18 CEO307T Diaster Mitigation and Management

1. B 2030
2. B New Delhi
3. A Prime minster of India
4. C 59 %
5. C 2005
6. D Focus
7. A typhoon
8. (A) Topple Landslide
9. (D) Storm surge
10. C Surface avalanche
11. (D) 1975
12. (D) Radiological Emergencies
13. (D) Unscientific Mining and extraction of coal past
14. C Biological Disaster
15. (B) Surface fire
16. A social habitation
17. B Post disaster
18. C Early warning system
19. A Land Use
20. A) Physical rehabitation
21. B) Kolkata
22. C Remote sensing
23. A Passive Sensing
24. C InSAR
25. D Pune

26 a Explain national level disaster management institution framework of India with flowchart

Institutional framework for disaster management in India: (6 Marks)

The institutional structure for disaster management in India is hierarchical and functions at four levels – Centre, State, District and Local. The structure draws involvement of various relevant ministries, government departments and administrative bodies.

National Disaster Management Authority (NDMA):

- The Disaster Management ACT, 2005 provides for setting up of a National Disaster Management Authority (NDMA) with the Prime Minister as Chairperson.
- NDMA is to be assisted by a National Executive Committee which comprises of Secretaries to the Government of India heading various Ministries or Departments having administrative control over Agriculture, Atomic Energy, Defence, drinking water supply, environment and forests, finance, health, power, rural development, science and technology, space, telecommunication, urban development and water resources.

State Disaster Management Authority (SDMA):

- The Disaster Management Act 2005 also provides for setting up of Stage Disaster Management Authorities under the Chairpersonship of the Chief Minister.

- State Authority is to be assisted by a State Executive Committee under the Chairpersonship of the Chief Secretary of the State.

District Disaster Management Authority (DDMA):

- The structure of disaster management institutions goes down to the district level where the responsibility is given to DDMA which is headed by the Collector/ District Magistrate with elected representative of the local authority as co-chairperson.
- DDMA will act as the planning, coordinating and implementing body for disaster management at the district

Local Authority:

- For the purpose of disaster management, local authorities would include Panchayati Raj institutions and those agencies which control and manage civic services.
- These bodies are required to ensure capacity building of their employees for managing disasters and carrying out relief and reconstruction activities in the affected areas.

National Institute of Disaster Management (NIDM):

- The institute was formed as National Centre for Disaster Management (NCDM) in 1995 but was re-designated as National Institute of Disaster Management in 2005 after the enacting of the Disaster Management Act.
- The institute is headed by the Union Home Minister and Vice-Chairman, NDMA also acts as the Vice-President of the Institute.

National Disaster Response Force (NDRF):

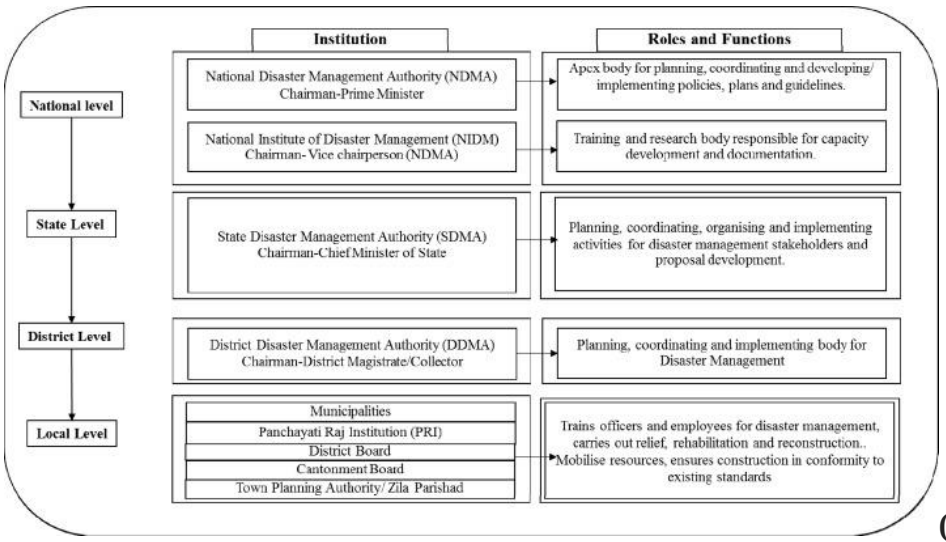
- NDRF was constituted in 2006 with 8 battalions drawn from the paramilitary forces.
- Presently it has strength of 10 battalions. General superintendence of the force vests in NDMA and the force is headed by the Director General of NDRF and Civil Defence.
- These battalions are positioned at different locations to provide timely response to disaster situations and are available to State Governments at the time of need.

