MAH M Arch CET Settlement Design and Planning

Sample Paper – 2

Total Questions	Total Marks	Duration	Exam Mode
10	20	12 Minutes	CBT (Online)

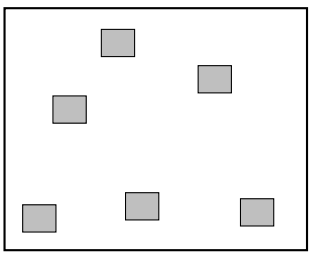
Instructions

- This paper contains 10 Multiple Choice Questions (Single Correct Answer), modelled on the Settlement Design and Planning portion of MAH M Arch CET entrance.
- Each correct answer carries +2 marks. There is no negative marking for incorrect or unattempted answers.
- Only one option is correct. Choose carefully.
- Syllabus: Urban hierarchy, housing, zoning, government schemes, density standards, infrastructure, and transportation.
- Use of mobile phones, calculators, or electronic gadgets is strictly prohibited.

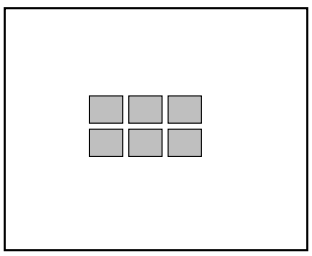
Section D | Settlement Design and Planning | 10 Questions × 2 Marks = 20 Marks

Q1. Study the two settlement patterns illustrated in the diagrams below and answer the question that follows.

Pattern I: Dispersed



Pattern II: Compact/Nucleated



Which of the following statements correctly describes a **disadvantage** of the dispersed settlement pattern (Pattern I) compared to the compact settlement pattern (Pattern II)?

(A) Dispersed settlements always have lower agricultural productivity per capita than nucleated settlements.
(B) Dispersed settlements are inherently more vulnerable to seasonal flooding than nucleated settlements.
(C) Provision of infrastructure (roads, water supply, electricity) is significantly more costly per household in dispersed settlements due to the greater distances involved.
(D) Dispersed settlements cannot accommodate future population growth due to lack of available land.

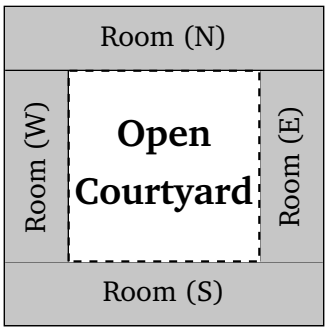
Q2. According to the Census of India 2011, urban settlements are classified into six classes based on population. Which of the following population ranges correctly defines a **'Class I'** statutory town?

(A) 1,00,000 (1 lakh) and above
(B) 50,000 to 99,999
(C) 20,000 to 49,999
(D) 5,000 to 9,999

Q3. In a Residential Use Zone (R-Zone) as defined in a typical Indian Master Plan, which of the following uses is **expressly PROHIBITED** and would require rezoning before it can be legitimately established?

(A) A convenience store occupying less than 50 m^2 at the ground floor of a residential building
(B) A day-care centre or crèche serving local residents within a residential society
(C) A doctor's clinic or polyclinic with up to 5 consultation rooms
(D) A medium-voltage electric sub-station serving multiple industrial units in an adjacent industrial zone

Q4. Refer to the schematic plan of a house typology shown below.



The courtyard house typology shown in the plan above is climatically **most advantageous** in which of the following Indian climate zones?

(A) Warm and humid coastal zone
(B) Hot and dry (arid) zone
(C) Cold mountainous zone
(D) Composite climate with predominantly cold winters

Q5. The Atal Mission for Rejuvenation and Urban Transformation (AMRUT), launched by the Government of India in 2015, primarily focuses on providing basic urban infrastructure to designated cities. Which of the following correctly describes the **PRINCIPAL objectives** of the AMRUT mission?

(A) Constructing 20 million affordable housing units under the Pradhan Mantri Awas Yojana in all urban local bodies
(B) Developing 100 cities into globally competitive smart cities using technology-driven governance
(C) Ensuring every household in mission cities has access to a tap with adequate water supply, a sewerage connection, and urban transport; developing green spaces and parks; and storm water drainage to reduce flooding
(D) Upgrading all national highways passing through urban areas to at least 6 lanes with dedicated pedestrian infrastructure

Q6. Which of the following correctly **distinguishes** the role of a Development Authority (e.g., CIDCO, DDA, MMRDA) from a Municipal Corporation in the Indian urban planning system?

