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## TPUM MOCK EXAM

### Question 1

### PART I

1-C

11-D

2-C

12-B

3-A

13-B

4-C

14-A

5-A

15-B

6-A

16-D

7-A

17-A

8-B

18-A

9-D

19-A

4. Identify and analyze the challenges posed by rapid urbanization in Pakistan. Discuss strategies for managing urban growth, ensuring infrastructure development, and improving living standards.

### Question 4

### PART II

#### Introduction

Pakistan is rapidly urbanizing due to advent of massive industrialization and uncontrolled population growth and the resultant rural-urban migration. According to Pakistan Bureau of statistic report of 2023, its population has reached 224M and is growing at a rate of 2.55%.

Furthermore, according to UNPF 2010 report, Pakistan had the highest urbanization rate in South Asia.

This unprecedented urbanization and its consequential challenges require a multi-faceted and holistic approach.

## II Identify Urban Challenges of Pakistan

### 1. The issue of urban sprawl

Due to a rapid population growth rate, the urban areas are developing and spreading into the outlying rural areas leading to urban sprawl.

**Example** Lahore is experiencing urban sprawl in areas like Kaseer, Sheikhupura and Faisalabad.

### 2- Environmental degradation.

With industrialization and increase in the number of personal vehicles, greenhouse gas (GHG) emissions have increased tremendously.

**Example** Lahore experiences high levels of smog in winters.

### 3- Rise in informal settlements

As the rural-urban migration increased with urbanization, more number of people settled in urban areas and due to lack of affordable housing, they resort to squatter and slum settlements.

According to World Bank, more than 70% of the world population will be living in urban centers by 2050.

**Example** The informal settlements of I-11 Katchi abadis are an example.

4- Rise in unemployment and poverty  
With the rise in population in urban centers, competitiveness increased. This led to a rise in unemployment and poverty.

**Example** Karachi is the most populated city of Pakistan and has high levels of poverty, especially in areas like Lyari.

### III Analysis of Urbanization in Pakistan

#### I- Post 1947 era

Pakistan inherited a weak economic base and had a decent agricultural production. Most people settled in rural areas indulging in agricultural activities like farming, livestock.

#### II- 1960s era

In the time of 'Green Revolution', also known as the decade of development, more emphasis was laid on industrialization hence more people moved from rural areas to urban centers like Karachi and Lahore.

#### III Rural Urban Migrations

High level of rural urban migrations took place at the time of **1971** Bangladesh

War and 2006 Swat operation

#### 4- Current Scenario

Presently, the urban centers of Pakistan are highly populated. This has also caused urban sprawl and development of informal settlements.

### IV Strategies to manage urban growth

The rapid urbanization of Pakistan require prudent measures to address subsequent challenges. Some strategies are listed below:

#### 1- Cluster development

Pakistan can employ cluster development which focuses on high density and compact development of houses, buildings and offices in a portion of land, leaving 30-50% area for open spaces and green areas.

**Example** Portland, USA has cluster development with a balance between urbanization and green spaces.

#### 2- Eco-city Model

Pakistan should also follow eco-city

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model where cities are self sufficient and are climate resilient. Ecocities are walkable, compact and built on the principle of mixed-use development.

**Example** Curitiba in Brazil is an ideal example of eco-city.

### 3- New Urbanism and New Pedestrianism

New Urbanism was an approach employed in the 1980s to address rapid urbanization. It focuses on walkable, compact and diverse use cities with Transit Oriented development. New Pedestrianism extends new Urbanism and focuses on increasing the spaces between communication routes and pedestrian pathways.

**Example** Florida in USA is a pioneering example of new urbanism and also focuses on new pedestrianism with its cycling infrastructure.

### 4- Regularization of informal Settlements

Instead of demolishing the informal settlements, there should be a regularization mechanism in Pakistan to integrate these settlements into the urban mainstream.

areas by building proper infrastructure and providing them amenities

**Example** "Camp of fire" program in Nairobi allows the residents to build houses, schools in return for the land they have been illegally squatting for 30 years

### **Jane Jacob-Neighbourhood Activism**

This approach incorporates participatory planning and the concept of neighbourhood activism as elucidated by Jane Jacob in her book "The life and death of American cities"

### **V- Conclusion**

W Pakistan should employ strategies like New Urbanism and regularization of informal settlements to address the challenges posed by urbanization. This way, it can counter environment degradation and rise of informal settlements and ensure a more green and sustainable Pakistan.

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2. Examine the role of Geographic Information Systems (GIS) and how can it be used in urban planning in Pakistan.

