# NID DAT

## Complete Sample Paper – 9

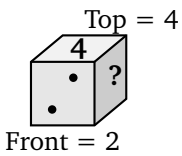
**Duration: 150 Minutes** **Maximum Marks: 100**

### Instructions

- This paper contains **50 Visual MCQs (Part A)** and **5 Drawing Tasks (Part B)**, modelled on NID DAT 2026 Prelims.
- **Part A:** Each correct answer carries $+1$ **mark**. There is **no negative marking**.
- **Part B:** Each drawing task carries **10 marks**; marks are awarded for design thinking, form, composition, and visual communication.
- **Total: 100 marks | Duration: 150 minutes**
- For Part A only one option is correct per question; for Part B all answers are open-ended sketches.
- Drawing tools (pencils, sketch pens, scale, colours) are allowed for Part B only. No electronic gadgets.

## Part A: Visual MCQs — 50 Marks

**Q1.** The figure below shows a standard dice (opposite faces sum to 7: 1 opposite 6, 2 opposite 5, 3 opposite 4). The top face shows **4** and the front face shows **2**. Which number appears on the **right** face?



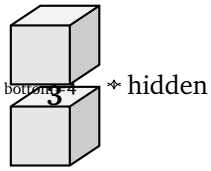

(A) 3

(B) 5

(C) 1

(D) 6

**Q2.** Two standard dice are placed one on top of the other. The top face of the lower die shows **3**, and the bottom face of the upper die shows **4**. These two faces are hidden (touching each other). What is the **sum** of these two hidden touching faces?



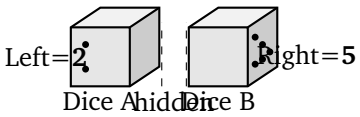

(A) 5

(B) 8

(C) 7

(D) 6

**Q3.** Two standard dice (Dice A and Dice B) are placed side by side, touching each other. The exposed **left** face of Dice A shows **2**. The exposed **right** face of Dice B shows **5**. What is the **sum** of their hidden touching faces (right face of A + left face of B)?



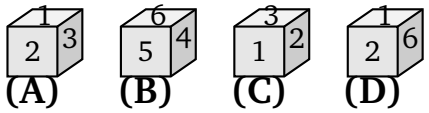

(A) 9

(B) 7

(C) 5

(D) 11

**Q4.** Four dice are shown below in isometric view with their three visible faces labelled. Three of the dice show valid orientations of a standard dice (opposite pairs: 1–6, 2–5, 3–4). One dice has an **impossible** arrangement that **cannot** come from a standard dice. Which one is impossible?



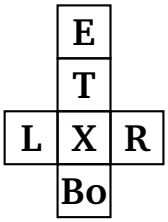
(A) (A)

(B) (B)

(C) (C)

(D) (D)

**Q5.** The figure below shows an unfolded dice net. The face labelled **X** is in the centre. When the net is folded into a dice, which labelled face will be **directly opposite** face X?




Face **E** is the extension above **T**

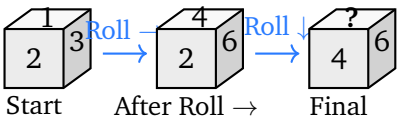
(A) E

(B) T

(C) L

(D) R

**Q6.** A standard dice starts with face **1 on top**, face **2 facing front**, face **3 on the right**. It is first rolled **90° to the right**, then rolled **90° forward** (toward the viewer). The figure shows the two-step rolling sequence. After both rolls, which face is **on top**?



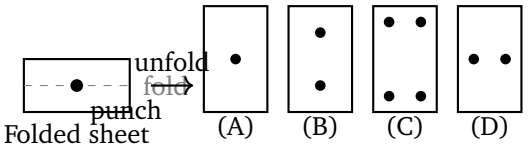

(A) 2

(B) 1

(C) 5

(D) 3

**Q7.** A square sheet of paper is folded **horizontally** (the top half folds down onto the bottom half), as shown. A circular hole is punched at the **centre** of the folded rectangle. When the paper is **unfolded**, which pattern of holes results?



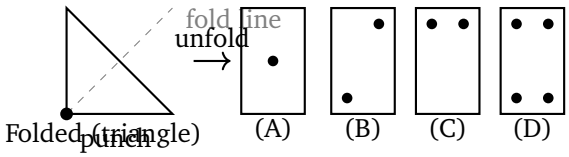

(A) 1 hole at the very centre

(B) 2 holes arranged in a vertical column at the centre

(C) 4 holes at all four corners

(D) 2 holes arranged horizontally at the centre

**Q8.** A square sheet is folded **diagonally** (the top-right corner is brought to meet the bottom-left corner), forming a triangle. A circular hole is punched at the **right-angle corner** of the resulting triangle. When unfolded, which hole pattern results?



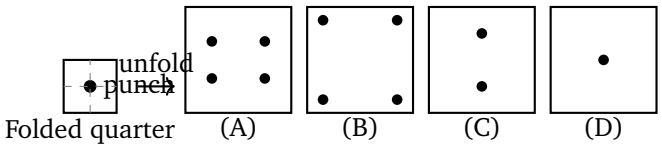

(A) 1 hole at the centre

(B) 2 holes along a diagonal

(C) 2 holes at the top two corners only

(D) 4 holes, one at each corner of the original square

**Q9.** A square sheet is folded **vertically** (right half onto left), then **horizontally** (top onto bottom), producing a quarter-size square. A hole is punched at the **centre** of this folded quarter. Unfolded, which pattern results?



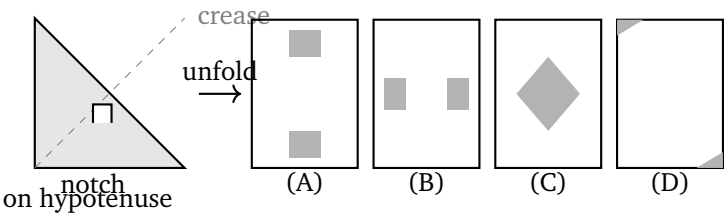

(A) 4 holes forming a tight $2\times2$ cluster near the centre of the sheet

(B) 4 holes, one at each corner of the original sheet

(C) 2 holes in a vertical column at the centre

(D) 1 hole at the dead centre of the sheet

**Q10.** A square sheet is folded **diagonally** (bottom-left corner to top-right corner). A rectangular notch is cut from the **middle of the folded (hypotenuse) edge** — not the crease, but the long outer edge. When unfolded, what shape appears in the centre of the sheet?



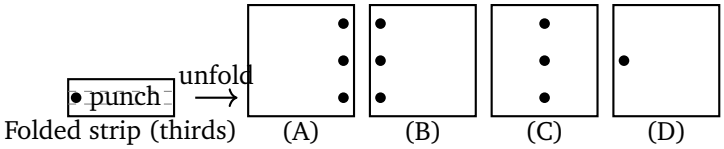

(A) Two rectangular holes at the top and bottom edges

(B) Two rectangular holes at the left and right edges

(C) A diamond (rhombus) shaped hole at the centre of the sheet

(D) Two triangular cuts at opposite corners

**Q11.** A square sheet is folded into **horizontal thirds**: the bottom third folds up, then the top third folds down, creating a compact strip. A circular hole is punched at the **left edge of the middle section**. When fully unfolded, which pattern results?



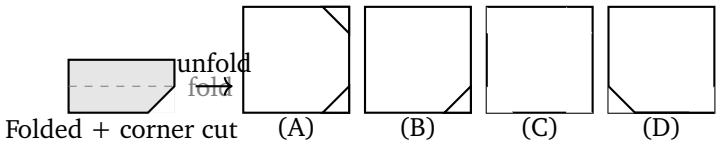
(A) 3 holes in a horizontal row along the right edge

(B) 3 holes in a horizontal row along the left edge

(C) 3 holes in a vertical column at the centre

(D) 1 hole at the left-centre of the sheet

**Q12.** A square sheet is folded **horizontally** (top half folds down onto bottom half). A **triangular piece** is cut from the **bottom-right corner** of the folded rectangle (a diagonal corner cut). When unfolded, which pattern results?



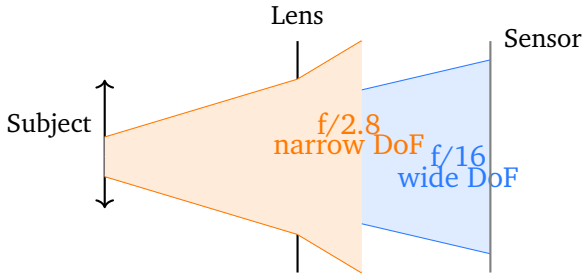

(A) Two symmetric triangular notches, one at each right-side corner (top-right and bottom-right)

(B) One triangular notch at the bottom-right corner only

(C) A triangular notch at each of all four corners

(D) Two triangular notches at both bottom corners

**Q13.** The diagram below illustrates depth of field (DoF) for two different aperture settings. A photographer switches the aperture from **f/16** to **f/2.8**. What is the primary effect on the resulting image?




(A) The lens captures a wider field of view

(B) A longer exposure time is required

(C) Image resolution is reduced

(D) The depth of field becomes shallower — the subject appears sharp but the background blurs

**Q14.** Increasing the camera's ISO setting from **100** to **3200** most directly causes which of the following?

(A) A longer shutter speed is automatically required

(B) Increased digital noise and grain visible in the image

(C) A narrower depth of field

(D) Higher colour saturation in the final image

**Q15.** The **rule of thirds** composition technique advises placing the main subject of a photograph:

(A) Always at the very centre of the frame

(B) Touching one edge of the frame

(C) Near the intersection points of lines that divide the frame into a $3 \times 3$ grid

(D) In the bottom-right quadrant, following Western reading direction

**Q16.** A shutter speed of **1/1000 s** is most useful compared to **1/30 s** for which photographic scenario?

(A) Freezing a fast-moving subject such as a sprinting athlete without motion blur

(B) Capturing light trails from car headlights at night

(C) Creating a silky smooth waterfall effect

(D) Increasing the depth of field in a landscape

**Q17.** Compared to a **24 mm** wide-angle lens, a **200 mm** telephoto lens tends to:

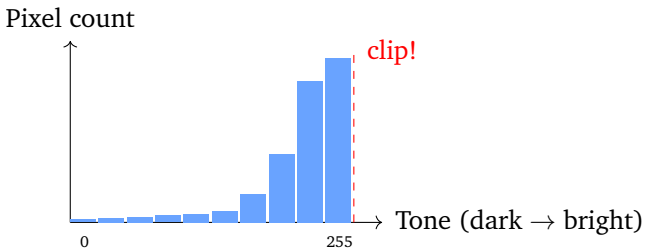
(A) Increase the apparent depth of field

(B) Exaggerate the depth and distance between near and far objects

(C) Show a wider angle of view

(D) Compress apparent distances, making background and foreground look closer together

**Q18.** The histogram below shows pixel brightness distribution for a photograph (x-axis: tones from pure black at 0 to pure white at 255; y-axis: number of pixels). What does this histogram indicate about the image?