Integrated Data Resource Network (IDRN):

- Integrated Data Resource Network is a database in the electronic form maintained by the Ministry of Home Affairs.
- The data enlists inventory of equipment and human resources relevant to disaster management.

National Disaster Management Authority:

The Government of India (GOI), in recognition of the importance of Disaster Management as a national priority, has set up a High-Powered Committee (HPC) in August 1999 and also a nation committee after the Gujarat earthquake, for making recommendations on the preparation of Disaster Management plans and suggestion effective mitigation mechanisms.



(4 Marks)

B Draw and explain disaster management cycle briefly.

(4 marks)

Preparedness: **(6 marks)**

Measures organisation, communities and enabling govt individuals

Response

Measures taken immediately prior to and following disaster impact.

Includes actions taken to save lives, prevent damage to property, and to preserve the environment during emergencies or disasters.

Recovery:

Processbywhichcommunitiesandthenationareassistedinreturningtotheirproperleveloffunctioning.

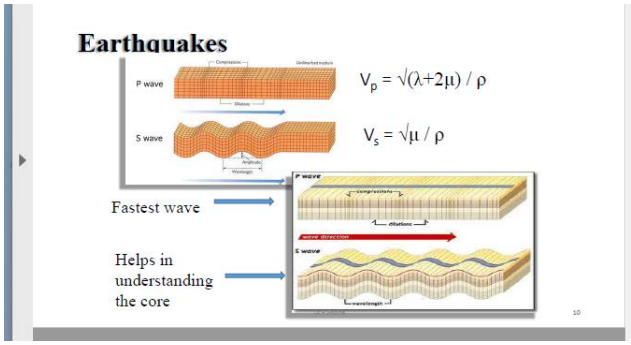
Activities following a disaster

•Ex.Temporary housing, claims

Mitigation: Measures aim reducing the impact of natural or man-made disaster nation or community

27. a **Explain Seismic wave and its types with neat sketch**

Seismic waves are caused by the sudden movement of materials within the Earth, such as slip along a fault during an earthquake.



(4 marks)

Based on the medium they travel in, earthquake waves can be classified under two categories:

Body waves, Surface waves **(6 marks)**

Body waves are those waves that travel through the earth. They originate at the epicenter of the earthquake and travel through the earth at amazing speeds. There are two types of body waves namely,

- P waves, S waves

Surface waves are those waves that travel on the surface of the earth. The destruction caused by earthquakes is primarily done by these waves.

S waves and P waves

S waves also called **secondary waves** and **shear waves,** are the second waves to hit the seismographs. They are transverse waves, which means that the motion is perpendicular to the direction of wave propagation. S waves can only travel through solids and scientists have been successful to map the interior of the earth by studying the routes of these waves.

P waves or **Primary waves** are the first waves to hit the seismographs when an earthquake strikes. They are longitudinal waves which means that the direction of motion and propagation are the same.

b) **Discuss landslide, its classification and mitigation measures briefly**

landslide, also called **landslip**, the movement downslope of a mass of rock, debris, earth, or soil (soil being a mixture of earth and debris). Landslides occur when gravitational and other types of shear stresses within a slope exceed the shear strength (resistance to shearing) of the materials that form the slope. **(2 marks)**

Classification **(4 marks)**

The most common mass-wasting types are falls, rotational and translational slides, flows, and creep. **Falls** are abrupt rock movements that detach from steep slopes or cliffs. Rocks separate along existing natural breaks such as fractures or bedding planes. Movement occurs as free-falling, bouncing, and rolling. Falls are strongly influenced by gravity, mechanical weathering, and water.

Rotational slides commonly show slow movement along a curved rupture surface.

Translational slides often are rapid movements along a plane of distinct weakness between the overlying slide material and the more stable underlying material. Slides can be further

subdivided into rock slides, debris slides, or earth slides depending on the type of the material involved.

Flows are rapidly moving mass-wasting events in which the loose material is typically mixed with abundant water, creating long runouts at the slope base. Flows are commonly separated into **debris flow** (coarse material) and **earth flow** (fine material) depending on the type of material involved and the amount of water. Some of the largest and fastest flows on land are called **sturz stroms**, or long-runout landslides. They are still poorly understood but are known to travel for long distances, even in places without significant atmospheres like the Moon.

