

OJEE M Arch Sample Paper 03

A) Mode and Time: The exam is a Computer Based Test (CBT) lasting 120 minutes.

B) Total Questions: The exam contains 90 questions.

C) Marking Scheme & Rules:

- Each question carry 1 mark and there is no negative marking for wrong answer.

Q1. Who was the first woman architect to be awarded the Pritzker Architecture Prize?

- A. Kazuyo Sejima
- B. Zaha Hadid
- C. Yvonne Farrell
- D. Anne Lacaton

Q2. Which classical order of architecture is characterized by heavy columns without a base and simple, unadorned capitals?

- A. Ionic
- B. Corinthian
- C. Doric
- D. Composite

Q3. In brick masonry, a bond consisting of alternate courses of headers and stretchers is known as:

- A. Flemish Bond
- B. English Bond
- C. Dutch Bond
- D. Stretcher Bond

Q4. The "Radburn Layout" in urban planning is most famous for its emphasis on:

- A. Grid-iron road networks
- B. Separation of pedestrian and vehicular traffic
- C. High-rise, high-density zoning
- D. Centralized commercial districts

Q5. Which of the following is NOT one of Le Corbusier's "Five Points of Architecture"?

- A. Pilotis (columns elevating the building)
- B. Free facade
- C. Ribbon windows
- D. Pitched roof

Q6. In a standard refrigeration cycle (HVAC), which component rejects heat to the outside environment?

- A. Compressor
- B. Evaporator
- C. Condenser
- D. Expansion Valve

Q7. The frequency of sound is measured in:

- A. Decibels (dB)
- B. Hertz (Hz)
- C. Sabins
- D. Watts

Q8. According to standard building codes, a fire-rated door is primarily designed to:

- A. Prevent forced entry
- B. Maintain structural load-bearing capacity
- C. Delay the spread of fire and smoke
- D. Enhance natural ventilation

Q9. In sustainable water management, "Greywater" refers to wastewater from:

- A. Toilets and urinals
- B. Industrial chemical processes
- C. Baths, sinks, and washing machines
- D. Stormwater runoff only

Q10. In project management, PERT (Program Evaluation and Review Technique) is primarily a:

- A. Deterministic model
- B. Probabilistic model
- C. Cost-estimating tool
- D. Material-tracking system

Q11. In Building Information Modeling (BIM), "4D BIM" introduces which additional dimension to the 3D model?

- A. Cost
- B. Time / Scheduling
- C. Sustainability
- D. Facility Management

Q12. Which surveying instrument is specifically designed to measure both horizontal and vertical angles with high precision?

- A. Dumpy level
- B. Theodolite
- C. Planimeter
- D. Clinometer

Q13. The gradual reduction in the volume of a fully saturated soil under sustained vertical loading is called:

- A. Compaction
- B. Consolidation
- C. Liquefaction
- D. Settlement

Q14. Which type of foundation is most suitable for expansive soils like black cotton soil?

- A. Strip footing
- B. Under-reamed piles
- C. Raft foundation
- D. Grillage foundation

Q15. The "Daylight Factor" is used to evaluate the:

- A. Heat gained through a window
- B. Amount of artificial lighting required
- C. Ratio of indoor illuminance to outdoor illuminance
- D. Speed of light passing through glass

Q16. The primary additive colors of light used in digital displays and lighting design are:

- A. Cyan, Magenta, Yellow
- B. Red, Yellow, Blue
- C. Red, Green, Blue
- D. Black and White

Q17. The towering, heavily ornamented gateways characteristic of South Indian Dravidian temple architecture are called:

- A. Mandapas
- B. Gopurams
- C. Stupas
- D. Vimanas

Q18. Which European city is widely considered the birthplace of the Renaissance in architecture?