(A) Development Authorities collect property tax and are funded entirely from central government grants, while municipalities rely solely on user charges
(B) Municipal Corporations prepare the Master Plan and Development Plan, while Development Authorities implement zoning rules on the ground
(C) Only Development Authorities have the power to demolish unauthorised constructions, while municipal corporations can only impose fines
(D) Development Authorities are primarily mandated to plan, acquire land, develop infrastructure, and release serviced plots for new areas; Municipal Corporations are responsible for ongoing municipal services and local governance in already-developed areas

Q7. Which of the following residential density categories is correctly paired with its approximate net residential density range as used in Indian planning norms (UDPFI Guidelines)?

(A) Low density residential — up to 75 persons per hectare (pph)
(B) Medium density residential — 500–750 persons per hectare
(C) High density residential — 50–100 persons per hectare
(D) Very-high density residential — 1,000–1,500 persons per hectare

Q8. The Solid Waste Management Rules 2016 (SWM Rules 2016), notified under the Environment Protection Act, mandate a priority hierarchy for waste management. Which sequence correctly represents this hierarchy from **highest to lowest priority**?

(A) Safe Disposal → Recycling → Reuse → Energy Recovery → Prevention
(B) Waste Prevention → Reuse → Recycling → Recovery of Energy → Safe Disposal
(C) Recycling → Reuse → Energy Recovery → Prevention → Safe Disposal
(D) Energy Recovery → Reuse → Recycling → Prevention → Safe Disposal

Q9. The diagram below shows the modal split of urban trips in a hypothetical Indian city.

Modal Split of Urban Trips (%)

Walk+Cycle	Bus	Auto/Taxi	Car
35%	30%	20%	15%

The modal split data shown above indicates that this city would **MOST benefit** from which of the following planning interventions?

(A) Constructing multi-level car parks and flyovers to accommodate growing private car ownership
(B) Replacing all bus routes with metro rail to increase passenger capacity on major corridors
(C) Priority investment in pedestrian infrastructure, cycling lanes, and public bus rapid transit (BRT) to reinforce the existing high share of non-motorised and public transport modes
(D) Banning three-wheelers and taxis to reduce congestion on major corridors

Q10. In urban planning, a 'greenbelt' encircling a city serves which of the following **PRIMARY** planning objectives?

(A) To restrict further outward physical expansion of the urban area, preserve agricultural land and natural landscapes at the urban fringe, and prevent urban sprawl
(B) To provide a dedicated zone for heavy and polluting industries that cannot be located within the city
(C) To function as a linear park system connecting all major city parks via a continuous green corridor within the built-up area
(D) To serve as an agricultural production zone specifically managed by the municipal corporation to supply fresh vegetables to urban markets

Detailed Solutions

Sol. 1.

Solution

Difficulty: Beginner • Chapter: Settlement Patterns and Morphology

Quick Solution: Dispersed settlements have much higher infrastructure cost per household because of the long distances between dwellings. **Answer: (C).**

Concept — Infrastructure Cost and Settlement Form: The spatial distribution of households directly determines the per-unit cost of providing physical infrastructure. In dispersed patterns, roads, water mains, drainage lines, and electrical cables must span large distances to reach each isolated dwelling, raising the capital and maintenance cost per household significantly compared to compact settlements where the same infrastructure length serves many more units.

Analysis of each option:

- **(A)**: Incorrect. Agricultural productivity is determined by soil quality, inputs, and technology, not settlement pattern per se. Dispersed farmers may have better field access.
- **(B)**: Incorrect. Flood vulnerability depends on topography and proximity to water bodies, not whether dwellings are nucleated or dispersed.
- **(C)**: Correct. Greater inter-household distances mean longer network runs for all infrastructure, raising the cost per household significantly.
- **(D)**: Incorrect. Dispersed settlements can accommodate growth; they typically have surplus land. Growth management differs but is not impossible.

Final Answer: Infrastructure provision per household is far more expensive in dispersed settlements $\Rightarrow$ C

Answer: (C) Go Back to Q1

Sol. 2.