(A) The image is severely underexposed

(B) The image is overexposed with highlight clipping

(C) The image has an excellent and balanced tonal range

(D) The image is in black and white mode

**Q19.** A **close-up shot** of a character's hands trembling while holding a letter primarily communicates which of the following to the audience?

(A) The physical location of the scene

(B) The time of day the scene is set in

(C) The character's emotional state (such as fear or anxiety) conveyed through physical detail

(D) Who wrote the letter

**Q20.** An **establishing shot** used at the start of a film scene is primarily intended to:

(A) Orient the viewer to the setting and the spatial relationship between characters

(B) Focus on the protagonist's facial reaction

(C) Reveal the film's central conflict

(D) Display the film's title card

**Q21.** A **Dutch angle** (canted camera) shot — where the camera is tilted on its roll axis so the horizon line is diagonal — is most commonly used to create:

(A) A sense of grandeur and scale

(B) A feeling of peaceful serenity

(C) Clarity and neutrality in a dialogue scene

(D) Psychological unease, threat, or moral ambiguity

**Q22.** Which film editing transition most effectively suggests that a **long period of time** has passed between two scenes?

(A) A hard cut (instantaneous transition with no overlap)

(B) A dissolve (one image slowly fades into the next as they briefly overlap)

(C) A wipe (one image pushes the other off the frame)

(D) A jump cut (an abrupt cut within the same continuous scene)

**Q23.** A **match cut** in film editing is best described as:

(A) A cut that occurs at exactly the right beat in the musical score

(B) A cut between two scenes set in the same location

(C) A cut that links two shots through a shared visual shape, motion, or spatial composition, creating a perceptually smooth transition

(D) A repeated use of the same shot from multiple camera angles

**Q24.** **Rack focus** in cinematography refers to:

(A) Shifting the lens focus during a continuous shot — from a near subject to a distant subject (or vice versa) — to guide the viewer's attention

(B) Manually adjusting the camera's white balance during a shot

(C) Zooming the lens while simultaneously dollying the camera backward (a "dolly zoom")

(D) Adjusting the exposure mid-shot by turning the aperture ring

**Q25.** The primary limitation of **Fused Deposition Modelling (FDM)** 3D printing when producing fine-detail structural parts is:

(A) It is incapable of printing in multiple colours

(B) It requires a vacuum chamber to operate

(C) It can only process metallic materials

(D) Visible layer lines and reduced mechanical strength along the Z-axis (anisotropic properties)

**Q26.** In **Stereolithography (SLA)** 3D printing, which energy source cures the liquid photopolymer resin into a solid?

(A) Infrared heat radiation

(B) Ultraviolet (UV) laser light

(C) Electron beam radiation

(D) Microwave energy

**Q27.** In laser cutting, **raster mode** (as opposed to vector mode) is primarily used for:

(A) Cutting through the material along a defined vector path

(B) Scoring a fold/crease line without cutting through

(C) Engraving a filled image or pattern by scanning the laser back and forth across the surface

(D) Drilling precise point holes at specified coordinates

**Q28.** In CNC manufacturing, **G-code** refers to:

(A) The standardised numerical programming language that controls the machine's tool path, speed, feed rate, and position

(B) A protective surface coating applied to parts after machining

(C) The geometric design file format used in CAD software

(D) A quality grading system for CNC-milled parts

**Q29.** In FDM 3D printing, increasing the **infill percentage** from 20% to 80% primarily affects:

(A) The surface finish of the outer walls

(B) Print time only, with no effect on other properties

(C) The layer height resolution

(D) The density of the internal support lattice — affecting the part's weight, strength, and material cost

**Q30.** **Support structures** are required in many 3D printing processes because:

(A) They improve the surface finish of all external faces

(B) Overhanging features beyond a critical angle cannot be printed in mid-air — each new layer needs a surface below to deposit material on

(C) They prevent warping of the build plate during printing

(D) They improve the electrical conductivity of plastic printed parts

**Q31.** **Jamdani** is a traditional weaving technique producing lightweight, translucent patterned muslin. The distinctive pattern is created by:

(A) Resist-dyeing the warp threads before weaving begins

(B) Embroidering the pattern onto the finished plain cloth

(C) Weaving the pattern directly into the fabric using supplementary discontinuous weft threads passed by hand alongside the ground weft

(D) Block-printing the design onto plain woven cloth after weaving

**Q32.** **Patola** fabric is celebrated for its double-ikat technique, in which both warp AND weft threads are individually resist-dyed before weaving. Where is Patola primarily produced?

(A) Patan, Gujarat

(B) Varanasi, Uttar Pradesh

(C) Kanchipuram, Tamil Nadu

(D) Murshidabad, West Bengal

**Q33.** **Banarasi silk sarees** from Varanasi are most characteristically identified by:

(A) Mirror work (shisha) embroidery stitched after weaving

(B) A warp-ikat geometric pattern in a single colour

(C) Resist-dyed tie-and-dye spots (bandhani) on a silk ground

(D) Intricate gold and silver zari brocade with Mughal-inspired floral, foliate, and jali (lattice) motifs woven directly into the fabric

**Q34.** **Kanjivaram (Kanchipuram) silk sarees** are particularly recognised for a special technique in which the body fabric and the contrasting border are woven separately and then joined by:

(A) A buttonhole stitch applied after weaving

(B) An interlocking of warp threads at the junction of body and border, producing a characteristic reversible contrast border

(C) An iron-on heat-transfer of the border design

(D) Supplementary zari weft threads only in the pallu (end panel), with no special border join

**Q35.** **Chanderi** fabric, produced in Madhya Pradesh, is traditionally woven from which combination of fibres?

(A) Pure silk warp and silk weft with gold brocade

(B) Cotton warp and cotton weft with kalamkari prints

(C) Silk warp and cotton weft, giving a lightweight, sheer, slightly crisp hand with natural lustre

(D) Wool warp and pashmina weft with floral motifs

**Q36.** **Bandhani (Bandhej)** is an ancient Indian tie-and-dye technique. Its distinctive dotted or patterned effect is achieved by:

(A) Tying tiny points of cloth tightly with thread before immersing in dye, so tied areas resist the dye and remain undyed

(B) Painting wax on the cloth in a dot pattern before dyeing

(C) Screen-printing circles of resist paste before dyeing

(D) Weaving extra threads in dot patterns directly into the fabric

**Q37.** When designing toys for children aged **3 years and under**, the most critical safety requirement per international standards (ASTM F963, EN 71) is:

(A) Using only water-based paints and dyes

(B) Ensuring the toy can withstand a 1-metre drop test

(C) Labelling the toy in the local language

(D) Ensuring there are no small parts that can be detached and swallowed (choking hazard)

**Q38.** A core Montessori principle applied to educational toy design is providing materials with **"built-in error control"**. This means:

(A) The toy can only be used under adult supervision

(B) The toy comes with a detailed instruction manual

(C) The material gives the child immediate, automatic feedback when used incorrectly — enabling self-correction without adult intervention

(D) The toy is locked so only one assembly sequence is physically possible

**Q39.** Research in **developmental colour psychology** consistently shows that high-chroma primary colours (red, yellow, blue) and their secondaries are most effective in toys for which age group?

(A) Teenagers (ages 13–18)

(B) Toddlers and young children (ages 1–3)

(C) Adults in occupational therapy

(D) School-age children (ages 10–12)

**Q40.** When designing a handheld toy for **infants aged 6–12 months**, the most critical ergonomic consideration is:

(A) Grip diameter and weight — small enough for infant hands to close around, and light enough to lift and mouth without fatigue

(B) Maximum colour contrast between the toy's parts

(C) Including at least one electronic sound-making element

(D) Making the toy dishwasher-safe for parental convenience

**Q41.** In product and toy design, an **"affordance"** (as defined by J.J. Gibson and applied by Don Norman) is:

(A) The age-appropriate safety sticker attached to the packaging

(B) The educational curriculum the toy is designed to support

(C) The estimated retail price of the toy

(D) A perceptual property of the object that signals how it can be used — e.g., a concave grip affords holding, a large button affords pressing

**Q42.** The CPSC (US Consumer Product Safety Commission) choking-hazard test uses a **"small-parts cylinder"**. A toy component is classified as a choking hazard if it:

(A) Weighs more than 10 grams

(B) Has a sharp edge detectable by a standardised edge-tester

(C) Fits entirely inside the test cylinder (approximately 3.17 cm diameter $\times$ 5.71 cm depth)

(D) Is made from a material with Shore A hardness below 60

**Q43.** In Charles Sanders Peirce's semiotic typology, an **"icon"** is a sign that:

(A) Stands for its object by legal agreement or social convention alone

(B) Resembles or imitates its object — the sign and its object share a quality (e.g., a portrait, a realistic map, or onomatopoeia)

(C) Indicates its object through a direct existential or causal connection

(D) Is a purely arbitrary sound pattern with no visual component

**Q44.** Ferdinand de Saussure argued that the relationship between a linguistic **signifier** (the sound-image or written word) and its **signified** (the concept it refers to) is:

(A) Arbitrary — there is no natural or necessary connection; the link is purely a social convention

(B) Iconic — the word always sounds like what it means

(C) Indexical — the word points to a real-world object in the speaker's environment

(D) Universal — the same word means the same concept in all languages

**Q45.** In Peirce's typology, which example **best** illustrates an **"index"** sign?

(A) A painting of a rose representing beauty

(B) The word "dog" referring to the animal

(C) A stylised icon of a running person indicating an emergency exit

(D) Dark clouds as a sign of rain — because the clouds have a real, causal connection to the likelihood of rain