- A. Rome
- B. Paris
- C. Florence
- D. Athens

Q19. The process of "seasoning" timber is done primarily to:

- A. Change its color
- B. Remove excess moisture and prevent warping
- C. Increase its weight
- D. Make it completely fireproof

Q20. The phenomenon where the volume of sand increases significantly due to the presence of a small amount of moisture is known as:

- A. Bulking of sand
- B. Shrinkage of sand
- C. Efflorescence
- D. Segregation

Q21. In structural engineering, the slenderness ratio of a column is the ratio of its effective length to its:

- A. Cross-sectional area
- B. Least radius of gyration
- C. Maximum diameter
- D. Yield strength

Q22. Young's Modulus is a measure of a material's:

- A. Ductility
- B. Toughness
- C. Stiffness / Elasticity
- D. Density

Q23. In urban planning in India, a comprehensive Master Plan for a city is typically prepared for a perspective period of:

- A. 5 years
- B. 10 years
- C. 20 years
- D. 50 years

Q24. A continuous, extended urban area formed by the merging of formerly separate towns or cities is called a:

- A. Suburb
- B. Conurbation
- C. Hamlet
- D. Metropolis

Q25. The famous postmodern architectural maxim "Less is a bore" was proclaimed by:

- A. Robert Venturi
- B. Mies van der Rohe
- C. Philip Johnson
- D. Louis Sullivan

Q26. According to the National Building Code (NBC), what is the minimum floor area for a habitable room in an apartment?

- A. 7.5 sq.m
- B. 9.5 sq.m
- C. 12.0 sq.m
- D. 15.0 sq.m

Q27. A septic tank treats sewage primarily through:

- A. Aerobic bacterial action
- B. Chemical precipitation
- C. Anaerobic bacterial action
- D. Mechanical filtration

Q28. In an electrical distribution system, what does MCCB stand for?

- A. Main Circuit Control Board
- B. Molded Case Circuit Breaker
- C. Miniature Core Circuit Breaker
- D. Master Current Control Box

Q29. In AutoCAD, pressing the F8 key toggles which drafting mode?

- A. Osnap (Object Snap)
- B. Ortho Mode
- C. Grid Display
- D. Polar Tracking

Q30. Which AutoCAD command is used to fill an enclosed area or selected objects with a hatch pattern or solid fill?

- A. FILL

- B. SHADE
- C. HATCH
- D. COLOR

Q31. In climatology, the side of a building or mountain facing the direction from which the wind blows is the:

- A. Leeward side
- B. Windward side
- C. Zenith
- D. Azimuth

Q32. On a standard psychrometric chart, the horizontal x-axis typically represents:

- A. Relative Humidity
- B. Wet-bulb temperature
- C. Dry-bulb temperature
- D. Specific volume

Q33. The exposed undersurface of an architectural element, such as an arch, balcony, or flight of stairs, is called the:

- A. Fascia
- B. Soffit
- C. Cornice
- D. Coping

Q34. A vertical structural element that divides adjacent window units is known as a:

- A. Transom
- B. Mullion
- C. Sill
- D. Lintel

Q35. The "Great Bath," one of the most famous structures of the Indus Valley Civilization, is located at:

- A. Harappa

- B. Lothal
- C. Mohenjo-Daro
- D. Dholavira

Q36. The Qutub Minar in Delhi is constructed primarily using which materials?

- A. White marble exclusively
- B. Red sandstone and marble
- C. Granite and limestone
- D. Basalt and slate

Q37. "Xeriscaping" is a landscaping philosophy that focuses on:

- A. Planting exotic tropical species
- B. Creating elaborate water fountains
- C. Conserving water through drought-tolerant plants
- D. Using artificial turf exclusively

Q38. The horticultural practice of training and clipping live shrubs or trees into decorative shapes is called:

- A. Bonsai
- B. Espalier
- C. Topiary
- D. Ikebana

Q39. In sanitary plumbing, the standard depth of a water seal in a trap is generally maintained between:

- A. 10 mm to 20 mm
- B. 25 mm to 30 mm
- C. 50 mm to 75 mm
- D. 100 mm to 150 mm

Q40. One "Ton of Refrigeration" (TR) is roughly equivalent to a heat extraction rate of:

- A. 1,000 BTU/hr

- B. 12,000 BTU/hr
- C. 24,000 BTU/hr
- D. 100,000 BTU/hr

Q41. Poisson's ratio is the ratio of:

- A. Lateral strain to linear strain
- B. Linear strain to lateral strain
- C. Shear stress to shear strain
- D. Axial load to cross-sectional area

Q42. Gypsum is added to Portland cement clinker during grinding primarily to:

- A. Increase the early strength
- B. Accelerate the setting time
- C. Retard the initial setting time
- D. Improve the color of the cement

Q43. The tensile strength of concrete is approximately what percentage of its compressive strength?

