic granules and injects the molten plastic under pressure into a mould cavity, where it cools into the final part.

Step 1 - Reject others: Forging shapes hot metal by hammering, welding joins metal parts, and turning removes material on a lathe.

Step 2 - Conclude: The process is injection moulding.

Tip: Injection moulding suits high-volume plastic products like bottle caps and toys.

Answer: B [Go Back to Q54](#)



Q55.

Q. Which of the following image file formats is a vector format, so it can be scaled to any size without losing quality?

- (A) JPEG
- (B) PNG
- (C) GIF
- (D) SVG

Solution

Concept - Raster versus vector graphics: Raster formats store a grid of pixels and blur when enlarged. Vector formats store shapes as maths, so they stay sharp at any size.

Step 1 - Classify: JPEG, PNG and GIF are all raster (pixel) formats.

Step 2 - Conclude: SVG (Scalable Vector Graphics) is the vector format.

Tip: Use vector (SVG) for logos and icons that must scale cleanly.

Answer: D [Go Back to Q55](#)

Q56.

Q. In typography and print, how many points make up one inch?

- (A) 12
 - (B) 96
 - (C) 72
 - (D) 100
-



Solution

Concept - Typographic units: The point is the basic unit of type size. By the standard used in digital design, one inch equals 72 points.

Step 1 - Related unit: 12 points make one pica, and 6 picas make one inch, so $6 \times 12 = 72$ points per inch.

Step 2 - Reject others: 96 is pixels per inch at the common screen setting, not points.

Tip: Remember $1 \text{ inch} = 6 \text{ picas} = 72 \text{ points}$.

Answer: C [Go Back to Q56](#)

Q57.

Q. The golden ratio, often used in art and design composition, is approximately equal to?

- (A) 1.414
- (B) 2.718
- (C) 3.142
- (D) 1.618

Solution

Concept - Proportion in design: The golden ratio, written with the Greek letter phi, is about 1.618. It is felt to give pleasing proportions and appears in layouts and logos.

Step 1 - Reject others: 1.414 is $\sqrt{2}$ (used for A-series paper), 2.718 is e , and 3.142 is π .



Step 2 - Conclude: The golden ratio is about 1.618.

Tip: Consecutive Fibonacci numbers divided give values that close in on 1.618.

Answer: D [Go Back to Q57](#)

Q58.

Q (Drawing). The competitive examinations are finally over and you are going on a holiday. You are at the nearest railway station with your family and relatives, waiting for the train that you can see arriving. The platform is bustling with activity. Other travellers with luggage, vendors and porters (and whatever else you are likely to observe) are also on the platform. Imagine and draw what you see, giving prominence to your family and relatives.

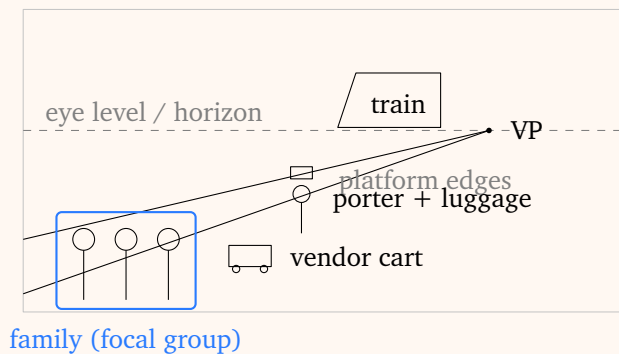
Note: Make pencil sketches only. Do not use colour.

Evaluation criteria: observation; composition of figures and objects; sense of perspective and proportion; quality of lines; attention to detail.

Model Approach and Evaluation

There is no single correct drawing. You are judged on how well you observe, compose and render a busy scene, so plan the layout before you draw. The schematic below shows a strong compositional plan for this brief.





Step 1 - Set the stage (perspective): fix one eye level and let the platform edge and the arriving train run back to a single vanishing point (VP). This one-point perspective instantly gives depth.

Step 2 - Compose in layers: foreground - your family and relatives (the focal group), largest and most detailed; middle ground - porters with luggage, a vendor cart, other travellers; background - the train, roof columns, signboards. Overlap figures so the crowd reads as depth.

Step 3 - Give the family prominence: place them slightly off-centre (rule of thirds), turn a few faces toward each other, and keep the busiest detail and darkest contrast on this group so the eye lands there first.