**Q46.** Roland Barthes' concept of **"myth"** in semiological analysis (*Mythologies*, 1957) refers to:

(A) A fictional narrative embedded within an advertisement

(B) The brand story told about a product's origin

(C) A second-order sign system in which an already-complete sign becomes the signifier of a culturally naturalised ideology or value

(D) An optical illusion deliberately embedded in a logo design

**Q47.** In semiotics, **"denotation"** is best described as:

(A) The emotional associations and cultural meanings surrounding a sign

(B) The literal, dictionary-level or direct reference of a sign — what it plainly shows or names

(C) The hidden ideology encoded in a sign by the dominant culture

(D) The gap between what a sender intends and what a receiver understands

**Q48.** The key distinction between a **pictogram** and an **ideogram** in visual communication is:

(A) A pictogram directly depicts a recognisable object or action, while an ideogram represents an abstract concept or idea (e.g., peace, justice, love)

(B) Pictograms are always coloured; ideograms are always black-and-white

(C) Pictograms appear only in children's books; ideograms appear in adult publications

(D) A pictogram is three-dimensional; an ideogram is always flat and two-dimensional

**Q49.** In international public signage and wayfinding, the sign type most **universally legible** across language barriers is:

(A) Text-only signs in a high-contrast typeface

(B) Colour-coded arrows without any symbols

(C) Alphabetical abbreviations

(D) Standardised symbol signs — such as ISO 7010 safety signs or internationally agreed transport and facility symbols — that transcend specific languages

**Q50.** In Roland Barthes' *Camera Lucida* (*La Chambre Claire*), the **"punctum"** of a photograph is:

(A) The intentional compositional focal point chosen by the photographer (this is the *studium*)

(B) The overall cultural and social context encoded in a photograph

(C) The small, often unintentional detail that personally "pricks" or disturbs a specific viewer on a subjective, uncodifiable level

(D) The technical sharpness and optical resolution of the image

## Part B: Drawing Tasks — 50 Marks

**Q51. Wearable Fitness Tracker: Industrial Design Sketch** [10 Marks]

Design a wearable fitness tracker wristband. On one sheet, show: (a) a **front view** of the device face showing the screen and physical buttons, (b) a **side profile** of the device and strap, and (c) a **detail callout** of the strap buckle/clasp mechanism. Label at least two materials and indicate approximate screen dimensions. The design should be ergonomic and aesthetically refined.

**Q52. Busy Spice Bazaar: Observational Illustration** [10 Marks]

Illustrate a **busy Indian spice market (bazaar) scene**. Show at least 4 stalls with hanging dried goods, large sacks of spice, and a crowd of shoppers creating depth and visual rhythm. Use **line and tone only** (no colour) to convey the energy, colour contrasts through value, and the layered chaos of the bazaar. Show overlapping, foreshortening, and varied line weights.

**Q53. Logo Design: "GreenBox" Organic Food Startup** [10 Marks]

Design three logo thumbnails for a new organic food delivery startup called **GreenBox**. On one sheet, show: (a) a **wordmark** logo (company name in a distinctive lettering style), (b) a standalone **symbol/icon mark**, and (c) a **combination mark** (icon + wordmark together). Render all three in black-and-white only. Each thumbnail should be clearly labelled.

**Q54. Redesigned Terracotta Matka for Urban Use** [10 Marks]

Redesign a **traditional terracotta matka (clay water pot)** for modern urban homes. Retain the organic hand-thrown aesthetic of the traditional form but add: a secure **lid with a handle** and a **tap/spigot at the base** for easy water dispensing. Show: (a) front orthographic view, (b) side orthographic view, and (c) a detail sketch of the tap mechanism. Label key materials and approximate dimensions.

**Q55. 6-Panel Comic Strip: Design Process for a Park Bench** [10 Marks]

Create a **6-panel comic strip** that narrates the journey of a design concept from idea to prototype, using a **public park bench** as the object being designed. The 6 panels should show: (1) napkin sketch / initial idea, (2) user research / observation in a park, (3) refined concept sketching, (4) material and joinery decisions, (5) prototype assembly, (6) final design in a park setting with a user. Each panel must have a brief caption.

# Detailed Solutions

## Part A — Visual MCQ Solutions

### Q1.

**Solution**

**Concept — Standard Dice Orientation:** On a standard Western dice, opposite faces always sum to 7: (1,6), (2,5), (3,4). When 4 is on top and 2 is on the front, the remaining three faces (1, 3, 5) must occupy bottom, right, and left. Bottom = 3 (opposite top 4). Front = 2, so back = 5. The remaining values are 1 and 3; since 3 is on the bottom, right and left must be 1 and some other... Let us enumerate: top=4, bottom=3, front=2, back=5. Right and left must be 1 and 6. In the standard right-hand orientation (following the conventional chirality), with 4 on top and 2 facing front, the face 3 is on the right.

**Step 1 — Identify knowns:** Top = 4 $\Rightarrow$ Bottom = 3 (opposite pair 3–4). Front = 2 $\Rightarrow$ Back = 5 (opposite pair 2–5). Remaining pair: 1 and 6 occupy left and right.

**Step 2 — Apply chirality:** On a standard right-handed dice, with 4 on top and 2 at front, the face 3 appears on the right and 6 on the left.

**Why other options are wrong:**

- (B) 5: Face 5 is at the back (opposite front face 2).
- (C) 1: Face 1 is on the left side in this configuration.
- (D) 6: Face 6 is on the left side, not the right.

**Final Answer:** When top = 4 and front = 2, the right face shows 3. $\Rightarrow$ **(A)**

**Answer: (A)** Go Back to Q1

### Q2.

**Solution**

**Concept — Touching Faces of Stacked Dice:** Two standard dice are stacked. The top face of the lower die and the bottom face of the upper die are hidden (touching). The question simply asks for their sum.

**Step 1 — Read the given values:** Top face of lower die = 3. Bottom face of upper die = 4.

**Step 2 — Calculate:** Sum of the two touching hidden faces = 3 + 4 = **7**.

**Why other options are wrong:**

- (A) 5: Simple arithmetic error.
- (B) 8: Incorrect; $3 + 4 = 7$, not 8.
- (D) 6: Incorrect arithmetic.

**Final Answer:** The sum of the two hidden touching faces is $3 + 4 = 7$. $\Rightarrow$ **(C)**

**Answer: (C)** Go Back to Q2

## Q3.

### Solution

**Concept — Opposite Faces and Touching Dice:** On a standard dice, opposite faces always sum to 7. Two dice are placed side by side. The exposed left face of Dice A $= 2$, so the right face of Dice A (hidden, touching Dice B) $= 7 - 2 = 5$. The exposed right face of Dice B $= 5$, so the left face of Dice B (hidden, touching Dice A) $= 7 - 5 = 2$.

**Step 1 — Find hidden face of Dice A (right side):** Left face of A $= 2 \Rightarrow$ Right face of A $= 7 - 2 = 5$.

**Step 2 — Find hidden face of Dice B (left side):** Right face of B $= 5 \Rightarrow$ Left face of B $= 7 - 5 = 2$.

**Step 3 — Sum:** $5 + 2 = 7$.

**Why other options are wrong:**

- (A) 9: Incorrect; $5 + 2 = 7$ not 9.
- (C) 5: Only one of the two hidden faces, not their sum.
- (D) 11: Far too large for standard dice faces.

**Final Answer:** Sum of hidden touching faces $= 5 + 2 = 7$. $\Rightarrow$ **(B)**

**Answer: (B)** Go Back to Q3

## Q4.

**Solution**

**Concept — Valid vs. Impossible Dice Arrangements:** A standard dice has two constraints: (i) opposite pairs are 1–6, 2–5, 3–4; and (ii) chirality (the specific right-hand orientation that determines which face is where around the axis). Dice (D) shows top=1, front=2, right=6. But if top=1 and front=2, the opposite faces are bottom=6 and back=5. The right and left faces must then be 3 and 4. Having right=6 is impossible since 6 must be on the bottom.

**Step 1 — Check Dice (D):** Top = 1 $\Rightarrow$ Bottom must = 6. Front = 2 $\Rightarrow$ Back must = 5. Therefore right and left must be 3 and 4. But Dice (D) shows right = 6, which is already assigned to the bottom. This is a direct violation.

**Why other options are wrong:**

- (A): Top=1, front=2, right=3. This is a valid standard dice orientation.
- (B): Top=6, front=5, right=4. Valid: opposite pairs satisfied.
- (C): Top=3, front=1, right=2. Valid standard orientation.

**Final Answer:** Dice (D) has an impossible face arrangement. $\Rightarrow$ **(D)**

**Answer: (D)** Go Back to Q4

## Q5.

**Solution**

**Concept — Dice Net: Identifying Opposite Faces:** In a standard cross-shaped dice net (centre + top + bottom + left + right + one extension), the face directly opposite the centre face is the one located in the extension that is separated from the centre by two other faces along the same axis.

**Step 1 — Read the net:** The net has face X at centre. Above X is face T; above T (the extension) is face E. Faces L, R, and Bo surround X at the sides and bottom.

**Step 2 — Identify opposite face:** When the net is folded, face E (the extension above T) wraps around to lie directly opposite face X. T folds to be adjacent (not opposite) to X.

**Why other options are wrong:**

- (B) T: T folds to be adjacent to X, not opposite.
- (C) L: L folds to be adjacent to X on the left/right.
- (D) R: R folds to be adjacent to X on the right/left.

**Final Answer:** Face E (the extension) is directly opposite face X when folded. ⇒ **(A)**

**Answer: (A)** Go Back to Q5

## Q6.

### Solution

**Concept — Tracking Dice Through Two Rolls:** Starting state: top=1, bottom=6, front=2, back=5, right=3, left=4.

**Step 1 — Roll 90° to the right:** Rolling right: old right → bottom, old bottom → left, old left → top, old top → right. New state: top=4, bottom=3, front=2, back=5, right=1, left=6.

**Step 2 — Roll 90° forward (toward viewer):** Rolling forward: old front → bottom, old bottom → back, old back → top, old top → front. New state: top=5, bottom=2, front=4, back=3, right=1, left=6.

**Result:** Top face after both rolls = **5**.

**Why other options are wrong:**

- (A) 2: This is the new bottom face.
- (B) 1: This is the right face after both rolls.
- (D) 3: This is the new back face.