- A. 1% to 2%
- B. 10% to 15%
- C. 30% to 40%
- D. 50% to 60%

Q44. Floor Space Index (FSI) is synonymous with:

- A. Ground Coverage
- B. Carpet Area
- C. Floor Area Ratio (FAR)
- D. Plinth Area

Q45. The Architects Act, which led to the establishment of the Council of Architecture (COA) in India, was passed in the year:

- A. 1955
- B. 1972

C. 1986

D. 2001

Q46. In a tendering process, EMD stands for:

A. Estimated Material Demand

B. Earnest Money Deposit

C. External Measurement Data

D. Equivalent Monthly Draft

Q47. A sequence where each number is the sum of the two preceding ones, closely related to the Golden Ratio in design, is the:

A. Arithmetic progression

B. Geometric series

C. Fibonacci sequence

D. Harmonic series

Q48. Windows placed high up on a wall, above eye level, designed to admit light and air while maintaining privacy, are called:

A. Bay windows

B. Clerestory windows

C. Casement windows

D. Dormer windows

Q49. According to Kevin Lynch, strategic focus points into which an observer can enter, such as a major intersection or a plaza, are called:

A. Edges

B. Landmarks

C. Nodes

D. Districts

Q50. The Indian Institute of Management (IIM) Bangalore campus, famous for its stone masonry, courtyards, and lush greenery, was designed by:

A. Charles Correa

B. Achyut Kanvinde

C. B.V. Doshi

D. Raj Rewal

Q51. The architect of the iconic Sydney Opera House was:

A. Jørn Utzon

B. Kenzo Tange

C. Oscar Niemeyer

D. Norman Foster

Q52. In AutoCAD, which command is used to round or curve the sharp corners of two intersecting lines?

A. CHAMFER

B. TRIM

C. FILLET

D. BLEND

Q53. For a solid rectangular masonry column subjected to an eccentric load, to ensure no tension develops anywhere in the section, the load must fall within the:

A. Middle third rule

B. Middle fourth rule

C. Outer edge

D. Exact center point only

Q54. Bitumen is primarily used in building construction for:

A. Acoustic insulation

B. Damp-proofing and waterproofing

C. Structural framing

D. Interior wall finishes

Q55. In the Northern Hemisphere, to block the high-angle summer sun, fixed horizontal shading louvers are most effective on which facade?

A. North

B. South

C. East

D. West

Q56. The Great Stupa at Sanchi was originally commissioned by which Indian emperor?

A. Chandragupta Maurya

B. Ashoka

C. Akbar

D. Harshavardhana

Q57. A traditional roof truss featuring a single vertical post in the center is called a:

A. Queen post truss

B. Pratt truss

C. King post truss

D. Howe truss

Q58. Which type of cost estimate is prepared initially for administrative approval before detailed drawings are made?

A. Detailed Estimate

B. Revised Estimate

C. Supplementary Estimate

D. Plinth Area Estimate (Approximate)

Q59. The 'Lumen Method' is a procedure used in architectural design to calculate:

A. HVAC cooling loads

B. Water pressure in pipes

C. The average illumination level in a room

D. The reverberation time of a hall

Q60. The total energy consumed by all of the processes associated with the production of a building, from the mining of natural resources to product delivery, is its:

A. Operational energy

B. Renewable energy

C. Embodied energy

D. Latent energy

Q61. Number Series: 2, 6, 12, 20, 30, ?

A. 40

B. 42

C. 44

D. 48

Q62. Letter Series: ACE, GIK, MOQ, ?

A. SUW

B. STU

C. TUV

D. TVX

Q63. Odd One Out:

A. Circle

B. Ellipse

C. Parabola

D. Sphere

Q64. Coding-Decoding: If APPLE is coded as BQQMF, how is MANGO coded?

