

MAH M Arch CET Current Architecture Practice

Sample Paper – 7

Duration: 12 Minutes

Maximum Marks: 20

Instructions

- This paper contains **10 Multiple Choice Questions (MCQs)**.
- Each question carries **+2 marks** for a correct answer.
- There is **no negative marking**.
- Each question has **only one correct** answer.
- Click on a question number to jump directly to its solution.

Section V — Current Architecture Practice

Q1. As per the **National Building Code of India 2016 (NBC 2016)**, **Part 5 – Building Materials**, which Indian Standard (IS) code specifies the requirements for **Ordinary Portland Cement (OPC), 33 Grade**, used in general building construction?

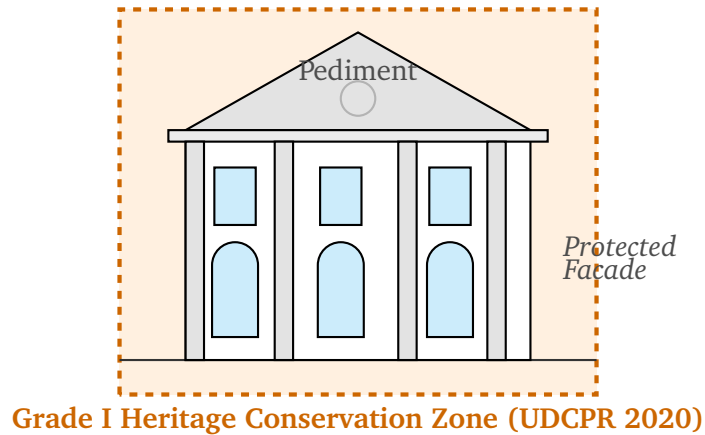
- (A) IS 383 – Specification for Coarse and Fine Aggregates from Natural Sources for Concrete
- (B) IS 456 – Code of Practice for Plain and Reinforced Concrete
- (C) IS 1786 – Specification for High Strength Deformed Steel Bars and Wires for Concrete Reinforcement
- (D) IS 269 – Specification for Ordinary Portland Cement, 33 Grade

Q2. As per the **National Building Code of India 2016 (NBC 2016)**, **Part 8 – Building Services**, what is the **maximum permissible angle of inclination** (in degrees) for an escalator installed in a public building?

- (A) 25°
- (B) 30°
- (C) 35°
- (D) 45°



- Q3.** Under the **Unified Development Control and Promotion Regulations (UDCPR) 2020** heritage conservation provisions, which of the following development activities is **permitted** for a **Grade I Heritage Listed** building situated in a Municipal Corporation area of Maharashtra?



- (A) Constructing a new addition of equal height immediately adjoining the heritage structure
- (B) Repainting the entire exterior facade in a contrasting contemporary colour scheme
- (C) Internal conservation and repair works that maintain the original character of the building
- (D) Partial demolition of structurally deteriorated portions and reconstruction in a modern style
- Q4.** Under the **UDCPR 2020** provisions for the **Cluster Redevelopment Scheme** in Maharashtra, what is the **minimum aggregate plot area** required for a group of contiguous plots to qualify for cluster redevelopment?
- (A) 4,000 sq.m
- (B) 2,500 sq.m
- (C) 1,000 sq.m
- (D) 6,000 sq.m
- Q5.** Under the **Maharashtra Regional and Town Planning (MRTP) Act, 1966**, which authority is **primarily empowered** to initiate the prepa-



ration of a Town Planning Scheme (TPS) for a designated area under the Act?

- (A) The State Government, directly through a gazette notification
- (B) The District Collector of the concerned district
- (C) The Planning Authority (local body / Municipal Corporation) for the area
- (D) The Director of Town Planning, Maharashtra State

Q6. As per the **Environmental Impact Assessment (EIA) Notification, 2006** (MoEFCC) – commonly applied alongside planning approvals under the MRTP Act – above what **minimum total built-up area (BUA)** does a building or construction project require mandatory **Prior Environmental Clearance (EC)**?