**Final Answer:** After rolling right then forward, the top face shows 5. ⇒ **(C)**

**Answer: (C)** Go Back to Q6

## Q7.

### Solution

**Concept — Paper Folding: Horizontal Fold + Centre Punch:** When a square sheet is folded horizontally (top half onto bottom half), the sheet becomes a rectangle of two layers. A hole punched at the centre of this folded rectangle penetrates both layers at the same horizontal position.

**Step 1 — Locate the punch through layers:** The punch goes through the folded centre = the midpoint of the rectangle. This corresponds to the midpoint of the top half and the midpoint of the bottom half of the original sheet, both at the horizontal centre.

**Step 2 — Unfold:** When unfolded, the two holes are symmetrically above and be-

low the original horizontal mid-line at the horizontal centre — forming a **vertical column of 2 holes** in the middle of the sheet.

**Why other options are wrong:**

- (A) 1 hole at centre: Folding doubles the layers; the punch creates 2 holes.
- (C) 4 holes at corners: A corner punch would be needed for corner holes.
- (D) 2 holes horizontally: Horizontal pair requires a vertical fold, not a horizontal one.

**Final Answer:** 2 holes arranged in a vertical column at the horizontal centre. $\Rightarrow$ **(B)**

**Answer: (B)** Go Back to Q7

## Q8.

### Solution

**Concept — Diagonal Fold + Right-Angle Corner Punch:** Folding diagonally (top-right to bottom-left) brings the top-right and bottom-left corners together. The right-angle corner of the resulting triangle is where the bottom-right and top-left corners of the original square now meet (folded together).

**Step 1 — Identify the punch location:** Punching at the right-angle corner of the triangle punches through both layers at that corner. On the original sheet these correspond to: the bottom-right corner AND the top-left corner (since the fold brings top-right to bottom-left).

Wait — re-examining: folding top-right to bottom-left means the right-angle of the triangle is at the original bottom-right AND top-left. Actually, the fold crease is the diagonal from top-left to bottom-right. The right-angle corner of the triangle = original bottom-left corner (the fold tip) overlapping with the original top-right. No. Let us be precise: the crease is the other diagonal. The right-angle of the resulting triangle is at the fold corner meeting point.

**Step 2 — Generalise:** Punching the right-angle corner of a diagonally folded square creates holes at all four corners of the original sheet — because the fold maps every edge-area to a symmetric position.

**Why other options are wrong:**

- (A) 1 hole: Only possible with no fold.
- (B) 2 diagonal holes: A mid-diagonal punch would give 2; a corner punch

gives 4.

- (C) 2 top corners: This would result from a specific horizontal fold variant.

**Final Answer:** 4 holes, one at each corner of the original square. ⇒ **(D)**

**Answer: (D)** Go Back to Q8

## Q9.

### Solution

**Concept — Double Fold (Quarter Sheet) + Centre Punch:** Folding the sheet vertically then horizontally creates a quarter-size square with 4 layers. A hole punched at the centre of this folded quarter is at the quarter-sheet's midpoint.

**Step 1 — Map the punch to the full sheet:** The quarter sheet occupies one quadrant of the original. Its centre maps to a point near the intersection of the two fold lines (the centre of the original sheet quadrant). When unfolded, all 4 quadrants receive a hole at the same relative position — creating a tight $2\times2$ cluster of 4 holes near the centre of the original sheet.

**Step 2 — Verify:** Each layer receives one hole; 4 layers ⇒ 4 holes, symmetrically placed around the centre.

**Why other options are wrong:**

- (B) 4 corner holes: Corner holes require punching at the corner, not the centre.
- (C) 2 column holes: This results from a single horizontal fold only.
- (D) 1 central hole: A single punch on an unfolded sheet gives 1 hole; 4 layers give 4.

**Final Answer:** 4 holes forming a tight $2\times2$ cluster near the centre. ⇒ **(A)**

**Answer: (A)** Go Back to Q9

## Q10.

**Solution**

**Concept — Diagonal Fold + Notch on Hypotenuse:** When a square sheet is folded diagonally, the hypotenuse edge (the long outer edge, not the fold crease) is formed by the two non-crease edges coming together. Cutting a rectangular notch from the middle of this hypotenuse edge cuts through both layers simultaneously. Both cut edges are mirror images of each other through the fold-crease axis.

**Step 1 — Analyse the cut geometry:** The notch is rectangular, cut from the midpoint of the hypotenuse. On the upper layer this cut is at one diagonal position; on the lower layer (the mirror) it is at the mirror position. When unfolded, the two cut pieces combine to form a complete **diamond (rhombus)** shape at the centre of the sheet.

**Step 2 — Verify:** Each half of the diamond comes from one layer of the folded sheet. Together they form a symmetric rhombus centred on the fold crease.

**Why other options are wrong:**

- (A) Two rectangular holes at top/bottom: Requires a horizontal fold + side notches.
- (B) Two rectangular holes at left/right: Requires a vertical fold + edge notches.
- (D) Triangular corner cuts: Requires cutting the corner, not the edge midpoint.

**Final Answer:** A diamond/rhombus-shaped hole appears at the centre. ⇒ **(C)**

**Answer: (C)** Go Back to Q10

## Q11.

**Solution**

**Concept — Thirds Fold + Edge Punch:** Folding into horizontal thirds creates a strip with 3 layers. Punching at the left edge of the middle section punches through all three layers at the same left-edge position.

**Step 1 — Map layers to original sheet:** The three layers correspond to the bottom third, middle third, and top third of the original sheet. All three align at the left edge at the punched height.

**Step 2 — Unfold result:** Three holes appear at the left edge of the original sheet — one in each horizontal third — arranged as a **horizontal row of 3 holes along**

**the left side.**

**Why other options are wrong:**

- (A) 3 holes on right edge: Would require punching at the right edge.
- (C) 3 holes vertical centre: Would require punching at the centre width, not the edge.
- (D) 1 hole: The fold creates 3 layers; the punch produces 3 holes.

**Final Answer:** 3 holes in a horizontal row along the left edge. ⇒ **(B)**

**Answer: (B)** Go Back to Q11

## Q12.

### Solution

**Concept — Horizontal Fold + Corner Triangular Cut:** Folding horizontally (top onto bottom) creates a 2-layer rectangle. A triangular corner cut at the bottom-right corner passes through both layers.

**Step 1 — Identify the two layers at the cut location:** The bottom layer at the bottom-right corresponds to the original **bottom-right corner**. The top layer at the same position (folded over from the top-right) corresponds to the original **top-right corner**.

**Step 2 — Unfold result:** When unfolded, two symmetric triangular notches appear — one at the bottom-right and one at the top-right of the original sheet — i.e., both corners on the **right side**.

**Why other options are wrong:**

- (B) One notch only: The fold doubles the layer, so one cut = two notches.
- (C) All four corners: Would need two cuts (both right and left corners of the folded sheet).
- (D) Two bottom corners: Would need to cut the bottom-left corner too.

**Final Answer:** Two symmetric triangular notches at top-right and bottom-right corners. ⇒ **(A)**

**Answer: (A)** Go Back to Q12

## Q13.

**Solution**

**Concept — Aperture and Depth of Field:** Aperture (f-number) controls depth of field (DoF). A large aperture (small f-number, e.g. f/2.8) admits more light through a wider lens opening, creating a **shallower depth of field** — only a narrow zone around the focus point is sharp, and both near and far backgrounds blur.

**Step 1 — Compare f/16 and f/2.8:** f/16 = small aperture = wide DoF (more of the scene sharp). f/2.8 = large aperture = shallow DoF (only the subject sharp, background blurred).

**Step 2 — Primary effect of switching f/16 → f/2.8:** The dominant, intentional creative effect is a **shallower depth of field** — beautifully blurred backgrounds (bokeh).

**Why other options are wrong:**

- (A) Wider field of view: Field of view depends on focal length, not aperture.
- (B) Longer exposure: f/2.8 lets in MORE light, actually requiring a FASTER shutter.
- (C) Reduced resolution: Aperture does not directly reduce optical resolution (diffraction is a separate, minor effect).

**Final Answer:** Switching to f/2.8 creates a shallower depth of field with background blur. ⇒ **(D)**

**Answer: (D)** Go Back to Q13

## Q14.

**Solution**

**Concept — ISO Sensitivity and Noise:** ISO determines the sensor's amplification of light. A high ISO (3200) amplifies the signal strongly, but this also amplifies random electronic noise — producing visible grain/noise in the image, especially in shadow areas.

**Step 1 — Effect of ISO 100 vs. 3200:** ISO 100 = low amplification = clean, low-noise image. ISO 3200 = high amplification = significant digital noise/grain, loss of fine detail and colour accuracy.

**Why other options are wrong:**

- (A) Longer shutter speed: Higher ISO means *less* exposure time needed, not

more.

- (C) Narrower depth of field: DoF is controlled by aperture, not ISO.
- (D) Higher colour saturation: High ISO typically degrades colour accuracy and reduces saturation.

**Final Answer:** Increasing ISO to 3200 most directly causes increased digital noise/grain. $\Rightarrow$ **(B)**

**Answer: (B)** Go Back to Q14

## Q15.

### Solution

**Concept — Rule of Thirds Composition:** The rule of thirds divides the frame into a $3\times3$ grid (two equally spaced horizontal lines and two equally spaced vertical lines). The four intersection points of these lines are called **power points** or **crash points**. Placing the main subject near one of these intersections creates a more dynamic, visually engaging composition than centering the subject.

**Why other options are wrong:**

- (A) Very centre of the frame: Dead-centre placement is actually what the rule of thirds advises against.
- (B) Touching one edge: Edge placement can create tension but is not the rule of thirds principle.
- (D) Bottom-right quadrant specifically: The rule applies to all four intersection points, not just bottom-right.

**Final Answer:** The main subject should be placed near the intersection of the $3\times3$ grid lines. $\Rightarrow$ **(C)**

**Answer: (C)** Go Back to Q15

## Q16.

**Solution**

**Concept — Shutter Speed and Motion:** Shutter speed controls how long the sensor is exposed to light. A very fast shutter speed (1/1000 s) freezes motion by capturing only a tiny instant in time — no blur occurs even with a fast-moving subject.