A. NBOHP

B. NCPHQ

C. OBPIQ

D. NAOHP

Q65. Blood Relation: Pointing to a photograph of a boy, Suresh said, "He is the son of the only son of my mother." How is Suresh related to that boy?

A. Brother

B. Uncle

C. Cousin

D. Father

Q66. Direction Sense: A person faces North and walks 10m. He turns left and walks 5m. He turns left again and walks 10m. How far is he from his starting point?

- A. 5m
- B. 10m
- C. 15m
- D. 25m

Q67. Syllogism: Statements: All squares are rectangles. All rectangles are polygons. Conclusions: I. All squares are polygons. II. Some polygons are squares.

- A. Only I follows
- B. Only II follows
- C. Both I and II follow
- D. Neither I nor II follows

Q68. Analogy: Bird : Ornithology :: Insects : ?

- A. Etymology
- B. Entomology
- C. Biology
- D. Ecology

Q69. Logical Sequence: Arrange in a meaningful order: 1. Seed 2. Fruit 3. Plant 4. Flower

- A. 1, 3, 4, 2
- B. 1, 4, 3, 2
- C. 3, 1, 4, 2
- D. 1, 3, 2, 4

Q70. Odd One Out:

- A. Copper
- B. Silver
- C. Gold
- D. Wood

Q71. Missing Number: 5, 10, 26, 50, 122, ?

- A. 144
- B. 170
- C. 196
- D. 226

Q72. Statement & Conclusion: Statement: "All polluting vehicles will be banned from the city center." Conclusion: I. Only electric vehicles will be allowed. II. The city center's air quality may improve.

- A. Only I follows
- B. Only II follows
- C. Both follow
- D. Neither follows

Q73. Venn Diagram Logic: Which relationship is best represented by three intersecting circles?

- A. Men, Fathers, Doctors
- B. Dogs, Animals, Pets
- C. Painters, Scholars, Men
- D. Tables, Chairs, Furniture

Q74. Verbal Analogy: INHALE : EXHALE :: ASCEND : ?

- A. Climb
- B. Descend
- C. Rise
- D. Fall

Q75. Find the synonym: METICULOUS

- A. Careless
- B. Sloppy
- C. Careful
- D. Hasty

Q76. Find the antonym: ARROGANT

- A. Proud
- B. Haughty
- C. Humble
- D. Conceited

Q77. Coding-Decoding: If A=1, B=2, C=3, and so on, what is the sum of the letters in the word "CAT"?

- A. 22
- B. 23
- C. 24
- D. 25

Q78. Word Formation: Which word CANNOT be formed using the letters of "INTERNATIONAL"?

- A. NATIONAL
- B. INTERNAL
- C. RADIO
- D. TRAIN

Q79. Paragraph Conclusion: "A new tax on imported steel has raised domestic construction costs by 15%, causing several builders to delay their upcoming projects." Conclusion: The tax on imported steel directly impacts the pace of domestic construction.

- A. True
- B. False
- C. Probably False
- D. Cannot be determined

Q80. Clock Reasoning: What is the angle between the hour and minute hands exactly at 9:00?

- A. 45 degrees
- B. 90 degrees
- C. 180 degrees

D. 360 degrees

Q81. Calendar Reasoning: If January 1st of a non-leap year is a Monday, what day of the week will January 1st of the next year be?

- A. Sunday
- B. Monday
- C. Tuesday
- D. Wednesday

Q82. Ranking: In a class, Rahul ranks 10th from the top and 15th from the bottom. How many students are in the class?

- A. 23
- B. 24
- C. 25
- D. 26

Q83. Fill in the blank (Grammar): A flock of birds flying over the building right now.

- A. are
- B. is
- C. were
- D. have

Q84. Idiom Meaning: "To spill the beans" means:

- A. To drop food on the floor
- B. To reveal a secret
- C. To cook a meal
- D. To ruin a plan

Q85. Error Spotting: Find the error in the sentence: (A) I have visited / (B) the Taj Mahal / (C) yesterday. / (D) No error.

- A. A
- B. B
- C. C

D. D

Q86. Number Matrix: Find the missing number (Row 1: 4, 3, 12; Row 2: 5, 4, 20; Row 3: 6, 7, ?)