- (A) 10,000 sq.m
- (B) 20,000 sq.m
- (C) 50,000 sq.m
- (D) 1,50,000 sq.m

Q7. Under the **Architects Act, 1972**, what is the **term of office (tenure)** of the **elected members** of the **Council of Architecture (CoA)**?

- (A) 2 years
- (B) 3 years
- (C) 4 years
- (D) 5 years

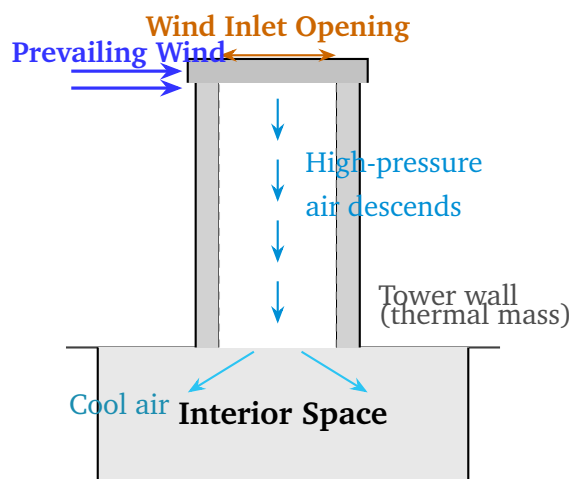
Q8. **Cross-Laminated Timber (CLT)** panels are manufactured by bonding layers of solid-sawn lumber with each adjacent layer oriented at 90° to the one below it. What is the **primary structural advantage** that this cross-lamination technique provides?

- (A) Significantly enhanced acoustic insulation between floor and ceiling layers



- (B) The ability to resist and distribute structural loads in **two perpendicular directions** (biaxial spanning)
- (C) Superior automatic fire resistance through char formation at each alternating grain interface
- (D) Substantially reduced panel weight compared to equivalent single-direction sawn lumber panels

Q9. The traditional **wind-catcher tower** (“Badgir” in Persian, “Malqaf” in Arabic) is a vernacular passive cooling device widely used in hot-arid climates. The simplified cross-section below illustrates its construction. Which physical principle does this device **primarily** rely upon to cool interior spaces?



- (A) Wind pressure differential that forces higher-velocity external air down through the tower shaft into interior spaces
- (B) Thermal mass of the tower walls absorbing solar heat during the day and releasing it slowly at night
- (C) Evaporative cooling through moisture-laden underground air drawn in via subterranean water channels
- (D) Radiative cooling through long-wave infrared emission from the tower cap surface to the night sky

Q10. In the **LEED v4 BD+C** (Building Design + Construction) rating system developed by the U.S. Green Building Council (USGBC), how many



credit categories does the system contain (excluding prerequisite-only categories)?

- (A) 7
- (B) 8
- (C) 9
- (D) 11



Solutions

Q1.

Solution

Concept: NBC 2016 Part 5 (Building Materials) mandates that all building materials conform to relevant Bureau of Indian Standards (BIS) specifications. For cement, a distinct IS code governs each grade and type.

Step 1: Identify what each IS code governs. IS 383 deals with aggregates, IS 456 is the concrete design code, IS 1786 covers high-strength deformed steel bars, and IS 269 specifies requirements for Ordinary Portland Cement, 33 Grade.

Step 2: IS 269 is the BIS standard referenced in NBC 2016 Part 5 for OPC 33 Grade, the most commonly specified general-purpose cement for building construction. The BIS certification mark on a cement bag confirms conformity to this standard.

Why other options are wrong:

- (A) IS 383 specifies requirements for coarse and fine aggregates used in concrete, not cement.
- (B) IS 456 is the code of practice for the design and construction of plain and reinforced concrete structures, not a material-quality specification for cement.
- (C) IS 1786 specifies high-strength deformed (HSD) steel bars (Fe 415, Fe 500, Fe 550), used as reinforcement in concrete structures, not cement.