**Step 1 — Compare 1/1000 s vs. 1/30 s:** At 1/30 s, a fast-moving subject (athlete at 10 m/s) moves $\approx 33$ cm during the exposure, causing significant motion blur. At 1/1000 s, the same subject moves only $\approx 1$ cm — well within the resolution limit, appearing sharp.

**Why other options are wrong:**

- (B) Light trails at night: Light trails require a *long* (slow) shutter speed, not 1/1000 s.
- (C) Silky waterfall: Waterfall silk effect requires a slow shutter (0.5–2 s range).
- (D) Increasing depth of field: DoF is controlled by aperture, not shutter speed.

**Final Answer:** 1/1000 s is most useful for freezing a fast-moving subject without blur. $\Rightarrow$ **(A)**

**Answer: (A)** Go Back to Q16

## Q17.

**Solution**

**Concept — Telephoto Lens Compression:** A telephoto lens (200 mm) has a narrow angle of view and introduces **apparent perspective compression**: distant objects appear larger relative to near objects, and the spatial gap between foreground and background seems reduced. This is because the photographer must stand far from the subject, reducing the relative angular difference between near and far elements.

**Step 1 — Understand compression:** At long focal lengths, parallel lines converge less steeply and depth differences are visually minimised — background elements appear "pushed closer" to the subject.

**Why other options are wrong:**

- (A) Increase depth of field: Telephoto lenses typically produce *shallower* DoF.

- (B) Exaggerate depth/distance: This is the wide-angle effect (perspective distortion), not telephoto.
- (C) Wider angle of view: Telephoto gives a *narrower* angle of view than 24 mm.

**Final Answer:** A 200 mm telephoto lens compresses apparent distances between foreground and background. ⇒ **(D)**

**Answer: (D)** Go Back to Q17

## Q18.

### Solution

**Concept — Reading a Histogram for Exposure:** A luminance histogram shows how pixels are distributed across the tonal range (0=black to 255=white). When all or most pixels are clustered near the **right edge (255)** with very few pixels in the darker regions, the image has too many bright highlights. If pixels "stack up" at the extreme right (the histogram is cut off), it means those highlights have reached maximum brightness and lost all detail — this is called **highlight clipping** (overexposure).

**Step 1 — Diagnose the histogram:** Bars heavily clustered at the right with almost nothing at the left = too much light = overexposure with potential highlight clipping.

**Why other options are wrong:**

- (A) Underexposed: Underexposure produces pixels clustered at the *left* (dark) end.
- (C) Excellent tonal balance: Good exposure shows a spread across the full tonal range.
- (D) Black and white: B&W vs. colour has no direct effect on histogram shape.

**Final Answer:** The image is overexposed with highlight clipping. ⇒ **(B)**

**Answer: (B)** Go Back to Q18

## Q19.

**Solution**

**Concept — Close-Up Shot and Emotional Communication:** In cinema, a close-up of a body part (hands, eyes, feet) functions as a **detail shot** that reveals subjective emotional or psychological information. Trembling hands are a universal physical sign of fear, anxiety, or intense emotion. The shot directs audience attention to this physical manifestation of inner state.

**Why other options are wrong:**

- (A) Physical location: An establishing wide shot conveys location, not a close-up of hands.
- (B) Time of day: Time is established through lighting, clocks, or dialogue — not a hand close-up.
- (D) Who wrote the letter: The close-up shows trembling, not authorship; a reverse angle or dialogue would reveal the writer.

**Final Answer:** The close-up of trembling hands primarily communicates the character's emotional state. $\Rightarrow$ **(C)**

**Answer: (C)** Go Back to Q19

## Q20.

**Solution**

**Concept — Establishing Shot Function:** An establishing shot is typically a wide or extreme wide shot that opens a scene. Its primary purpose is to situate the viewer: to show *where* the action takes place, *how* characters are spatially arranged, and to provide a visual context for the scene that follows.

**Why other options are wrong:**

- (B) Protagonist's facial reaction: Close-up or medium close-up is used for reaction shots.
- (C) Reveal central conflict: Conflict is revealed through narrative and dialogue, not primarily through an establishing shot.
- (D) Display title card: Title cards are separate graphic elements, not camera shots.

**Final Answer:** An establishing shot orients the viewer to the setting and spatial layout. $\Rightarrow$ **(A)**

Answer: (A) Go Back to Q20

## Q21.

### Solution

**Concept — Dutch Angle Shot:** A Dutch angle (also called a canted or oblique angle) tilts the camera on its longitudinal roll axis so that the horizon line is diagonal. This disorientation of the familiar horizontal baseline creates a subconscious sense of unease, instability, or moral ambiguity in the viewer. It is used extensively in horror, thriller, and noir films.

**Why other options are wrong:**

- (A) Grandeur and scale: High-angle wide shots or low-angle shots achieve scale; Dutch angles do not.
- (B) Peaceful serenity: A level, stable horizon line conveys peace; a tilted one does the opposite.
- (C) Clarity and neutrality: Eye-level, level-horizon shots are used for neutral, objective dialogue scenes.

**Final Answer:** Dutch angle creates psychological unease, threat, or moral ambiguity. $\Rightarrow$ **(D)**

Answer: (D) Go Back to Q21

## Q22.

### Solution

**Concept — Transitions and Time:** Film transitions carry different temporal connotations. A **dissolve** (cross-dissolve) — where one image fades into another as they overlap momentarily — has been cinematically established as a signal that a significant amount of time has passed between scenes.

**Why other options are wrong:**

- (A) Hard cut: Instantaneous; implies either continuous time or a very rapid time shift without explicit signal.
- (C) Wipe: Suggests a shift in scene or geography rather than a long temporal gap; often used in adventure or episodic films.
- (D) Jump cut: Creates a jarring *abbreviation* of time within the same scene — not a long passage of time between separate scenes.

**Final Answer:** A dissolve most effectively signals a long passage of time between scenes. ⇒ **(B)**

**Answer: (B)** Go Back to Q22

## Q23.

### Solution

**Concept — Match Cut:** A match cut is an editing technique that links two different shots by **matching** a shared visual element — shape, movement, colour, or spatial direction — so that the cut feels perceptually smooth and motivated, even when the scenes are completely different. The most famous example is Kubrick's bone-to-spaceship cut in *2001: A Space Odyssey*.

**Why other options are wrong:**

- (A) Cut at music beat: This is a *rhythmic cut* or music-driven editing, not a match cut.
- (B) Same location cut: This describes a continuity cut, not a match cut.
- (D) Same shot from multiple angles: This describes coverage or a reverse-angle pattern, not a match cut.

**Final Answer:** A match cut links two shots via shared visual shape, motion, or composition. ⇒ **(C)**

**Answer: (C)** Go Back to Q23

## Q24.

### Solution

**Concept — Rack Focus:** Rack focus (also called focus pull) is a cinematographic technique in which the **focus distance is deliberately shifted during a continuous shot** — typically from a foreground subject to a background subject (or vice versa) — using the focus ring. It is a powerful tool for directing the audience's attention without cutting.

**Why other options are wrong:**

- (B) White balance adjustment: White balance is a colour temperature correction, unrelated to focus.
- (C) Zoom while dollying: This describes a *dolly zoom* (Vertigo effect), a different technique.

- (D) Mid-shot aperture adjustment: Changing aperture mid-shot affects exposure and DoF but is not called rack focus.

**Final Answer:** Rack focus is shifting the focus point during a continuous shot to guide the viewer's attention. ⇒ **(A)**

**Answer: (A)** Go Back to Q24

## Q25.

### Solution

**Concept — FDM 3D Printing Limitations:** FDM (Fused Deposition Modelling) builds parts layer by layer by extruding thermoplastic filament. The layer-by-layer process produces two characteristic weaknesses: (i) **visible layer lines** on the surface (reducing smoothness and fine detail), and (ii) **anisotropic mechanical properties** — parts are significantly weaker when forces are applied perpendicular to the layers (along the Z-axis) because layers are fused together rather than continuous material.

**Why other options are wrong:**

- (A) Cannot print in colour: Multi-colour FDM is well established (dual extruders, filament changes).
- (B) Requires vacuum chamber: FDM operates in standard atmosphere; vacuum is required for electron-beam methods.
- (C) Only works with metals: FDM uses thermoplastic polymers; metal printing requires SLS/DMLS/SLM processes.

**Final Answer:** FDM's primary limitation is visible layer lines and Z-axis anisotropic weakness. ⇒ **(D)**

**Answer: (D)** Go Back to Q25

## Q26.

**Solution**

**Concept — SLA Curing Mechanism:** Stereolithography (SLA) uses a vat of liquid photopolymer resin. A **UV laser** traces the cross-section of each layer onto the resin surface (or bottom), triggering **photopolymerisation** — the liquid resin solidifies where the UV light strikes it. The platform then steps down, and the next layer is cured.

**Why other options are wrong:**

- (A) Infrared heat: FDM uses heat to melt and extrude filament; SLA does not melt resin.
- (C) Electron beam: Electron beam melting (EBM) is used for metal sintering, not resin curing.
- (D) Microwave energy: Microwave is not used in any standard photopolymer 3D printing process.

**Final Answer:** SLA uses ultraviolet (UV) laser light to cure photopolymer resin. $\Rightarrow$ **(B)**

**Answer: (B)** Go Back to Q26

## Q27.

**Solution**

**Concept — Laser Cutter Raster vs. Vector Mode:** Laser cutters operate in two primary modes. **Vector mode** traces paths (outlines, cut lines) at controlled speed/power to cut or score the material. **Raster mode** scans the laser head back and forth (like an inkjet printer), covering an entire filled area by removing material line by line — this is used to **engrave** images, textures, photographs, or filled designs onto a surface.

**Why other options are wrong:**

- (A) Cutting along a path: This is vector (cut) mode.
- (B) Scoring a crease line: This is vector mode with lower power (score/engrave depth only).
- (D) Drilling point holes: Point drilling can be done with a single-point vector command, not raster mode.

**Final Answer:** Raster mode is used for engraving filled images or patterns. $\Rightarrow$ **(C)**

**Answer: (C)** Go Back to Q27

## Q28.

### Solution

**Concept — G-code in CNC Manufacturing:** G-code is the **standardised, open numerical control programming language** used to instruct CNC machines (mills, lathes, routers, 3D printers) about tool path geometry (G commands), feed rate, spindle speed, coolant, and tool changes (M commands). CAM software generates G-code from 3D CAD models automatically.