Step 4 - Proportion and detail: keep heads roughly on the eye-level line (figures further back sit lower and smaller). Add believable props - trolley bags, a chai vendor, a station clock - without clutter.

Tip: use confident, varied line weight - firm outlines for the family, lighter strokes for the background crowd. Spend the last few minutes on line quality, not new objects. [Go Back to Q58](#)

Q59.

Q (Design Aptitude). A visit to a museum or a zoo is always something we look forward to with much excitement. But such visits are very tiring too; after about an hour or so we look for a place to sit - a chair or bench - that is never nearby. What if we could carry our own chair everywhere?

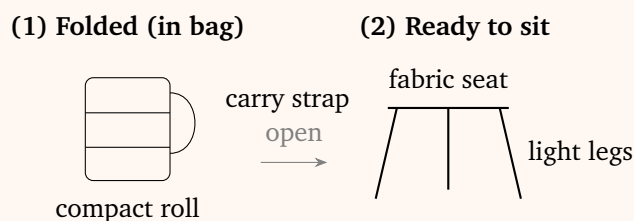
Design a portable seating device that you could carry in your backpack or hand bag. It should be light enough to carry around, small enough to fit into your bag, easy to use, and good to look at. Show the seating device (1) when it has just been taken out of the bag, and (2) when it is ready to sit on.

Note: Make pencil sketches only. Do not use colour.

Explain your design only through visuals and short labels; do not write separate explanations.

Model Approach and Evaluation

This tests design thinking, not artistic flair alone. Marks come from a device that genuinely solves the problem and is explained through clear visuals and short labels. One good direction - a collapsible tripod stool - is sketched below in both required states.



Step 1 - Nail the requirements: light, folds small enough for a bag, quick to open, stable to sit on, pleasant to look at. Pick ONE clear mechanism (folding tripod, telescoping tube, or fabric sling on a collapsible frame) rather than mixing several.

Step 2 - Show the two required states: draw (1) the folded/packed form as it comes out of the bag, and (2) the deployed, ready-to-sit form, at a consistent scale, with an arrow showing the opening action.

Step 3 - Label features, do not write essays: short call-outs with leader lines - 'twist-lock leg', 'ripstop seat', 'carry strap', 'rubber foot for grip', 'weight approx 400 g'. Add a tiny human or bag for scale.

Step 4 - Prove it works: include a small sketch of a person seated on it to show stability and comfortable height, and hint at the material (mesh, aluminium tube) with simple texture.

Tip: examiners reward suitability, ease of carrying and use, uniqueness, attention to detail, and communication through visuals only. A clever, clearly-drawn simple mechanism beats a complicated one that is hard to read. [Go Back to Q59](#)



Answer Key (Part A)

Section 1 - NAT (Numerical Answer Type)

Q1	Q2	Q3	Q4	Q5	Q6	Q7
5	16.8	1800	625	20	12	36

Q8	Q9	Q10	Q11	Q12	Q13	Q14
476.19	24	44	11	42	75	3080

Section 2 - MSQ (Multiple Select - one or more correct)

Q15	Q16	Q17	Q18	Q19
B, C	A, C, D	A, C, D	B, C, D	A, B, C

Q20	Q21	Q22	Q23	Q24
C, D	A, B, C, D	A, D	B, D	B, C

Q25	Q26	Q27	Q28	Q29
B, C, D	D	A, D	C	B, C, D

Section 3 - MCQ (single correct)

Q30	Q31	Q32	Q33	Q34	Q35	Q36
A	A	C	B	C	B	D

Q37	Q38	Q39	Q40	Q41	Q42	Q43
A	C	D	B	B	A	A

Q44	Q45	Q46	Q47	Q48	Q49	Q50
C	D	D	B	C	C	A



Q51	Q52	Q53	Q54	Q55	Q56	Q57
A	B	D	B	D	C	D

Part B (Q58-Q59) is subjective; see the Model Approach for each under Detailed Solutions.