Solution

Difficulty: Beginner • Chapter: Urban Hierarchy and Classification

Quick Solution: The Census of India 2011 defines Class I towns as having a population of 1,00,000 and above. **Answer: (A).**

Concept — Census Urban Classification: The Census of India classifies urban settlements into six classes (I–VI) strictly by population size. Class I ($\geq$1 lakh) includes large cities; Class II (50,000–99,999), Class III (20,000–49,999), Class IV (10,000–19,999), Class V (5,000–9,999), and Class VI (below 5,000). This hierarchy is fundamental to urban planning, infrastructure allocation, and scheme eligibility.

Analysis of each option:

- **(A)**: Correct. 1,00,000 and above is the exact threshold for Class I towns as per Census 2011.
- **(B)**: Incorrect. 50,000–99,999 corresponds to Class II towns.
- **(C)**: Incorrect. 20,000–49,999 corresponds to Class III towns.
- **(D)**: Incorrect. 5,000–9,999 corresponds to Class V towns.

Final Answer: Class I statutory towns have a population of 1,00,000 and above $\Rightarrow$ A

Answer: (A) Go Back to Q2

Sol. 3.

Solution

Difficulty: Intermediate • Chapter: Zoning Regulations and Land Use Control

Quick Solution: An industrial-service sub-station is an infrastructure facility ancillary to industrial use and is not permitted within an R-Zone without re-zoning. **Answer: (D).**

Concept — R-Zone Permissible and Prohibited Uses: Indian Master Plans divide urban land into use zones. In a Residential Zone (R-Zone), the permissible uses are those that serve the daily needs of residents: local shops, clinics, schools, and small recreational amenities. Uses that generate nuisance, attract heavy traffic, or are ancillary to non-residential activities (such as industrial sub-stations) are expressly prohibited and require a change of land use (CLU)

or rezoning.

Analysis of each option:

- **(A)**: Incorrect. A small convenience store (<50 m^2) is typically a permissible local-commerce use within an R-Zone in most state planning regulations.
- **(B)**: Incorrect. A day-care centre/crèche is a social amenity permitted within residential zones as it serves local residents.
- **(C)**: Incorrect. A doctor's clinic or polyclinic with up to 5 rooms is a local health facility, expressly permissible in R-Zones under most state rules.
- **(D)**: Correct. An electric sub-station serving industrial units is an industrial-infrastructure facility; its presence in an R-Zone requires rezoning.

Final Answer: A medium-voltage industrial sub-station is expressly prohibited in an R-Zone $\Rightarrow$ D

Answer: (D) Go Back to Q3

Sol. 4.

Solution

Difficulty: Beginner • Chapter: Climatic Responsive Architecture and Housing Typologies

Quick Solution: The courtyard creates a shaded, cool microclimate by reducing direct solar radiation to surrounding rooms — ideal for the hot and dry (arid) climate zone. **Answer: (B).**

Concept — Courtyard Typology and Thermal Performance: In hot and dry regions, the central courtyard functions as a thermal buffer. During the day, the high surrounding walls shade the courtyard floor, cooling air through radiation to the sky at night. This cooled air sinks and flows into adjacent rooms, reducing indoor temperatures. The enclosed form also minimises dust ingress from the hot, arid environment. Historic examples include havelis in Rajasthan and desert settlements across North Africa and the Middle East.

Analysis of each option:

- **(A)**: Incorrect. In warm and humid zones, a courtyard can trap moisture and impede cross-ventilation; linear, open plans with shaded verandas are preferred.

- **(B)**: Correct. The courtyard provides natural shading, a cool microclimate, and protection against hot, dust-laden winds characteristic of the arid zone.
- **(C)**: Incorrect. In cold mountainous regions, open courtyards cause significant heat loss; compact, cluster forms with minimal surface area are preferred.
- **(D)**: Incorrect. In composite climates with cold winters, reducing exposed surface area takes priority; an open courtyard would increase heat loss.

Final Answer: Courtyard typology is climatically most advantageous in the hot and dry (arid) zone $\Rightarrow$ B

Answer: (B) Go Back to Q4

Sol. 5.

Solution

Difficulty: Beginner • Chapter: Government Schemes for Urban Development

Quick Solution: AMRUT focuses on basic service coverage: water supply, sewerage, urban transport, green spaces, and storm water drainage in 500 mission cities. **Answer: (C).**

Concept — AMRUT Mission (2015): AMRUT (Atal Mission for Rejuvenation and Urban Transformation) was launched in June 2015 to replace the earlier JNNURM. It targets 500 cities with a population above 1 lakh and a few other notified cities. Its five focus areas are: (1) water supply, (2) sewerage and septage management, (3) storm water drainage, (4) green spaces and parks, and (5) non-motorised urban transport. AMRUT 2.0 (launched 2021) further expanded the scope to achieve 100% water and sewerage coverage.