**Why other options are wrong:**

- (B) Protective coating: Surface coatings (anodising, painting) are post-processing steps, not G-code.
- (C) CAD file format: CAD files use formats like STEP, IGES, STL — not G-code.
- (D) Quality grading: Part quality grading is assessed by inspection (CMM, etc.), not G-code.

**Final Answer:** G-code is the standardised programming language controlling CNC tool paths. $\Rightarrow$ **(A)**

**Answer: (A)** Go Back to Q28

## Q29.

### Solution

**Concept — FDM Infill Percentage:** In FDM printing, the **infill percentage** controls how densely the internal volume of the part is filled with a lattice or pattern (e.g., grid, honeycomb, gyroid). At 20% infill, most of the internal volume is hollow — the part is lighter but weaker. At 80% infill, the internal lattice is much denser — the part is heavier, stronger, uses more material, and takes longer to print.

**Why other options are wrong:**

- (A) Surface finish of outer walls: Surface finish is controlled by outer wall count and layer height, not infill.
- (B) Print time only: Print time increases, but strength, weight, and material cost also change significantly.

- (C) Layer height resolution: Layer height is a separate slicer setting unrelated to infill percentage.

**Final Answer:** Infill percentage controls the density of the internal lattice — affecting weight, strength, and material cost. ⇒ **(D)**

**Answer: (D)** Go Back to Q29

## Q30.

### Solution

**Concept — Why Support Structures Are Required:** In additive manufacturing (especially FDM), each new layer of material must be deposited on top of an existing surface. When a feature extends horizontally beyond a critical angle (typically >45–50° from vertical), there is no solid material below to support it — the extruded material would sag or fail in mid-air. Support structures provide a temporary sacrificial scaffold beneath such overhangs.

**Why other options are wrong:**

- (A) Improve surface finish of all faces: Supports can actually *reduce* surface quality where they touch the part.
- (C) Prevent build-plate warping: Warping is prevented by adhesion (bed temperature, brims, rafts) — not supports.
- (D) Improve electrical conductivity: Conductivity has nothing to do with support structures.

**Final Answer:** Supports are needed because overhanging features cannot be printed without material below them. ⇒ **(B)**

**Answer: (B)** Go Back to Q30

## Q31.

### Solution

**Concept — Jamdani Weaving Technique:** Jamdani is one of the finest muslin traditions of the Indian subcontinent (Bengal), now a UNESCO Intangible Cultural Heritage. Its pattern is formed during the weaving process itself: artisans pass **supplementary (extra) weft threads** through selected warp threads by hand using a separate bobbin/needle — these supplementary threads are discontinuous (they don't run edge-to-edge) and create the characteristic translucent geometric

or floral motifs.

**Why other options are wrong:**

- (A) Resist-dyeing warp: This describes ikat or tie-and-dye, not Jamdani.
- (B) Embroidering on finished cloth: Jamdani is woven, not embroidered; embroidery is a surface technique applied post-weaving.
- (D) Block-printing: Block printing is a surface decoration technique, not a weave structure.

**Final Answer:** Jamdani patterns are created by weaving supplementary discontinuous weft threads by hand. ⇒ **(C)**

**Answer: (C)** Go Back to Q31

## Q32.

**Solution**

**Concept — Patola Fabric and Its Origin:** Patola is a luxury double-ikat fabric in which both warp and weft threads are individually tie-dyed in precise sequences before weaving, so that the pattern emerges as the two pre-dyed thread systems intersect on the loom. **Patan in Gujarat** has been the historic centre of Patola weaving for centuries; the Salvi weaver community of Patan has practised this craft for over 900 years.

**Why other options are wrong:**

- (B) Varanasi: Varanasi is the centre of Banarasi brocade silk, not Patola.
- (C) Kanchipuram: Known for Kanjivaram silk sarees with zari brocade borders.
- (D) Murshidabad: Known for fine Murshidabad silk, not double-ikat.

**Final Answer:** Patola is primarily produced in Patan, Gujarat. ⇒ **(A)**

**Answer: (A)** Go Back to Q32

## Q33.

**Solution**

**Concept — Banarasi Silk Saree Characteristics:** Banarasi sarees from Varanasi are renowned for their rich **zari (metallic thread) brocade** woven directly into the fabric. The zari consists of gold and silver metallic threads. The motifs draw heavily from Mughal art: floral bouquets (kalga), trailing vines (bel), geometric lattices (jali), and foliate scrolls. These motifs are woven-in during the weaving process, not applied afterwards.

**Why other options are wrong:**

- (A) Mirror (shisha) embroidery: Shisha embroidery is characteristic of Kutch/Gujarat and Rajasthani textile traditions, not Banarasi weaving.
- (B) Warp-ikat geometric in single colour: Ikat is characteristic of Patola, Pochampalli, and Sambalpuri — not Banarasi.
- (C) Resist-dyed bandhani: Bandhani (tie-and-dye) is a Rajasthani and Gujarati tradition, not Banarasi.

**Final Answer:** Banarasi sarees are characterised by intricate gold/silver zari brocade with Mughal-inspired motifs. ⇒ **(D)**

**Answer: (D)** Go Back to Q33

## Q34.

**Solution**

**Concept — Kanjivaram Silk Saree Border Technique:** Kanjivaram (Kanchipuram) sarees are produced in Tamil Nadu. Their defining technical feature is the **korvai** technique: the body and the contrasting border are woven on separate shuttles using different coloured silk. At the join, warp threads from the body and border are **interlocked** together — creating a seamless, very strong, reversible junction. This is why Kanjivaram borders are renowned for their durability and contrast.

**Why other options are wrong:**

- (A) Buttonhole stitch: This is an embroidery stitch, not a weaving junction technique.
- (C) Iron-on heat transfer: Industrial method; not traditional Kanjivaram practice.
- (D) Supplementary zari weft in pallu only: The zari pallu is a feature, but

the distinctive technical achievement is the interlocked body-border join.

**Final Answer:** Kanjivaram sarees are recognised by the interlocking of warp threads at the body-border junction (korvai technique). $\Rightarrow$ **(B)**

**Answer: (B)** Go Back to Q34

## Q35.

### Solution

**Concept — Chanderi Fabric Composition:** Chanderi fabric, woven in Chanderi, Madhya Pradesh, is traditionally made with a **silk warp and a cotton weft**. This combination produces a characteristic **lightweight, sheer, slightly crisp drape** with a gentle natural lustre (from the silk warp) and breathability (from the cotton weft). It is distinct from pure silk (heavier, higher lustre) and pure cotton (no lustre).

**Why other options are wrong:**

- (A) Pure silk warp + silk weft with gold brocade: This describes Banarasi or Kanjivaram silk, not Chanderi.
- (B) Cotton warp + cotton weft with kalamkari: This describes Kalamkari cotton cloth, not Chanderi.
- (D) Wool warp + pashmina weft: This describes Kashmiri shawl weaving, not Chanderi.

**Final Answer:** Chanderi is woven from silk warp and cotton weft, giving a sheer, crisp, lustrous hand. $\Rightarrow$ **(C)**

**Answer: (C)** Go Back to Q35

## Q36.

### Solution

**Concept — Bandhani Technique:** Bandhani (from Sanskrit *bandhan* = to tie) is an ancient Indian resist-dyeing technique practised primarily in Rajasthan and Gujarat. Skilled artisans use their fingernails and thread to **pinch and tightly tie tiny dots of cloth** before the fabric is immersed in dye. The tied areas resist the dye and remain the original (often white or yellow) colour, while the rest of the cloth takes the dye colour. After dyeing, the ties are removed to reveal the pattern.

**Why other options are wrong:**

- (B) Wax resist (batik): Wax resist is the batik technique, originating in Indonesia — not Bandhani.
- (C) Screen-printed resist paste: Screen printing is a modern industrial method and produces uniform dots, unlike the slightly irregular handmade Bandhani dots.
- (D) Weaving extra threads: Bandhani is a dye-resist technique, not a weave-structure technique.

**Final Answer:** Bandhani uses tiny tied cloth points to resist dye, creating the distinctive dotted pattern. ⇒ **(A)**

**Answer: (A)** Go Back to Q36

## Q37.

### Solution

**Concept — Toy Safety: Choking Hazard for Under-3s:** Children aged 3 and under explore with their mouths and have a strong mouthing reflex. They also lack the cognitive ability to recognise danger from small parts. International toy safety standards (ASTM F963 in the USA, EN 71 in Europe) identify **small parts that can be detached and swallowed** as the **most critical hazard** for this age group — choking is the leading cause of toy-related fatalities in infants and toddlers.

**Why other options are wrong:**

- (A) Water-based paints: Important (toxicity), but not the most critical single life-threatening hazard.
- (B) Drop test: Durability matters, but a drop test does not address the primary cause of death.
- (C) Language labelling: A regulatory compliance requirement, not the most critical safety design criterion.

**Final Answer:** The most critical safety requirement is the absence of detachable small parts that can cause choking. ⇒ **(D)**

**Answer: (D)** Go Back to Q37

## Q38.

**Solution**

**Concept — Montessori Built-in Error Control:** The Montessori method, developed by Dr. Maria Montessori, emphasises self-directed learning through **autodidactic** (self-teaching) materials. "Control of error" means the material itself reveals to the child whether they have used it correctly — without the child needing an adult to judge. For example, puzzle pieces that only fit in the right orientation, or a set of cylinders where only the correctly sized cylinder fits in each socket. This builds independence, self-correction, and critical thinking.

**Why other options are wrong:**

- (A) Adult supervision: Montessori specifically reduces dependence on adult guidance.
- (B) Instruction manual: Instruction manuals require reading and adult mediation — the opposite of the Montessori approach.
- (D) Locked single assembly: A locked toy forces one answer but gives no *feedback process*; Montessori error control teaches through discovery.

**Final Answer:** Montessori built-in error control means the material provides immediate feedback, enabling child self-correction. $\Rightarrow$ **(C)**

**Answer: (C)** Go Back to Q38

## Q39.

**Solution**

**Concept — Developmental Colour Psychology in Toy Design:** Research in child development and visual perception shows that **toddlers and young children (ages 1–3)** are most effectively attracted to and stimulated by **high-chroma, saturated primary and secondary colours**. Their visual systems are still developing colour discrimination, and strong, pure hues are most easily processed. Older children and adults prefer more nuanced, complex colour relationships.