Final Answer:

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

Q2.

Solution

Concept: NBC 2016 Part 8 (Building Services) covers mechanical transportation systems including lifts, escalators, and moving walks. The inclination angle of an escalator directly affects passenger safety and comfort.

Step 1: NBC 2016 Part 8, read with IS 4659 (Safety Code for Escalators and Moving Walks), sets limits on escalator angles. Steeper angles increase the risk of passengers losing balance, particularly for the elderly and children.

Step 2: For escalators installed in public buildings, the maximum permissible angle of inclination is 30° . A relaxation to 35° is only permitted for escalators with a short vertical rise (not exceeding 6 m) in specific situations; 30° remains the standard maximum for general public-building escalators.



Why other options are wrong:

- (A) 25° is unnecessarily conservative and is not the standard prescribed maximum.
- (C) 35° is a conditional relaxation allowed only for very short-rise escalators, not the general public-building maximum.
- (D) 45° is never permissible for a passenger escalator; it would pose unacceptable safety risks.

Final Answer: **Answer:** (B) [Go Back to Q2](#)**Q3.****Solution**

Concept: UDCPR 2020 classifies heritage buildings into Grade I (highest protection – exceptional historical/architectural/cultural significance), Grade II (moderate protection), and Grade III (least restrictive). Grade I listings carry the most stringent development controls.

Step 1: For a Grade I Heritage Listed building, the UDCPR 2020 heritage conservation provisions prohibit any external alteration, extension, new addition, demolition (even partial), or change that affects the heritage character or appearance of the structure.

Step 2: Only activities that *preserve and maintain* the original fabric are permitted – specifically internal conservation, structural stabilization, repair of original materials (masonry, plasterwork, timber), and sympathetic reuse for a compatible function. The original external appearance must be fully retained.

Why other options are wrong:

- (A) New additions – even of equal height – alter the spatial and visual integrity of a Grade I building and are not permitted under UDCPR heritage provisions.
- (B) Repainting the exterior in a contrasting colour changes the heritage appearance; only restoration of historically documented original colours is permitted.
- (D) Demolition of any portion of a Grade I listed structure and reconstruction in a contemporary style is strictly prohibited; it destroys irreplaceable heritage fabric.

Final Answer: **Answer:** (C) [Go Back to Q3](#)

Q4.

Solution

Concept: The Cluster Redevelopment Scheme under UDCPR 2020 allows owners of contiguous old or dilapidated plots to pool their land for comprehensive redevelopment. This scheme provides enhanced FSI and other incentives to improve living conditions in congested urban pockets.

Step 1: To ensure that the scheme results in meaningful, properly planned redevelopment (rather than individual plot-level construction), a minimum aggregate area threshold is prescribed. Plots below this threshold cannot avail of the cluster redevelopment benefits.

Step 2: Under UDCPR 2020, the **minimum aggregate plot area** required for a group of contiguous plots to qualify as a Cluster Redevelopment Scheme is **4,000 sq.m** (0.4 hectares). This ensures sufficient land for proper layout, amenity spaces, and infrastructure.

Why other options are wrong:

- (B) 2,500 sq.m is below the UDCPR 2020 prescribed minimum of 4,000 sq.m and does not qualify.
- (C) 1,000 sq.m is far too small; such a plot area would barely accommodate a single residential building and cannot be a cluster.
- (D) 6,000 sq.m exceeds the minimum threshold; while such plots would qualify, 6,000 sq.m is not the prescribed minimum figure under UDCPR 2020.

Final Answer:

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

Q5.

Solution

Concept: The MRTP Act 1966 establishes a hierarchy of planning bodies. Town Planning Schemes (TPS) are detailed land reconstitution and infrastructure schemes prepared for specific localities to implement the Development Plan on the ground.