Analysis of each option:

- **(A)**: Incorrect. Constructing affordable housing units is the objective of PMAY (Pradhan Mantri Awas Yojana), not AMRUT.
- **(B)**: Incorrect. Developing 100 smart cities is the objective of the Smart Cities Mission, a separate centrally sponsored scheme.
- **(C)**: Correct. AMRUT's principal objectives are universal water and sewerage coverage, urban transport, green spaces, and storm water drainage.
- **(D)**: Incorrect. Upgrading national highways to 6 lanes is the mandate of NHAI/MoRTH, not an urban mission like AMRUT.

Final Answer: AMRUT focuses on water supply, sewerage, urban transport,

green spaces, and storm water drainage ⇒ C

Answer: (C) Go Back to Q5

Sol. 6.

Solution

Difficulty: Intermediate • Chapter: Urban Planning Institutions and Governance

Quick Solution: Development Authorities plan and develop new land; Municipal Corporations manage ongoing services and governance in built-up areas. **Answer: (D).**

Concept — Development Authorities vs. Municipal Corporations: In India's two-tier urban governance structure, Development Authorities (such as DDA in Delhi, CIDCO in Maharashtra, BDA in Bangalore) are statutory bodies created under state Acts to plan and develop new urban extensions. They acquire land, lay infrastructure, and dispose of serviced plots. Municipal Corporations, created under respective Municipal Corporation Acts, manage day-to-day civic services, collect taxes, and provide local governance in established urban areas. Both operate within their own legislative mandates and geographic jurisdictions.

Analysis of each option:

- **(A)**: Incorrect. Property tax is collected by municipal corporations, not development authorities; funding structures for both involve multiple sources.
- **(B)**: Incorrect. In most states, the Development Authority or the state planning board prepares the Master Plan, not the municipal corporation.
- **(C)**: Incorrect. Both Development Authorities and Municipal Corporations typically have powers of enforcement including demolition of unauthorised structures under their respective Acts.
- **(D)**: Correct. This accurately captures the planning/development mandate of Development Authorities and the service/governance mandate of Municipal Corporations.

Final Answer: Development Authorities plan new areas; Municipal Corporations manage services in built-up areas ⇒ D

Answer: (D) Go Back to Q6

Sol. 7.

Solution

Difficulty: Intermediate • Chapter: Residential Density Standards and Planning Norms

Quick Solution: The UDPFI Guidelines classify low-density residential as up to 75 persons per hectare; medium density is approximately 150–300 pph. **Answer: (A).**

Concept — UDPFI Density Categories: The Urban Development Plans Formulation and Implementation (UDPFI) Guidelines issued by the Ministry of Urban Development provide net residential density benchmarks: Low Density (up to 75 pph), Medium Density (approximately 150–300 pph), High Density (300–500 pph), and Very High Density (above 500 pph, typically associated with high-rise redevelopment). These norms guide zoning, FAR determination, and infrastructure sizing in Indian cities.

Analysis of each option:

- **(A)**: Correct. Low density residential is defined at up to approximately 75 persons per hectare under UDPFI guidelines.
- **(B)**: Incorrect. 500–750 pph is far above medium density; it would correspond to very high density, such as in high-rise redevelopment projects.
- **(C)**: Incorrect. 50–100 pph is within the low-density range, not high density.
- **(D)**: Incorrect. 1,000–1,500 pph is an extremely high figure encountered only in dense slum redevelopment scenarios with tall towers, not a standard planned category.

Final Answer: Low density residential is up to 75 persons per hectare per UDPFI Guidelines $\Rightarrow$ $\boxed{\text{A}}$

Answer: (A) Go Back to Q7

Sol. 8.

Solution

Difficulty: Beginner • Chapter: Solid Waste Management and Environmental Infrastructure

Quick Solution: The internationally adopted waste hierarchy places Prevention first, followed by Reuse, Recycling, Energy Recovery, and Safe Disposal as the last resort. **Answer: (B).**

Concept — SWM Rules 2016 Priority Hierarchy: The Solid Waste Management Rules 2016 are aligned with the globally recognised waste management hierarchy (often shown as an inverted triangle or ladder). The highest priority is given to Waste Prevention (reducing waste at source), followed by Reuse (using the material again without reprocessing), Recycling (reprocessing into new material), Recovery of Energy (e.g., waste-to-energy plants), and finally Safe Disposal (landfilling as the last resort). This sequence reflects both environmental impact and resource efficiency principles.