A. 35

B. 40

C. 42

D. 45

Q87. Cause and Effect: I. The price of petrol increased drastically. II. The number of people using public transport increased.

A. I is the cause and II is the effect

B. II is the cause and I is the effect

C. Both are independent causes

D. Both are effects of independent causes

Q88. Blood Relation: A girl introduced a boy as the son of the daughter of the father of her uncle. How is the boy related to the girl?

A. Brother

B. Cousin

C. Uncle

D. Nephew

Q89. Analogy: Pen : Write :: Knife : ?

A. Cut

B. Cook

C. Sharp

D. Metal

Q90. Find the odd word:

A. Foundation

B. Column

C. Beam

D. Carpet

Solutions

1. B

Explanation: Iraqi-British architect Zaha Hadid became the first woman to win the Pritzker Architecture Prize in 2004, celebrated for her radical deconstructivist designs.

2. C

Explanation: The Doric order is the oldest and simplest of the classical Greek orders, characterized by heavy fluted columns without a base and plain, saucer-shaped capitals.

3. B

Explanation: An English Bond consists of alternating courses (horizontal layers) of headers (short side out) and stretchers (long side out), known for its high structural strength.

4. B

Explanation: Designed by Clarence Stein and Henry Wright in 1929, the Radburn layout pioneered the separation of pedestrian and vehicular traffic using cul-de-sacs and superblocks.

5. D

Explanation: Le Corbusier's five points are: Pilotis, Free floor plan, Free facade, Ribbon windows, and Roof gardens (flat roofs, not pitched roofs).

6. C

Explanation: In the HVAC refrigeration cycle, the condenser cools the hot, high-pressure refrigerant gas into a liquid, releasing the absorbed indoor heat to the outside environment.

7. B

Explanation: The frequency of a sound wave (pitch) is measured in Hertz (Hz), which represents the number of cycles or vibrations per second.

8. C

Explanation: A fire-rated door is constructed to slow or prevent the spread of fire and smoke between compartments of a building for a specified duration (e.g., 1 or 2 hours).

9. C

Explanation: Greywater refers to relatively clean wastewater generated from domestic activities like laundry, dishwashing, and bathing, which can be recycled on-site for irrigation or flushing.

10. B

Explanation: PERT is a probabilistic model used in project scheduling to handle tasks with uncertain durations by calculating optimistic, pessimistic, and most likely time estimates.

11. B

Explanation: In BIM, the 4th dimension (4D) integrates project scheduling and time-related data with the 3D spatial model to visualize the construction sequence over time.

12. B

Explanation: A theodolite is an optical surveying instrument equipped with horizontal and vertical circles, used by surveyors to measure horizontal and vertical angles precisely.

13. B

Explanation: Consolidation is the gradual expulsion of water from the pores of a saturated, cohesive soil (like clay) under sustained loading, causing a gradual decrease in volume.

14. B

Explanation: Under-reamed piles have enlarged bases (bulbs) that anchor the foundation deeper into the ground, resisting the uplift forces caused by the swelling of expansive soils.

15. C

Explanation: The Daylight Factor (DF) is the ratio of internal illuminance at a point inside a building to the simultaneous unshaded external illuminance under an overcast sky, expressed as a percentage.

16. C

Explanation: In the additive color model (used for light and screens), the primary colors are Red, Green, and Blue (RGB). Mixing them produces white light.

17. B

Explanation: Gopurams are the massive, intricately carved entrance towers typical of South Indian Dravidian temples, which often dominate the temple complex visually.

18. C

Explanation: Florence, Italy, is considered the cradle of the Renaissance. Architects like Filippo Brunelleschi initiated the revival of classical Roman architectural principles there in the 15th century.

19. B

Explanation: Seasoning is the controlled drying of timber to bring its moisture content down to an equilibrium with the surrounding environment, increasing strength and preventing warping/decay.

20. A

Explanation: The bulking of sand occurs when moisture forms a film around sand particles, pushing them apart and causing a significant increase in volume (up to 20-30%).