## Introduction

Geographic Information system (GIS) is a powerful tool of urban information systems (UIS) which allows the planners to visualize spatial and geographic data to make informed decisions about urban planning. It is crucial to understand land patterns like land use, population density, transport network and environmental factors to devise robust frameworks of urban planning. This can be achieved by the usage of GIS. It can be incorporated in the traditional urban planning frameworks of Pakistan for better transport management and land use policy.

## Applications of GIS

There are various applications of GIS. Some of which are listed below:

### 1- Land Use Planning

GIS can be used to determine the optimal land use by mapping spatial patterns related to zoning, infrastructure and environmental consideration.

## 2- Urban Infrastructure development

Urban planners can employ GIS to manage utilities (water, electricity, gas) and the construction of transport networks.

## 3- Environmental Planning

GIS can be employed in EIAs (environmental impact assessments) of various developmental projects to ensure that there are no subsequent environmental repercussions.

## 4- Disaster Management

GIS can be used in disaster management frameworks to evaluate earthquake-sensitive and flood prone areas. It can be achieved by appraising whether the area has seismic dangers or is close to river water bodies.

## 5- Cultural and heritage preservation

GIS can be employed by urban planners to protect the cultural identity.



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heritage sites of the area. It can protect landmarks and monumental buildings.

As Kevin Lynch says in his book "The image of city" that the perception of a city in the minds of its inhabitants is determined by its paths, nodes and important landmarks.

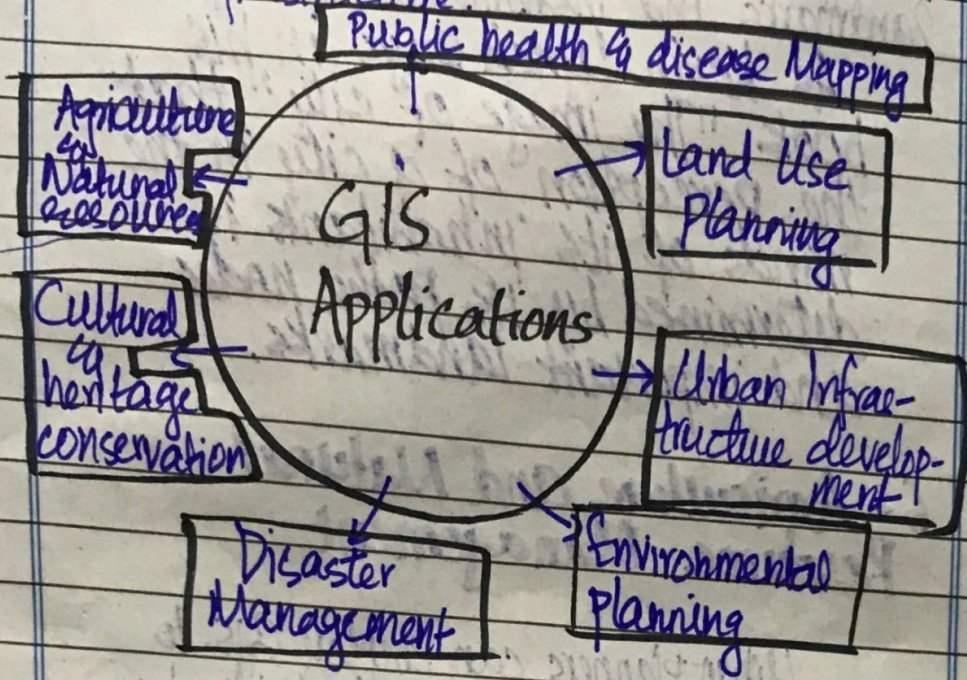
## 6- Agriculture and Natural Resource Management

Urban planners can employ GIS to optimize the agricultural productivity by improving the land use classification policy. Using markers like soil health, crop quality, water management, agriculture is improved. Other natural resources like fossil fuels and ground water levels can be mapped and conserved.

## 7- Public health and disease Mapping

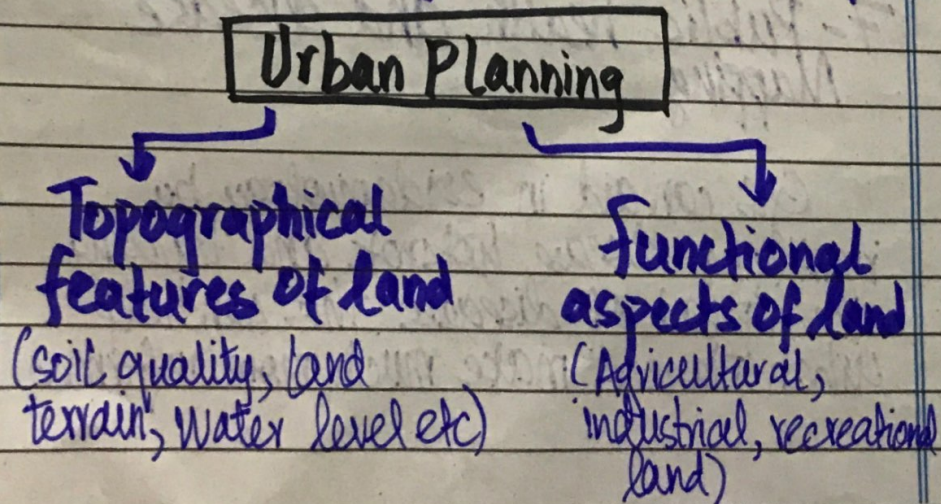
GIS can aid in epidemiology by identifying disease hotspots and tracking the spread of diseases. This can help urban planners make much more informed