Step 1: Under MRTP Act 1966, Part IV (Sections 59–86), the power to initiate and prepare a Town Planning Scheme is vested in the **Planning Authority** – the designated local body (Municipal Corporation, Municipal Council, or Special Planning Authority) for the area. The Planning Authority passes a resolution to prepare a TPS and then proceeds with its preparation.

Step 2: The State Government's role in TPS is primarily supervisory – it can sanc-



tion, modify, or direct a Planning Authority to prepare a TPS, but does not itself initiate the scheme in the ordinary course. The District Collector and Director of Town Planning have advisory or appellate roles, not initiating powers.

Why other options are wrong:

- (A) The State Government may *direct* a Planning Authority to prepare a TPS, but initiation is the Planning Authority's prerogative; the State Government does not prepare TPS itself.
- (B) The District Collector is a revenue authority; the MRTP Act does not designate the Collector as the authority to initiate a TPS.
- (D) The Director of Town Planning, Maharashtra, has a technical advisory and approval role; initiation authority rests with the Planning Authority under the Act.

Final Answer:

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

Q6.

Solution

Concept: The EIA Notification, 2006 (issued under the Environment (Protection) Act, 1986) mandates Prior Environmental Clearance (EC) from the competent authority before commencement of specified categories of projects, including building and construction activities. This EC requirement is a prerequisite that planning authorities (including those under the MRTP Act) verify before granting development permission.

Step 1: The EIA Notification 2006 Schedule lists project categories. Building and construction projects are listed under Category B (decided at State level by the State Environment Impact Assessment Authority, SEIAA). The schedule specifies the built-up area threshold that triggers the requirement.

Step 2: Projects with a total built-up area (BUA) of $\geq 20,000$ sq.m require mandatory Prior Environmental Clearance. Projects with BUA $\geq 1,50,000$ sq.m (or covering ≥ 50 ha) fall under Category A and require central-level clearance from MoEFCC.

Why other options are wrong:

- (A) 10,000 sq.m is below the EIA Notification 2006 threshold; projects of this size do not require Prior EC.
- (C) 50,000 sq.m is above the trigger point (20,000 sq.m); EC would already be mandatory from 20,000 sq.m onwards.
- (D) 1,50,000 sq.m is the Category A threshold (requiring central-level MoE-



FCC clearance), not the minimum trigger for EC.

Final Answer:

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

Q7.

Solution

Concept: The Architects Act, 1972 establishes the Council of Architecture (CoA) as the statutory body responsible for regulating the architectural profession in India. The CoA's composition, elections, and terms of office are defined in the Act itself.

Step 1: The CoA consists of elected members (chosen by registered architects from each electoral zone), nominated members (representing professional bodies, universities, and government), and ex-officio members. The Act specifies the tenure for elected members to ensure periodic democratic renewal of the Council.

Step 2: Under the Architects Act 1972 (Sections 3, 4 and 9), elected members of the Council of Architecture hold office for a term of **5 years** from the date of their election. They are eligible for re-election, subject to continued valid registration under the Act.

Why other options are wrong:

- (A) 2 years is too short and is not the term prescribed by the Architects Act, 1972 for CoA elected members.
- (B) 3 years is sometimes associated with professional body terms in other Acts, but is not the CoA term under the Architects Act, 1972.
- (C) 4 years is not the prescribed tenure; the Act clearly specifies 5 years for elected members of the CoA.

Final Answer:

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

Q8.

Solution

Concept: Cross-Laminated Timber (CLT) is a mass timber engineered wood product produced by gluing together layers (lamellae) of kiln-dried solid-sawn lumber. The distinguishing feature is that each layer is oriented perpendicular (90°) to the adjacent layers.

Step 1: In plain sawn lumber, load-bearing capacity is strongest *along* the grain



and significantly weaker *across* the grain. A single-direction panel can only span efficiently in one direction – parallel to the grain of its major laminations.