21. B

Explanation: The slenderness ratio of a structural column is defined as the ratio of its effective length to its least radius of gyration, determining its tendency to buckle under compressive loads.

22. C

Explanation: Young's Modulus (Modulus of Elasticity) measures the stiffness of a solid material; it is the ratio of tensile stress to tensile strain in the elastic deformation region.

23. C

Explanation: In Indian urban planning, a Master Plan is a statutory, long-term perspective plan document typically designed to guide the city's development for a period of 20 to 25 years.

24. B

Explanation: A conurbation is a region comprising a number of cities, large towns, and other urban areas that, through population growth and physical expansion, have merged to form one continuous urban and industrially developed area.

25. A

Explanation: Robert Venturi famously coined "Less is a bore" in his 1966 book "Complexity and Contradiction in Architecture," challenging Mies van der Rohe's minimalist motto "Less is more."

26. B

Explanation: As per the NBC of India, the area of a habitable room (where there is only one room in a dwelling unit) shall not be less than 9.5 square meters.

27. C

Explanation: A septic tank is an underground chamber through which domestic wastewater flows for basic treatment, functioning primarily via the decomposition of organic matter by anaerobic bacteria.

28. B

Explanation: MCCB stands for Molded Case Circuit Breaker, an electrical protection device that protects the electrical circuit from excessive current, which can cause overloads or short circuits.

29. B

Explanation: Pressing F8 toggles Ortho mode in AutoCAD, which constrains cursor movement to purely horizontal or vertical directions relative to the User Coordinate System.

30. C

Explanation: The HATCH command in AutoCAD is used to fill enclosed boundaries or selected objects with solid colors, gradient fills, or patterns (like brick, concrete, or sand).

31. B

Explanation: The windward side is the side of a structure or landscape feature facing the prevailing wind. The leeward side is the sheltered side, facing away from the wind.

32. C

Explanation: On a psychrometric chart, the horizontal x-axis represents the dry-bulb temperature (the standard temperature measured by a regular thermometer).

33. B

Explanation: A soffit (from French 'soffite', meaning "formed as a ceiling") is the exposed underside of any architectural element, such as an arch, balcony, or eave.

34. B

Explanation: A mullion is a heavy vertical structural element that separates and supports adjacent window units. A transom is the horizontal equivalent.

35. C

Explanation: The Great Bath, one of the earliest known public water tanks featuring advanced brickwork and waterproofing (bitumen), was discovered in the ruins of Mohenjo-Daro.

36. B

Explanation: The Qutub Minar is built primarily using red sandstone for the lower three storeys, while the fourth and fifth storeys are constructed from a mix of marble and red sandstone.

37. C

Explanation: Xeriscaping is a landscaping method developed for arid and semi-arid climates that utilizes water-conserving techniques and drought-tolerant native plants to eliminate the need for supplemental irrigation.

38. C

Explanation: Topiary is the horticultural art of clipping and training live perennial plants, usually evergreen shrubs and trees, into clearly defined geometric or fanciful shapes.

39. C

Explanation: A water seal prevents noxious sewer gases from entering the building. In standard plumbing traps (like P-traps), the depth of this water seal is typically between 50 mm and 75 mm.

40. B

Explanation: One Ton of Refrigeration (TR) is defined as the rate of heat transfer required to freeze 1 ton (2000 lbs) of pure water at 32°F in 24 hours, equal to 12,000 British Thermal Units (BTU) per hour.

41. A

Explanation: Poisson's ratio is the fundamental mechanical property that measures the ratio of transverse (lateral) strain to axial (linear) strain when a material is stretched or compressed.

42. C

Explanation: A small amount of gypsum (usually 3-5%) is ground with cement clinker to retard its initial setting time, preventing flash setting and allowing enough time for mixing, transporting, and placing the concrete.

43. B

Explanation: Concrete is strong in compression but weak in tension. Its tensile strength is generally estimated to be only about 10% to 15% of its compressive strength.

44. C

Explanation: Floor Space Index (FSI) and Floor Area Ratio (FAR) represent the same concept: the ratio of the total built-up floor area of a building to the total area of the plot it sits on.