Analysis of each option:

- **(A)**: Incorrect. This sequence places safe disposal first and prevention last — a complete reversal of the correct hierarchy.
- **(B)**: Correct. Prevention → Reuse → Recycling → Energy Recovery → Safe Disposal is the correct priority sequence under SWM Rules 2016.
- **(C)**: Incorrect. Placing recycling above prevention/reuse is wrong; waste prevention and reuse are always higher priority than recycling.
- **(D)**: Incorrect. Energy recovery should not be the top priority; it is still a downstream processing option that does not recover raw materials.

Final Answer: Waste Prevention → Reuse → Recycling → Energy Recovery → Safe Disposal ⇒ B

Answer: (B) Go Back to Q8

Sol. 9.

Solution

Difficulty: Intermediate • Chapter: Urban Transportation Planning and Modal Split

Quick Solution: With 65% of trips already by walk/cycle and bus, the logical investment is to reinforce these sustainable modes through pedestrian infrastructure, cycle lanes, and BRT. **Answer: (C).**

Concept — Modal Split and Planning Response: Modal split analysis reveals the existing travel behaviour of a city's residents. A high share of non-motorised transport (NMT) and public transport indicates that most residents already depend on sustainable modes. The appropriate planning response is to improve the quality, safety, and reliability of these existing modes, not to induce a shift toward private cars. Investments in footpaths, segregated cycle lanes, bus shelters, and BRT corridors can consolidate and grow the sustainable modal share while reducing congestion and emissions.

Analysis of each option:

- **(A)**: Incorrect. Car parks and flyovers serve only 15% of current trips (private car) and would induce further car use, undermining the city's sustainable modal share.
- **(B)**: Incorrect. A full metro replacement of buses would be disproportionately expensive and may not serve dispersed trip patterns as effectively as a bus network that already has 30% modal share.
- **(C)**: Correct. Walk+Cycle (35%) and Bus (30%) together account for 65% of trips. Reinforcing these with better infrastructure is the most rational and cost-effective intervention.
- **(D)**: Incorrect. Banning three-wheelers and taxis would remove a 20% modal share essential for last-mile connectivity, causing more people to shift to private cars.

Final Answer: Reinforce the dominant walk, cycle, and bus modes through targeted infrastructure investment $\Rightarrow$ $\boxed{\text{C}}$

Answer: (C) Go Back to Q9

Sol. 10.

Solution

Difficulty: Beginner • Chapter: Urban Fringe Planning and Greenbelts

Quick Solution: A greenbelt's primary purpose is to contain urban growth, preserve peri-urban land, and prevent sprawl — not to host industry or serve as a municipal food supply zone. **Answer: (A).**

Concept — Greenbelt as an Urban Containment Tool: The concept of a greenbelt was popularised by Ebenezer Howard and formalised in British planning through the 1947 Town and Country Planning Act. A greenbelt is a ring of predominantly open land (agriculture, woodland, parks) encircling a city. Its primary functions are: (1) preventing further outward urban expansion (containment), (2) preserving agricultural and ecological land at the urban fringe, (3) preventing coalescence of neighbouring towns, and (4) offering recreational land near the city. It is distinct from industrial buffer zones, city greenways, or municipal farms.

Analysis of each option:

- **(A)**: Correct. Restricting outward expansion, preserving peri-urban land, and preventing urban sprawl are the primary objectives of a greenbelt.
- **(B)**: Incorrect. Heavy or polluting industries are assigned to separately designated industrial zones, not greenbelts, which are predominantly open/agricultural land.
- **(C)**: Incorrect. A linear park system within a city describes a 'greenway' or 'parkway', not a greenbelt, which is located around the urban perimeter.
- **(D)**: Incorrect. While greenbelt land may include farms, its planning purpose is containment and preservation, not municipal food supply management.

Final Answer: The primary purpose of a greenbelt is urban containment and preservation of peri-urban land $\Rightarrow$ $\boxed{\text{A}}$

Answer: (A) Go Back to Q10

Answer Key

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