decisions about where to build the health care infrastructure.



## How can Pakistan use GIS in its Urban Planning

Urban planners of Pakistan can employ GIS to analyze the spatial & geographic traits of land. Urban planning is done in two ways:



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GIS can be employed in both dimensions of urban planning.

Below are some ways how Pakistan can use GIS in its Urban Planning.

### 1- Better zoning regulations

Zoning frameworks devised by regulatory bodies like LDA, KDA, CDA can employ zoning to classify land into residential, commercial, industrial, open space and recreational land.

**Example:** URA (Urban Redevelopment Authority) of Singapore uses euclidean zoning by employing GIS.

### 2- Transportation Networks & Transit Oriented development

Pakistani urban planners can use GIS to construct better transport networks like roads, bridges, flyovers. GIS can also be used to map if transit-oriented development in an area will be viable or will cause chaotic development as in the case of Chaburgji Lahore Metro Station.

### 3- Better Disaster Management

NDMA (National Disaster Management

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authority) and PDMA (Provincial disaster Management authority) can use GIS to map flood-prone areas especially in Punjab and Sindh. Had GIS been used in disaster management frameworks before the 2005 earthquakes in the erstwhile NWFP, the catastrophic impact of earthquakes could have been curtailed.

#### 4- Agriculture Management

GIS can be used to map groundwater levels, soil health and environmental patterns. Farmers of Punjab can use precision agriculture technique to boost yield. Had GIS been used before 2022 floods, the agricultural crops could have been saved.

#### 5- Heritage Preservation

Pakistan has heritage sites like the UNESCO designated site of Mohenjodaro in Sindh and the 'Androne-Shehar' of Lahore.

#### Conclusion

GIS can be employed by the urban planners of Pakistan to make informed

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decisions about transport infrastructure development, disaster management and cultural and heritage preservation.

3. Evaluate the potential benefits of Intelligent Transportation Systems (ITS) in managing urban mobility challenges in Pakistani cities. Discuss specific applications and their impact on traffic management?

## Introduction

Intelligent transport system (ITS) has innumerable potential benefits for Pakistan. Since Pakistan has no formal transport management system and lack of transport-related enforcement frameworks, it faces imminent challenges of traffic congestion and road safety. Karachi, Islamabad and Lahore witness <sup>experience</sup> extremely congested communication routes despite the presence of Mass Rapid Transit (MRT) and BRT (Bus Rapid Transit) facilities like metro bus, orange line, yellow line. To curb ~~that~~ these issues, Pakistan needs to incorporate ITS in its Transportation management frameworks and Urban Plans (master plans, strategic plans, transport plans). The following answer emphasises how Pakistan can employ ITS and benefit from it.

## The potential benefits of ITS

for Pakistan and how can ITS applications be realised

## 1- Reduces Traffic Congestion

ITS can significantly reduce traffic congestion through real time traffic monitoring and adaptive traffic signal control in cities like Karachi and Lahore

**Application**: Using sensors, cameras and a control centre in a Transport Management System (TMS), real time information can be collected to monitor congestion and make informed decisions.

Adaptive traffic signal control is equipped with Artificial Intelligence (AI) and sensors to adjust the timing of traffic signal based on real time information.

**Case Study** Barcelona in Spain uses an extensive ITS with smart traffic lights.

## 2- Provides Smart Transport Infrastructure

ITS can also help Pakistan construct smart transport infrastructure i.e infrastructure with digital facilities. It can be employed in motorways, expressways and highways.

## Application

Roadside units can be provided in long range communication routes which will act as interface for users and drivers to provide information on traffic hazards e.g. "ice on road, Slow down"

LIDAR (Light detection and ranging) <sup>can be</sup> ~~are~~ used in vehicles to create 3D maps of environment to detect obstacles

Radar can also be employed while using cruise control and collision-avoidance systems.