Step 2: By alternating grain direction at 90° between layers, CLT achieves **bi-axial structural behaviour**: it can simultaneously resist and span loads in *both* major and minor plan directions. This allows CLT floor panels to act like two-way reinforced concrete slabs, enabling large-span open plans without intermediate supports, and CLT wall panels to distribute lateral loads in multiple directions.

Why other options are wrong:

- (A) Acoustic insulation is a secondary performance attribute of CLT assemblies (influenced by panel mass) and is not the primary *structural* advantage of cross-lamination.
- (C) Char formation for fire resistance is an inherent property of all wood (slow surface carbonisation protects inner core) and is *not* caused by alternating grain orientation specifically.
- (D) CLT panels are not lighter than equivalent single-direction lumber panels; the additional bonding and layering generally results in similar or greater mass per unit area.

Final Answer: B

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

Q9.

Solution

Concept: The Badgir (Persian) or Malqaf (Arabic) is a vernacular passive cooling tower found across hot-arid regions (Iran, UAE, Oman, Egypt, Pakistan). It rises several metres above the roofline to intercept prevailing winds and channel them downward into occupied interiors – functioning without mechanical energy.

Step 1: The tower presents a wind-facing opening at its top. At height, wind speeds are higher and temperatures can be somewhat lower than at ground level. The windward face of the tower experiences a positive wind pressure (stagnation pressure), while the interior spaces and leeward side experience relatively lower pressure.

Step 2: This **wind pressure differential** (positive pressure at the windward inlet vs. lower pressure in the interior) drives ambient air down through the tower shaft and into the occupied rooms below, creating natural ventilation. As the air descends through the thermally massive tower walls (often mud-brick or stone), it is further cooled by contact with the cool wall surfaces. The primary driving force is *wind pressure* (not stack effect, evaporation, or radiation), as confirmed by the



tower's orientation toward the prevailing wind direction.

Why other options are wrong:

- **(B)** Thermal mass of the tower walls is a *secondary* cooling mechanism (it augments the temperature drop of descending air) but is not the primary driving force for air movement.
- **(C)** Evaporative cooling via underground water channels (qanats) is an augmentation found in some elaborated Badgir designs, not the fundamental operating principle of the tower itself.
- **(D)** Radiative cooling from the tower cap to the night sky is a real phenomenon but occurs only at night and is not the primary cooling principle of the wind-catcher during daytime operation.

Final Answer:

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

Q10.

Solution

Concept: LEED (Leadership in Energy and Environmental Design) v4 BD+C is the USGBC's rating system for the design and construction of new or major-renovation buildings. It is organized into distinct credit categories, each containing prerequisites (mandatory, non-scorable) and credits (optional, earnable points).

Step 1: LEED v4 was released in 2013 (replacing LEED 2009 / v3). One of its structural changes was the expansion and reorganization of credit categories compared to earlier versions such as LEED v3, which had 7 main categories.

Step 2: LEED v4 BD+C contains **9 credit categories**: (1) Integrative Process (IP), (2) Location and Transportation (LT), (3) Sustainable Sites (SS), (4) Water Efficiency (WE), (5) Energy and Atmosphere (EA), (6) Materials and Resources (MR), (7) Indoor Environmental Quality (EQ), (8) Innovation (IN), and (9) Regional Priority (RP). All 9 categories include scorable credits alongside their prerequisites.

Why other options are wrong:

- **(A)** 7 categories is the count for LEED v3 (2009), not LEED v4; LEED v4 added Integrative Process and expanded Location and Transportation.
- **(B)** 8 is not the correct count for any standard LEED v4 BD+C configuration; the system has 9 distinct categories.
- **(D)** 11 categories has never been the structure of any standard LEED rating system; no published version has 11 main credit categories.

Final Answer:



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



Answer Key

Q	Ans	Q	Ans	Q	Ans	Q	Ans	Q	Ans
1	D	2	B	3	C	4	A	5	C
6	B	7	D	8	B	9	A	10	C