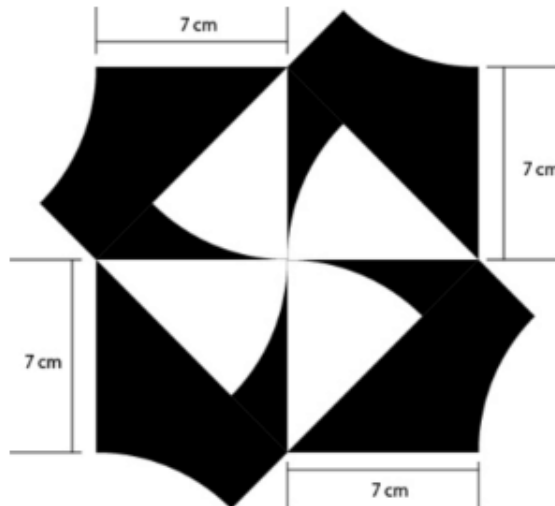


Appendix: Visual Reasoning

Practice from Past UCEED Papers

These are **real questions from past UCEED papers**, included so you can practise on the actual figure style the exam uses. They are visual-reasoning questions, so work each one out yourself - no answer key is given here (this mirrors how such questions feel in the real test). A short **How to approach** note follows each figure.

P1. (Past UCEED) Area of black surface in the following image is _____ cm².
 Note: 1. All curves have same radii. 2. Use the value of pi as $\frac{22}{7}$.



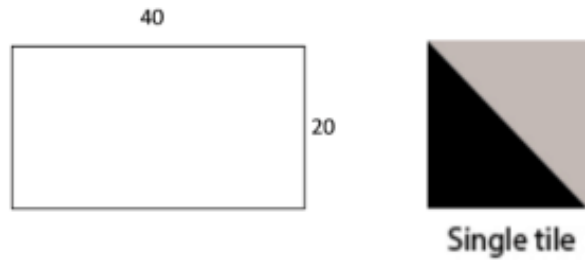
How to approach

Note the overall dimensions and find the total area first. Check the figure for symmetry: if the shaded and unshaded regions map onto each other under a rotation or reflection, the shaded area is a simple fraction of the whole. Otherwise split the shaded shape into triangles and rectangles, read each base and height off the figure, compute each area, and add them.

P2. (Past UCEED) The image is a ceramic tile of dimension 20 cm × 20 cm.



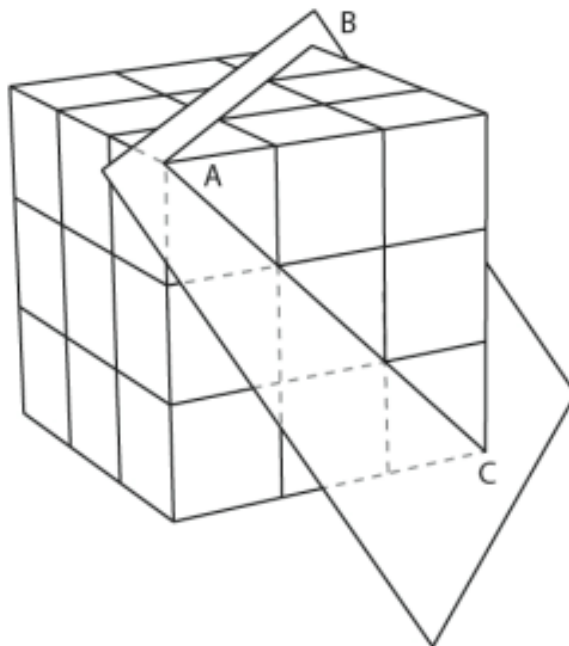
How many distinct patterns can you create by using two such ceramic tiles in a rectangular patch of $40\text{ cm} \times 20\text{ cm}$ on the wall?



How to approach

Study the figure carefully and note what is fixed and what changes. Break the problem into smaller parts, use any symmetry in the figure, and count or compute each part systematically before combining. A quick rough redraw usually makes the answer clear.

P3. (Past UCEED) A cube is created by stacking 27 smaller cubes as shown in the figure. A plane, going through vertices A, B and C, cuts the cube as shown in the figure. How many smaller cubes will get cut?



How to approach

Use any symmetry stated in the question. Count the cubes in one layer (or one octant), multiply by the number of identical layers, and adjust for cubes shared on a common plane or axis. Build the solid up layer by layer from the bottom so hidden cubes are not missed.

- P4. (Past UCEED)** At most how many triangles can appear by adding two straight lines to the figure?

**How to approach**

Redraw the combined line figure on rough paper. Count triangles in a fixed order: first the smallest single triangles, then triangles made of two or more small pieces. Working smallest-to-largest stops you missing any or counting one twice.