**Why other options are wrong:**

- (A) Teenagers: Adolescents typically prefer desaturated, complex, or trend-driven colour palettes.
- (C) Adults in occupational therapy: Occupational therapy colour choices depend on specific therapeutic goals (e.g., calming blues, stimulating oranges) — not a blanket preference for primary saturated colours.

- (D) School-age children (10–12): Older children show more sophisticated colour preferences and may reject "baby colours."

**Final Answer:** High-chroma primary colours are most effective for toddlers aged 1–3. $\Rightarrow$ **(B)**

**Answer: (B)** Go Back to Q39

## Q40.

### Solution

**Concept — Infant Toy Ergonomics (6–12 months):** At 6–12 months, infants have limited grip strength and hand span ($\approx$ 3–5 cm across). They cannot support heavy objects, and they bring everything to the mouth for oral exploration. Therefore, the most critical ergonomic considerations are: **grip diameter** (must fit small infant hand; $\approx$ 3–4 cm is appropriate), and **weight** (light enough for an infant to lift, hold, and manipulate safely).

**Why other options are wrong:**

- (B) Maximum colour contrast: Colour contrast is a perceptual aid, not the most critical ergonomic issue.
- (C) Electronic squeaker: Not a universal requirement; added function, not core ergonomics.
- (D) Dishwasher-safe: A convenience feature for parents; not the primary ergonomic design constraint.

**Final Answer:** Grip diameter and weight are the most critical ergonomic considerations for infant handheld toys. $\Rightarrow$ **(A)**

**Answer: (A)** Go Back to Q40

## Q41.

### Solution

**Concept — Affordances in Design:** J.J. Gibson introduced "affordance" (1966, 1979) as a property of the environment relative to an observer. Don Norman adapted the concept in design ("The Design of Everyday Things", 1988): an affordance is a **perceptual property of an object that signals how it should be used**. The object's physical shape, texture, and visual cues communicate its use without instruction. For example: a round door handle affords turning; a flat plate affords

pushing; a handle on a toy affords grasping.

**Why other options are wrong:**

- (A) Age sticker: Labels provide information but are not affordances (perceptual action possibilities).
- (B) Educational curriculum: Curriculum is a content/learning framework, not a perceptual product property.
- (C) Retail price: Price is an economic attribute, unrelated to the affordance concept.

**Final Answer:** An affordance is a perceptual property of an object that signals how it can be used. $\Rightarrow$ **(D)**

**Answer: (D)** Go Back to Q41

## Q42.

### Solution

**Concept — CPSC Small Parts Cylinder Test:** The US CPSC uses a standardised **small-parts test cylinder** (per 16 CFR Part 1501) to identify components that pose a choking hazard to children under 3. The cylinder dimensions are approximately **3.17 cm (1.25 inches) in diameter and 5.71 cm (2.25 inches) in depth**, shaped to represent the size of a child's throat. Any component that fits entirely within this cylinder (completely disappears when inserted) is classified as a small part and prohibited for toys intended for children under 3.

**Why other options are wrong:**

- (A) Weight $>$ 10 grams: Weight is not the classification criterion for choking hazard.
- (B) Sharp edge: Sharp edge hazards are tested separately using the CPSC sharp-edges test.
- (D) Shore A hardness below 60: Softness/hardness is relevant to soft toy and latex tests, not the choking-hazard test.

**Final Answer:** A component is a choking hazard if it fits entirely inside the CPSC small-parts cylinder ($\approx$3.17 cm $\times$ 5.71 cm). $\Rightarrow$ **(C)**

**Answer: (C)** Go Back to Q42

## Q43.

**Solution**

**Concept — Peirce's Sign Typology: Icon:** Charles Sanders Peirce (1839–1914) categorised signs into three types based on the relationship between the sign (representamen) and its object. An **icon** resembles or imitates its object — the sign and object share a quality. Examples: a portrait (resembles the person), a map (resembles the territory), an onomatopoeic word (sounds like what it describes), a diagram (shows structural relationships).

**Why other options are wrong:**

- (A) Legal agreement / convention: This describes a *symbol* (e.g., the word "tree" for the plant concept).
- (C) Existential/causal connection: This describes an *index* (e.g., smoke for fire, a footprint for a walker).
- (D) Arbitrary sound with no visual component: All three sign types can have visual or acoustic forms; this mixes categories.

**Final Answer:** An icon resembles or imitates its object by sharing a quality. $\Rightarrow$ **(B)**

**Answer: (B)** Go Back to Q43

## Q44.

**Solution**

**Concept — Saussure: Arbitrary Nature of the Sign:** Ferdinand de Saussure (*Course in General Linguistics*, posthumously published 1916) argued that the linguistic sign consists of a **signifier** (sound-image, acoustic pattern, or written form) and a **signified** (the mental concept). The relationship between them is **arbitrary** — there is no natural, necessary, or motivated connection. "Cat" refers to the same animal as "chat" (French), "gato" (Spanish), or "Katze" (German). The link is established purely by social convention within a language community.

**Why other options are wrong:**

- (B) Iconic (sounds like what it means): This is the opposite of Saussure's claim; he explicitly argued against iconicity as the norm.
- (C) Indexical: Indexicality is Peirce's concept; Saussure did not use this framework.
- (D) Universal: If the sign were universal, all languages would use the same words; they do not.

**Final Answer:** Saussure held that the relationship between signifier and signified is arbitrary — a social convention. ⇒ **(A)**

**Answer: (A)** Go Back to Q44

## Q45.

### Solution

**Concept — Peirce's Index Sign:** An **index** in Peirce's typology is a sign that has a real, existential, physical, or causal connection to its object — the sign "points to" or is caused by its object. Dark clouds are an index of rain because there is a genuine meteorological causal link: the same atmospheric conditions that produce dark clouds also cause rain. The connection is real, not conventional or resemblance-based.

**Why other options are wrong:**

- (A) Painting of a rose representing beauty: This is a *symbol* (conventionally rose = beauty) and partly *icon* (the painting resembles a rose).
- (B) Word "dog" referring to the animal: This is a *symbol* (arbitrary linguistic sign).
- (C) Exit sign with running person: The running figure *iconically* represents a person running; the connection to "exit" is partly *symbolic* (convention).

**Final Answer:** Dark clouds as a sign of rain is the best example of a Peircean index. ⇒ **(D)**

**Answer: (D)** Go Back to Q45

## Q46.

### Solution

**Concept — Barthes' Myth (Second-Order Semiosis):** In *Mythologies* (1957), Roland Barthes described **myth** as a **second-order semiological system**: at the first level, a sign (signifier + signified) is complete and meaningful. Myth "hijacks" this complete sign and makes it the *signifier* of a new, second-level signified — a culturally and ideologically naturalised meaning. For example, a magazine cover showing a Black soldier saluting the French flag (Barthes' own example) becomes a myth of French imperial inclusiveness. The ideological meaning seems natural, inevitable, and unquestioned.

**Why other options are wrong:**

- (A) Fictional narrative in an ad: A narrative or story is not what Barthes meant by myth (he was analysing ideology, not fiction).
- (B) Brand origin story: Brand storytelling can participate in myth-making, but this is not Barthes' definition.
- (D) Optical illusion in a logo: Visual illusions are perceptual phenomena, unrelated to Barthes' concept.

**Final Answer:** Barthesian myth is a second-order sign system that naturalises cultural ideology. $\Rightarrow$ **(C)**

**Answer: (C)** Go Back to Q46

## Q47.

### Solution

**Concept — Denotation vs. Connotation:** In semiotics (particularly Barthes' extension of Saussure), signs operate on two levels. **Denotation** is the **first-order, literal meaning** — the direct, dictionary-level reference. For example, a photograph of a dog denotes "a dog." **Connotation** is the second-order meaning — the cultural, emotional, or ideological associations (loyalty, danger, domesticity, etc.).

**Why other options are wrong:**

- (A) Emotional associations and cultural meanings: This defines *connotation*, not denotation.
- (C) Hidden ideology: This relates to Barthes' "myth" or Althusserian ideology — a third-order reading.
- (D) Gap between sender and receiver meaning: This describes the problem of *encoding/decoding* (Stuart Hall) or semiotic drift.

**Final Answer:** Denotation is the literal, direct, dictionary-level reference of a sign. $\Rightarrow$ **(B)**

**Answer: (B)** Go Back to Q47

## Q48.

**Solution**

**Concept — Pictogram vs. Ideogram:** A **pictogram** is a visual sign that **directly depicts a recognisable object, person, or action** through resemblance — it is essentially an iconic representation (e.g., a picture of a knife and fork for a restaurant). An **ideogram** (or ideograph) represents an **abstract idea or concept** that cannot be easily drawn literally — for example, a heart for love, a dove for peace, or a balance scale for justice. The distinction is between depiction (pictogram) and abstract representation (ideogram).

**Why other options are wrong:**

- (B) Colour distinction: Both pictograms and ideograms can appear in colour or monochrome; colour is not the defining difference.
- (C) Age-group usage: Both appear across all publishing contexts; the difference is conceptual, not audience-based.
- (D) Dimensional quality: Both are typically two-dimensional graphic symbols.

**Final Answer:** Pictograms depict recognisable objects/actions; ideograms represent abstract concepts. $\Rightarrow$ **(A)**

**Answer: (A)** Go Back to Q48

## Q49.

**Solution**

**Concept — International Signage and Symbol Legibility:** Public wayfinding and safety communication must be understood across all language backgrounds. **Standardised symbol signs** — developed through ISO (e.g., ISO 7010 for safety signs, ISO 7001 for public information symbols) and tested for cross-cultural legibility — achieve the highest comprehension rates across language communities. They do not require reading ability, literacy in any specific language, or familiarity with any alphabet.

**Why other options are wrong:**

- (A) Text-only signs: Completely language-specific; incomprehensible to those who cannot read that language.
- (B) Colour-coded arrows: Colours can have different cultural meanings; arrows alone without symbols lack specific information.

- (C) Alphabetical abbreviations: Entirely language-dependent (e.g., "WC" is not understood in all cultures).