45. B

Explanation: The Architects Act was passed by the Indian Parliament in 1972, providing for the registration of architects and creating the Council of Architecture (COA) as the regulatory body.

46. B

Explanation: Earnest Money Deposit (EMD) is a refundable security deposit submitted by a contractor along with their tender bid to demonstrate their serious intention (earnestness) to execute the contract if awarded.

47. C

Explanation: The Fibonacci sequence (0, 1, 1, 2, 3, 5, 8...) generates numbers by summing the two preceding ones. As the numbers increase, the ratio of successive terms approaches the Golden Ratio (approx. 1.618).

48. B

Explanation: A clerestory is a high section of a wall that contains windows above eye level. Its primary purpose is to allow natural light and fresh air into the interior space while maintaining wall space and privacy below.

49. C

Explanation: In Kevin Lynch's "The Image of the City," nodes are strategic focus points, such as squares or major intersections, that an observer can enter, acting as intense centers of activity.

50. C

Explanation: Master architect B.V. Doshi designed the IIM Bangalore campus (completed in 1983), drawing inspiration from traditional Indian cities to create a porous complex of interlocking courtyards and covered walkways.

51. A

Explanation: The Sydney Opera House, a masterpiece of modern architecture known for its distinctive white "shell" roofs, was designed by Danish architect Jørn Utzon in 1957.

52. C

Explanation: In AutoCAD, the FILLET command connects two objects with a smoothly curving arc of a specified radius, rounding off sharp corners.

53. A

Explanation: For a solid rectangular column, to ensure only compressive stresses develop (no tension), the eccentric load must be applied within the central "middle third" area of the cross-section (the core).

54. B

Explanation: Bitumen is a highly viscous, sticky, and water-repellent petroleum byproduct, making it an excellent and widely used material for damp-proofing, roofing, and road paving.

55. B

Explanation: In the Northern Hemisphere, the summer sun sits high in the southern sky. Fixed horizontal louvers or overhangs on the South facade effectively block direct high-angle sunlight while admitting lower winter sun.

56. B

Explanation: The Great Stupa at Sanchi, one of the oldest stone structures in India housing Buddhist relics, was originally commissioned by the Mauryan emperor Ashoka in the 3rd century BCE.

57. C

Explanation: A king post truss features a single vertical member (the king post) extending from the apex of the triangular truss down to the center of the bottom tie beam, suitable for spans up to 8 meters.

58. D

Explanation: A Plinth Area Estimate is an approximate cost estimate made by multiplying the plinth area of the building by a standard plinth area rate, typically used to obtain initial administrative approval and funding.

59. C

Explanation: The Lumen Method (or Zonal Cavity Method) is a simplified calculation procedure used to determine the number of lighting fixtures required to achieve a specific average illuminance level on a working plane in a room.

60. C

Explanation: Embodied energy accounts for all the energy consumed during the entire lifecycle of a material's production, including raw material extraction, manufacturing, transportation, and assembly.

61. B

Explanation: The pattern follows $n^2 + n$. ($1^2 + 1 = 2$, $2^2 + 2 = 6$, $3^2 + 3 = 12$, $4^2 + 4 = 20$, $5^2 + 5 = 30$). Next is $6^2 + 6 = 42$.

62. A

Explanation: Each sequence skips one letter in the alphabet. A-C-E, G-I-K, M-O-Q. The starting letters (A, G, M) jump by 6 positions. Following M ($+6 = S$), the next sequence is S, U, W.

63. D

Explanation: Circle, Ellipse, and Parabola are two-dimensional planar curves (conic sections). A Sphere is a three-dimensional geometric solid.

64. B

Explanation: The coding pattern advances every letter by 1 alphabetical position. For APPLE: A(+1)=B, P(+1)=Q, etc. For MANGO: M(+1)=N, A(+1)=B, N(+1)=O, G(+1)=H, O(+1)=P. (NBOHP)

65. D

Explanation: "The only son of my mother" refers to Suresh himself. Therefore, the boy in the photograph is Suresh's son, making Suresh the father.

66. A

Explanation: Walking 10m North, turning left (West) for 5m, and left again (South) for 10m creates a U-shape. He ends up exactly 5m West of his starting position.