Mitigation **(4 marks)**

- Geometric methods, in which the geometry of the hillside is changed (in general the slope);
- Hydrogeological methods, in which an attempt is made to lower the groundwater level or to reduce the water content of the material
- Chemical and mechanical methods, in which attempts are made to increase the shear strength of the unstable mass or to introduce active external forces (e.g. anchors, rock or ground nailing) or passive (e.g. structural wells, piles or reinforced ground) to counteract the destabilizing forces.

28 a) **Explain air pollution and its types along with sources and its effects**

Air pollution is contamination of the indoor or outdoor environment by any chemical, physical or biological agent that modifies the natural characteristics of the atmosphere (2 marks)

Air pollutants may be natural, such as wildfires, or may be synthetic (manmade). Air pollutants are classified as primary pollutants and secondary pollutants.
Primary Pollutants
The pollutants that directly cause air pollution are known as primary pollutants. Sulphur-dioxide emitted from factories is a primary pollutant.

Secondary Pollutants

The pollutants formed by the intermingling and reaction of primary pollutants are known as secondary pollutants. Smog, formed by the intermingling of smoke and fog, is a secondary pollutant. (3 marks)

effects of Air Pollution (5 marks)

The hazardous effects of air pollution on the environment include:

Diseases

Air pollution has resulted in several respiratory disorders and heart diseases among humans. The cases of lung cancer have increased in the last few decades. Children living near polluted areas are more prone to pneumonia and asthma. Many people die every year due to the direct or indirect effects of air pollution.

Global Warming

Due to the emission of greenhouse gases, there is an imbalance in the gaseous composition of the air. This has led to an increase in the temperature of the earth. This increase in earth's temperature is known as global warming. This has resulted in the melting of glaciers and an increase in sea levels. Many areas are submerged underwater.

Acid Rain

The burning of fossil fuels releases harmful gases such as nitrogen oxides and sulphur oxides in the air. The water droplets combine with these pollutants, become acidic and fall as acid rain which damages human, animal and plant life.

Ozone Layer Depletion

The release of chlorofluorocarbons, halons, and hydrochlorofluorocarbons in the atmosphere is the major cause of depletion of the ozone layer. The depleting ozone layer does not prevent the harmful ultraviolet rays coming from the sun and causes skin diseases and eye problems among individuals.

Effect on Animals

The air pollutants suspend in the water bodies and affect aquatic life. Pollution also compels the animals to leave their habitat and shift to a new place. This renders them stray and has also led to the extinction of a large number of animal species.

Air Pollution Control

Following are the measures one should adopt, to control air pollution:

Avoid Using Vehicles

People should avoid using vehicles for shorter distances. Rather, they should prefer public modes of transport to travel from one place to another. This not only prevents pollution, but also conserves energy

b) **Discuss forest fire and its types along with effect and management**.

A forest fire, bushfire, wildland fire or rural fire is an unplanned, uncontrolled and unpredictable fire in an area of combustible vegetation starting in rural and urban areas. Some forest ecosystems in their natural state depend on wildfire. (2 marks)

(2 marks)

The three types of forest fires are crown fire, surface fire and ground fire. Ground fire occurs on land and spreads slowly. Crown fires pose a high risk as they can spread from one tree to another. However, surface fires are usually smaller and cause the least damage.

(2 marks)

- Forest fires can impact the economy as many families and communities depend on the forest for food, fodder and fuel.
- It burns down the small shrubs and grasses, leading to landslides and soil erosion.

- Burning of forests causes smoke and poisonous gas emissions that result in significant health issues in humans.
- Loss of trees can disrupt the climatic conditions and break down the carbon chain.
- Wildfires damage the habitat of animals, causing them to wander in cities. Many die in the fires, unable to escape.
- These fires destroy the vegetation, soil quality and overall flora and fauna.

(4 marks)

Maintaining environmental stability. 2) Conserving the natural heritage of the country. 3) Checking soil erosion and denudation. 4) Checking the extension of sand dunes. 5) Increasing forests and tree cover. 145 6) Meeting the requirements for fuel wood, fodder, minor forest produce, and small timber. 7) Increasing productivity of the forests. 8) Encouraging efficient utilization of the forest produce. 9) Creating a massive people's movement, including involvement of women, for achieving these objectives

29 a **Explain Landuse, objectives, major elements and zoning controls of landuse.**

Land use involves the management and modification of natural environment or wilderness into built environment such as settlements and semi-natural habitats such as arable fields, pastures, and managed woods. (2 marks)

Under stand the relationship between landuse zoning and disasters.