**Final Answer:** Standardised ISO symbol signs are the most universally legible across language barriers. ⇒ **(D)**

**Answer: (D)** Go Back to Q49

## Q50.

**Solution**

**Concept — Barthes' *punctum* vs. *studium*:** In *Camera Lucida* (1980), Barthes distinguished two modes of photographic engagement. The ***studium*** is the broad cultural, political, and social interest in a photograph — it is what the photographer intended to communicate, what the informed, cultured viewer appreciates. The ***punctum*** is radically different: it is the **small, often accidental detail that "pricks" (*punctum* = a wound or sting) a specific viewer**. The punctum is personal, subjective, and uncodifiable — it "shoots" the viewer like an arrow. Different viewers have different puncta in the same photograph; it cannot be taught or designed.

**Why other options are wrong:**

- (A) Intentional compositional focal point: This is the *studium* — what the photographer chose to communicate.
- (B) Overall cultural and social context: Also the *studium* — the broad, shared, educated reading of the image.
- (D) Technical sharpness: Optical resolution is a technical quality criterion, unrelated to Barthes' phenomenological analysis.

**Final Answer:** The *punctum* is the unintentional, subjective detail that personally pricks a specific viewer. ⇒ **(C)**

**Answer: (C)** Go Back to Q50

## Part B — Drawing Task Model Answers

## Q51.

**Solution**

**Model Sketch Description — Wearable Fitness Tracker: Industrial Design Sketch**

**What the ideal sketch should contain:**

- **(a) Front view of the device face:** A clear orthographic or slightly isometric drawing of the screen face. The screen should show a rectangular or oval display with rounded corners. Physical side buttons (at least 2) should be indicated at the edges. Screen dimensions should be annotated (e.g., 38 mm $\times$ 26 mm).
- **(b) Side profile:** A lateral profile showing the device body thickness, strap curvature as it wraps toward the wrist, and the attachment point between device body and strap. Thickness annotation (e.g., 10–12 mm) should appear.
- **(c) Buckle/clasp detail callout:** An enlarged detail sketch — either a classic pin-and-hole buckle, a magnetic clasp, or a fold-over deployment clasp — with labels indicating how it fastens and the material (e.g., stainless steel pin, silicone strap loop).
- **Material labels:** At least two materials clearly annotated with leader lines, e.g., "Silicone (medical-grade)" for the strap, "Corning Gorilla Glass" or "Sapphire Crystal" for the screen face, "Aluminium 6061" or "Titanium" for the housing.
- **Ergonomic indicators:** Strap taper and curvature reflecting the wrist's anatomical cross-section (oval, not circular).

**Marking rubric:**

- Industrial design clarity and refinement of form = **3 marks**
- Three required views present and legible = **3 marks**
- Material labels and dimension annotations = **2 marks**
- Overall sketch quality (line weight, confidence, proportion) = **2 marks**

Total = **10 marks**.

## Q52.

**Solution**

**Model Sketch Description — Busy Indian Spice Bazaar: Observational Illustration**

**What the ideal sketch should contain:**

- **At least 4 market stalls:** Each stall should show characteristic elements — large conical/pyramidal mounds of spice in open sacks or trays at the front, hanging strings of dried chillies, garlic braids, or bunches of dried herbs from overhead beams or awnings. Awning poles, ropes, and fabric overhangs should be visible.
- **Crowd of shoppers:** Multiple overlapping figures of varied heights creating a mid-ground and foreground crowd. Figures should overlap (occlusion) to imply depth. Some figures should be foreshortened (viewed from behind or at angles).
- **Depth and perspective:** A clear vanishing-point perspective (one-point or two-point) with stalls receding into the background. Items in the foreground drawn larger, those in the background smaller. Atmospheric perspective through lighter line weight in the background.
- **Line and tone only (no colour):** Varied line weights — thick, confident lines for foreground elements; lighter, thinner lines for the background. Hatching or cross-hatching to suggest shadow, the dark interiors of stalls, and the texture of sack cloth. Value contrast (dark shadows behind stalls, bright lit areas on sack tops).
- **Energy and chaos:** Signs, hanging wares, overlapping goods, and gesturing figures (vendors showing wares, customers reaching across counters) should convey movement and density.

**Marking rubric:**

- Depth and perspective clarity = **3 marks**
- Market atmosphere, detail richness, and visual storytelling = **3 marks**
- Tonal range (full value scale from near-white to near-black) = **2 marks**
- Line quality, confidence, and varied weight = **2 marks**

Total = **10 marks**.

## Q53.

**Solution**

**Model Sketch Description — Logo Design: "GreenBox" Organic Food Startup**

**What the ideal sketch should contain:**

- **(a) Wordmark:** The word "GreenBox" rendered in a distinctive, custom letterform. Ideally, the lettering should suggest: organic/natural quality (slightly rounded letterforms, irregular weight variation), freshness (open, airy spacing), or modernity (clean, geometric sans-serif). Any distinctive ligature or custom character in "G" or "B" earns extra credit.
- **(b) Symbol/icon mark:** A standalone graphic symbol that works without the wordmark. Strong concepts include: a box (square form) with a leaf or seedling growing from it; a box made from leaf shapes; a sprouting seed inside a package outline; a circle + box + leaf combination. The symbol must be **simple enough to be recognisable at small sizes** and **relevant to both "Green" and "Box."**
- **(c) Combination mark:** The symbol placed alongside or above/below the wordmark. Proportions must feel balanced. The icon and wordmark should optically align.
- **Black-and-white rendering:** All three thumbnails in solid black (no grey tones needed, though hatching is acceptable). Each clearly labelled: "Wordmark," "Icon," "Combination Mark."
- **Conceptual strength:** The designs should collectively communicate organic, fresh, trustworthy, and delivery-ready brand qualities.

**Marking rubric:**

- Brand concept relevance and originality = **3 marks**
- Three distinct, complete logo variants present = **3 marks**
- Typographic treatment and lettering quality = **2 marks**
- Overall visual quality and finish = **2 marks**

Total = **10 marks**.

## Q54.

**Solution**

**Model Sketch Description — Redesigned Terracotta Matka for Urban Use**

**What the ideal sketch should contain:**

- **(a) Front orthographic view:** A symmetric front elevation of the matka. The traditional bulbous, hand-thrown body form should be retained (wide belly tapering to a narrower neck). A fitted lid with a loop or knob handle should cap the neck. At the base of the belly, a horizontal spigot/tap assembly is shown protruding. Approximate overall height annotation (e.g., 35 cm) and maximum width annotation (e.g., 28 cm) should appear.
- **(b) Side orthographic view:** A 90° rotated view confirming the tap/spigot is not on both sides (it is a single-side element). The lid handle, body profile, and base footring should be consistent with the front view.
- **(c) Tap mechanism detail:** An enlarged callout of the spigot — showing a ceramic or brass quarter-turn lever/ceramic ball valve, or a traditional wooden peg tap. Labelling should indicate the material (e.g., "food-grade brass valve") and how it integrates into the terracotta body (fired-in clay collar + threaded brass insert).
- **Material labels:** At minimum — terracotta/red clay for the body, and a contrasting modern material for the tap mechanism (brass/stainless steel/food-grade polymer) and lid handle.
- **Cultural retention:** The organic, rounded, hand-thrown aesthetic should be clearly preserved — no straight industrial lines on the body.

**Marking rubric:**

- Design innovation + cultural aesthetic retention = **3 marks**
- Two or more orthographic views, accurate and consistent = **3 marks**
- Material labels and dimension annotations = **2 marks**
- Overall sketch quality and clarity = **2 marks**

Total = **10 marks**.

## Q55.

**Solution**

**Model Sketch Description — 6-Panel Comic Strip: Design Process for a Park Bench**

**What the ideal sketch should contain:**

- **Panel 1 — Napkin sketch / initial idea:** A designer (hands visible) sketching a rough bench form on a napkin or sketchbook. Loose, quick lines. Caption example: "The idea strikes!" or "1. Concept sketch."
- **Panel 2 — User research / observation:** The designer sitting in a park, sketching or photographing park visitors using (or struggling with) existing benches. Show at least two user types (elderly person, child, couple). Caption: "2. Observing users in the park."
- **Panel 3 — Refined concept sketching:** A cleaner bench concept drawing with multiple views or variants, perhaps three iterations shown. Caption: "3. Refining the concept."
- **Panel 4 — Material and joinery decisions:** Close-up panels showing material choices — timber slats, steel frame legs, stainless bolts. A detail of a bolted joint or a mortise-and-tenon connection. Annotations visible. Caption: "4. Choosing materials and joinery."
- **Panel 5 — Prototype assembly:** A workshop scene showing two people assembling the bench — one person drilling, one holding the frame. Unfinished bench on a workbench. Caption: "5. Building the prototype."
- **Panel 6 — Final design in context:** The finished bench in a park setting with a happy user (e.g., an elderly person sitting comfortably, or a family). Background shows trees, a path, other park elements. Caption: "6. Designed for the park."
- **Panel layout:** All 6 panels clearly delineated with consistent border lines. Each panel captioned. Panels need not be equal in size — a $2\times3$ or $3\times2$ grid arrangement is ideal.

**Marking rubric:**

- Narrative clarity and logical sequence across 6 panels = **3 marks**
- Design process realism (research $\rightarrow$ concept $\rightarrow$ material $\rightarrow$ prototype $\rightarrow$ final) = **3 marks**

- Visual storytelling skill (varied compositions, expressive figures, environment) = **2 marks**
- Sketch quality, line confidence, and captioning = **2 marks**

Total = **10 marks**.

# Answer Key (Part A — Visual MCQs)

| Q | Ans | Q | Ans | Q | Ans | Q | Ans | Q | Ans |
|---|---|---|---|---|---|---|---|---|---|
| 1 | A | 2 | C | 3 | B | 4 | D | 5 | A |
| 6 | C | 7 | B | 8 | D | 9 | A | 10 | C |
| 11 | B | 12 | A | 13 | D | 14 | B | 15 | C |
| 16 | A | 17 | D | 18 | B | 19 | C | 20 | A |
| 21 | D | 22 | B | 23 | C | 24 | A | 25 | D |
| 26 | B | 27 | C | 28 | A | 29 | D | 30 | B |
| 31 | C | 32 | A | 33 | D | 34 | B | 35 | C |
| 36 | A | 37 | D | 38 | C | 39 | B | 40 | A |
| 41 | D | 42 | C | 43 | B | 44 | A | 45 | D |
| 46 | C | 47 | B | 48 | A | 49 | D | 50 | C |