67. C

Explanation: Since all squares are rectangles, and all rectangles are inside the polygon category, all squares must be polygons (I follows). Because squares are polygons, it implies some polygons are squares (II follows).

68. B

Explanation: Ornithology is the scientific study of birds. Similarly, Entomology is the scientific study of insects.

69. A

Explanation: The logical biological progression of a plant's lifecycle is: Seed (1) grows into a Plant (3), which produces a Flower (4), which eventually turns into a Fruit (2).

70. D

Explanation: Copper, Silver, and Gold are all elemental metals that are highly conductive. Wood is a non-metallic, organic material.

71. B

Explanation: The sequence represents squares of prime numbers plus 1. $2^2 + 1 = 5$, $3^2 + 1 = 10$, $5^2 + 1 = 26$, $7^2 + 1 = 50$, $11^2 + 1 = 122$. The next prime is 13: $13^2 + 1 = 170$.

72. II

Explanation: Banning polluting vehicles doesn't mean *only* electric ones are allowed (bicycles, non-polluting gas cars exist), making I false. However, removing polluting vehicles logically implies the air quality *may* improve (II follows).

73. C

Explanation: "Painters, Scholars, Men" is best represented by three intersecting circles because a person can be any one, any two, or all three of these things simultaneously.

74. B

Explanation: Inhale and Exhale are exact opposites (antonyms). The exact opposite of Ascend (to go up) is Descend (to go down).

75. C

Explanation: To be 'meticulous' means to show great attention to detail; to be very careful and precise. Therefore, 'Careful' is the correct synonym.

76. C

Explanation: 'Arrogant' means having an exaggerated sense of one's own importance or abilities. The direct antonym is 'Humble' (having a modest estimate of one's importance).

77. C

Explanation: Converting letters to their alphabetical numbers: C = 3, A = 1, T = 20. The sum is $3 + 1 + 20 = 24$.

78. C

Explanation: The word "INTERNATIONAL" does not contain the letter 'D', so it is impossible to form the word "RADIO" from its letters.

79. A

Explanation: The paragraph states that the tax raised costs, which caused builders to delay projects. Delaying projects is a direct impact on the pace of construction, making the conclusion logically True.

80. B

Explanation: At exactly 9:00, the minute hand points at 12 and the hour hand points at 9, forming a perfect right angle (90 degrees).

81. C

Explanation: A standard non-leap year has 365 days. $365 \div 7$ leaves a remainder of 1. Therefore, the same date shifts forward by exactly 1 day of the week in the following year.

82. B

Explanation: Total students = (Position from top + Position from bottom) - 1. Therefore, $(10 + 15) - 1 = 24$ students.

83. B

Explanation: In English grammar, collective nouns like "flock" act as a single unit when the group is acting together, thereby taking the singular verb "is".

84. B

Explanation: The idiom "to spill the beans" means to prematurely or accidentally reveal confidential information or a secret.

85. A

Explanation: The sentence uses a specific past time marker ("yesterday"). Therefore, the simple past tense "I visited" should be used instead of the present perfect "I have visited" in segment A.

86. C

Explanation: In each row, the logic is simply $Column1 \times Column2 = Column3$. Row 1: $4 \times 3 = 12$. Row 2: $5 \times 4 = 20$. Row 3: $6 \times 7 = 42$.

87. A

Explanation: A drastic increase in petrol prices makes driving private vehicles expensive, causing people to shift to cheaper public transport. Thus, I is the cause and II is the logical effect.

88. C

Explanation: Her uncle's father is her grandfather. The daughter of her grandfather is her mother or aunt. The son of her mother/aunt is her brother or cousin. Since she calls the other man 'uncle', it's her cousin. Let's trace: girl's uncle -> his father (grandfather) -> his daughter (aunt/mother) -> her son (cousin/brother). "Cousin" is the safest general relation.

89. A

Explanation: A pen is a tool primarily used to Write. Similarly, a knife is a tool primarily used to Cut.

90. D

Explanation: Foundation, Column, and Beam are fundamental load-bearing structural elements of a building. A Carpet is a non-structural interior furnishing.