Know how faulty allocations of landuse zoning can help not only in disaster mitigation, but also in disaster relief operations. (4 marks)

Landusepoliciesandplanssetting.outthesocial,economicandenvironmentalgoalsofcomprehensivelanddevelopmentandtheirstagesofdevelopment;

■Landownershipandlandtenurepatternsidentifyingthelegal,socialandeconomicbasisofownershipandtenure

■Landvaluesandprices,reflectingtheforcesofsupplyanddemandforlandand

■Landusecontrolswhichmaybesubdividedintothreebroadcategories,i.e.,legal,fiscalanddirective.

Zoning Controls: (4 marks)

Landuse Macrozoning, Landuse Micro Zoning, Sub division regulations, Sub divisions regulations, building or location permits, open, space controls, building codes.

b) **Explain post disaster stage briefly.**

The state when disaster has already occurred, and the government is involved in rescue activities

Search and Rescue (SAR) – Helpful behaviours in emergencies (5 marks)

Search and rescue is a technical activity rendered by a group of specially trained personnel.

Plan for Rescue – Manpower, Equipment's, methods

Triage and first response – Immediate, Delayed, Minor, Dead

Rehabilitation – Housing and infrastructure Redevelopment, Social Rehabilitation (5 marks)

Programme, Economic Rehabilitation Programme, other related programme and activities

Rehabilitation (Social aspects) – Strengthening/restrengthening of existing health facilities and infrastructure.

Rehabilitation of educational activities within the disaster affected region.

Rehabilitation of Women and children affected by the disaster.

Rehabilitation (Economic aspects)

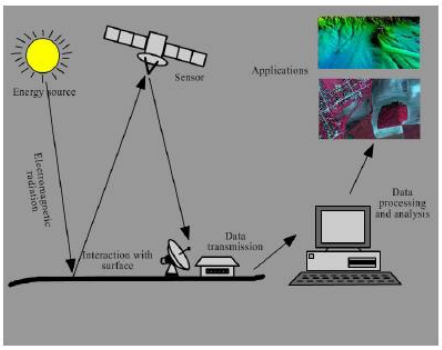
Agricultural habitation of disaster affected area, rehabitation of artisans and marginal businessmen affected due to the disaster.

Rehabilitation of animal husbandry in the area affected due to the disaster.

30 a Write about remote sensing, its elements and its types along with its role in disaster management

Remote sensing is the science of acquiring information about the Earth surface without actually being in contact with it. (2 marks)

Elements – Energy source, Radiation and atmosphere, interaction with the target, Recording of energy by the sensor, Transmission, reception and Processing, Interpretation and analysis Application (4 marks)



Types of sensing (4 marks)

Passive sensing is a collection of energy that is reflected or emitted from the surface of the earth.

Active Sensing system sends the energy towards the object then measure and detect the radiation that is reflected or backscattered from the object.

Flood Studies

Earth observations satellites area so used extensively in the phases of preparedness/Warning and response/monitoring
The use of optical sensor for flood mapping is seriously limited by the extensive cloud cover

Synthetic Aperture Radars(SAR) from ERS and RADARSAT have been proven very useful for mapping flood induation areas, due to the all weather capability.

• Colour composite are generating using SAR data flood and Pre flood SAR images

b) **Explain about industrial safety inspectorate and emergency management system**

Industrial safety encompasses the prevention of a wide variety of industrial hazards, occupational accidents and work-related illnesses in order to create a “zero-risk” environment. While this is a challenging task, effective prevention strategies at the enterprise, national, regional and international levels can eliminate, or at least minimize the occurrence and impacts of industrial hazards. (4 marks)

Emergency Management. (6 marks)

Emergency planning aims to prevent emergencies from occurring, and failing that, initiates an efficient action plan to mitigate the results and effects of any emergencies. The development of emergency plans is a cyclical process, common to many risk management disciplines such as business continuity and security risk management, wherein recognition or identification of risks as well as ranking or evaluation of risks are important to prepare.

Physical Exposure, Chemical exposures, Biological exposure, Psychological exposures

Prevention,

Preventive measures are taken at the domestic and international levels and are designed to provide permanent protection from disasters.

Mitigation strategy,

Disaster mitigation measures are those that eliminate or reduce the impacts and risks of hazards through proactive measures taken before an emergency or disaster occurs.

Preparedness

Preparedness focuses on preparing equipment and procedures for use when a disaster occurs. The equipment and procedures can be used to reduce vulnerability to disaster, to mitigate the impacts of a disaster, or to respond more efficiently in an emergency.