## 3-Cost-effective Public Transit

Public transit like MRT, BRT can employ ITS to carry more number of people as compared to a personal vehicle

**Application** ITS can be in metro bus of Lahore and Islamabad and in Orange Yellow line of Karachi, a ~~pro~~ mechanism of electronic ticketing should be introduced. Furthermore, there should be electronic toll collection to reduce delays and congestion.

In public transit, electronic LEDs can be employed to provide the passengers with real time information.

#### 4- Reduce the risk of accidents and enhance road safety

ITS can be employed to reduce the risk of accidents and enhance road safety in highly congested & busy roads of Lahore and Karachi.

**Application** This can be materialised by the usage of speed cameras and automatically generated overspeeding fines.

Computer vision can be used to increase road safety as it uses cameras coupled with AI to interpret visual data like road signs, pedestrian and other markings.

#### 5- Provide Climate Resilient Infrastructure and reduce environmental degradation

ITS strategies can be used to minimize the GHG emissions contributing to climate resilience.

**Application** GPS (Global positioning system) can be used to locate vehicles and suggest the most fuel efficient route to minimise carbon footprint.

Electronic toll payments can be introduced with Automatic Number plate recognition.



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techniques to reduce the delay time, reducing the fuel wastage.

## 6- Parking Management Systems

ITS can provide a convenient parking management systems in areas like Blue Area of Islamabad.

### Application

This can be realised through electronic parking payments and electronic parking ticket generation. Apps can be used to streamline this process further.

## 7. Robust Transportation Plans

Better transport plans can be formulated using smart technology for better road experience.

**Application** All data collected from sensors and computer vision cameras should be integrated to make more informed decisions. Machine learning algorithms can be used to predict traffic patterns and install relevant infrastructure.

### Conclusion

By using ITS, Pakistan can solve

its traffic related challenges ranging from traffic congestion to road accidents.

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7. Write short note on any TWO of the following:

- (a) Gentrification
- (b) Public participation in planning
- (c) Indus Valley Civilization

## Part a: Short Note on Gentrification

### Introduction

Gentrification is a socio-economic process where the neighbourhood undergoes a transformation due to rapid influx of affluent residents. This leads to an increase in property values and displacement of residents who no longer can afford living in that area.

### Drivers of Gentrification

There are various drivers of gentrification:

#### 1. Economic growth & infrastructure

The real estate developers and businesses usually target underdeveloped neighbourhoods. They renovate old buildings and develop new infrastructure.

## 2- Urban Regeneration and revitalization policies

Local governments can lead urban regeneration and revitalization policies to spur employment and attract investment.

## 3- Housing Market Dynamics

As housing cost increases in the city center, wealthier individuals can gentrify affordable neighbourhoods.

## Advantages of gentrification

1- Urban renewal and development  
are neglected or underdeveloped areas can be developed

### 2- Increased Market Value

Better amenities account for the increased market value of the area.

### 3- Economic growth and employment opportunities

Infrastructure attracts investment from foreign and local investors. This can in turn provide employment opportunities to the residents.

## 4- Crime Reduction

As neighbourhoods become more affluent and aware, crime rate decreases.

## Disadvantages of Gentrification

### 1- Displacement of lower income residents

As the property value increases, the affordability reduces, resulting in displacement of lower income residents.

### 2- Increased social inequality

As more affluent residents move in, the social and economic disparity within the neighbourhood pronounces.

### 3- Loss of Cultural Identity

With the displacement of low income residents, the cultural identity of the area is lost.

### 4- Homogenization of Neighbourhoods

With the influx of similar socio-economic groups of people, neighbourhood becomes gentrified.

## Example of Gentrified area

Chandni Chauk in Delhi is an example of gentrification.

## Part b Public participation in planning

### Introduction

Public participation is an essential element in planning as it incorporates and considers grassroots issues. It follows a bottom-up approach involving lower tiers of government and community participation.

Jane Jacob concept of Neighbourhood activism also emphasises the role of community participation in urban planning.

In her book, "The life and death of American cities", she says:

"Urban areas can provide something for everyone, if they are planned by everyone."

This emphasises that urban areas can only be benefit for the community if

There is public participation in the planning process.

## Advantages of Public participation in Planning

### 1- Increased transparency and accountability

As the community members are involved in the discussion about land use and urban development, there is more transparency in projects.

### 2- Better management of informal settlements

When the public community is involved in planning process their grass-root issues like slums and squatter settlements can be addressed and regularized.

### 3- Fostering Social Inclusion

This also ensure inclusivity as community members from diverse socio-economic and demographic groups participate in decision making.

### 4- Lesser Crime

As the issues of public are

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addressed in public participation. There will be lesser marginalization and feelings of dissent, reducing the crime rate.

## Conclusion

Public participation is a democratic form of planning which will ensure social inclusion and more informed decisions.